INTELLIGENT BUDGET PLANNER

BY

TAN SENG KIAT

A REPORT

SUBMITTED TO

University Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF COMPUTER SCIENCE (HONS)

Faculty of Information and Communication Technology

(Perak Campus)

MAY 2011

Declaration of Originality

I declare that this report entitle "INTELLIGENT BUDGET PLANNER" is my own work except cited in the references. The report has not been accepted for any degree and is not being submitted concurrently in candidature for any degree or other award.

Signature   :   _____

Name   :   TAN SENG KIAT

Date   :   5 April 2011

Acknowledgement

First of all, I would like to give a special thanks to my final year project supervisor, Miss Yap Seok Gee, for her valuable time in supervising me in this project. With her tolerant and help in guiding me throughout the whole process of development of this system and documentation. She is also the one who is responsible for the approval and the testing for this project. With the advices from Miss Yap, I have successful in making the content of this project more attractive and somehow more perfect.

Miss Yap has also spent much of her precious time and exerts much effort to test my system and gave me many important pointers, guidance and recommendations about this system. With her guidance, I can make this system to be more user friendly and increase this system functionalities.

Finally, I would like to take this opportunity to say "thank you" to all of my friends who had assist me during this final year project. I also want to tanks to my parents and my family for their love, support and continuous encouragement throughout this project. Without your encouragements, I will not able to finish my final year project completely and successfully.

Abstract

This project is called Intelligent Budget Planner. It is a personal budget management system which allows multiple users to access and use this system. Each user will enjoy the features in creating their own income types, expenses categories, expenses types, budget, income records, expenses records (daily or monthly) and bank records. Base on the records that maintained by the users, this system will able to generate report which will contain summarization of each income types, expenses categories, expenses types and budget. The report can be generated in any filtered information according to user's specification.

Besides, this system can generate fixed records automatically if the records are fixed. Basically, this system will check whether the fixed records are generated or not. If they are haven't generated, this system will generate it without interaction with users. Users will save a lot of time with this feature instead of key in the same record every month.

Visual Basic 6.0 is the programming language that used to develop this system. Microsoft SQL Server Compact 3.5 (CE) is the database server model that used and maintains this system database.

TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

IBP	Intelligent Budget Planner
ID	Identity
VB	Visual Basic
IDE	Integrated Development Environment
ISM	Industrial Scientific Medical
IrDA	Infra-red Data Association
PDA	Personal Digital Assistant
LED	Light Emitting diodes
PIN	Personal Identification Number
WLAN	Wireless Local Area Network
IEEE	Institute of Electrical and Electronics Engineers
AP	Access Point
VBA	Visual Basic for Applications
GUI	Graphic User Interface
RDBMS	Relational Database Management System
SID	System Identity
SGA	System Global Area
SQL	Structured Query Language
SDLC	System Development Life Cycle
RAD	Rapid Application Development
XP	Extreme Programming
JAD	Joint Application Development
YNAB	You Need A Budget
PDF	Portable Document Format
SGD	Singapore Dollar
MYR	Malaysian Ringgit

<div align="right">

Chapter 1

</div>

<div align="right">

Introduction

</div>

Contents:

1-1 Introduction

Nowadays, many users failed to plan for their financial especially for the fresh graduate. They most probably end up with debt in their financial; hence this application is developed to solve those problems. This application is called Intelligent Budget Planner (IBP). In this application, it mostly to handle the users' personal budget in controlling their spending, planning for the future use and etc.

The application is a desktop based application. It will be able to allow the users to keep track of their monthly income such as wages, bonuses and subsidies. Users may include the fixed monthly payment for example public utility (electricity, water, telephone and internet fee), loan (mortgage and automobile), insurance, education fee and etc. Besides, users also can include the monthly saving. The application will keep track the users' spending and income and can calculate maximum spending on everyday in order to achieve the personal budget. Those spending can be in food, transport, entertainment and etc.

The application can keep track the users' spending in everyday by letting the users key in their spending everyday to the application. After the application gather the spending information to the application, the application will show the results to the users such as alert the users that they are over budget or the budget in under control.

The application will show the statistical reports such as daily spending, average spending for a month period, grouped data (income or spending) for a month and etc. The users can view those reports in report form or in graph form (chart). In short, by viewing those reports, users can learn how to manage their own personal budget in future.

The application can let the users to choose to precede the same income or fixed spending for the next month. It is a very useful feature if the users remain the same job or same salary, they don't have to redo the key in process for the next month. It can be worked as the fixed expenses such as public utility, loan, insurance and etc. The users also can freely to change the fixed transactions if they wish to do so.

1-2 Problem Statement

In this section, concise descriptions of the issues that need to be addressed before try to solve the problems. In other words, problem statement describes **what is the problem**, **who has the problem** and **what form can the resolution be**. The main purpose of a problem statement is to focus the attention of the problem solving team. There are three main problems currently without this application:-

- ✓ *Fail to control spending*

  There are many people that don't know how to control their daily spending. Since the knowledge in managing financial are limited and it's hard to be learned among the public. Without a good budget planner, they hard to keep track their daily spending and hence can't control it very well.

- ✓ *Without plan, easy over budget*

  This problem is approximately same as the previous problem. It is due to the limited knowledge in controlling the financial. Hence the users will over budget if they don't plan probably.

1-3 Objectives

Objective is a projected state of affairs that a system plans to achieve. This application is created with several objectives for solving the problems as stated above:-

➢ *A systematic application improve users' financing management*
   Users can manage their personal budget more systematic with IBP. All users needed to do are following the application's instructions that are included the income and spending. Later the application will calculate the results such as average spending, maximum spending in month and etc.

➢ *Help to control daily spending*
   After users input the information such as spending to the application, the application will alert if they are over budget for the particular days. It will help users to control themselves in spending.

➢ *Attractive and simple interface application helps users to access easily*
   The application has a simple and attractive interface so that the users can access it easily. It helps a lot for those users which have limited computer knowledge. In short, it is so simple to be used to help the users to manage their personal budget.

1-4 Scope of Work

In this project, the application will be included interrelated features such *as Account Creation, Account Login, Income and Expenses Tracking, Account Maintenance and Reports Generating.* These will cover various aspects from data entry and retrieval from the application. Each of the features will have their own unique data and purposes in order to help managing users' personal budget. Descriptions of the features are as below:-

✓ **Account Creation**

This feature allows users to create several accounts and store in the application's database. It can support several accounts creation so that this application can be used by several users with one personal computer. For example, a father and a mother can use this application if they share the same computer. Different accounts can have different data such as income (salary, bonus or subsidies) and expenses (food, transport, insurance, public utility and etc). With different ID, the users can identify their own account when they want to access the application.

✓ **Account Login**

Each account can has its own ID and password. With the log in feature, users can only access the application with one account at one time. It is because to prevent data or information such as income and expenses to be stolen by unauthorized person. This also can help the users to prevent to be confusing in accessing their accounts.

✓ **Income and Expenses Tracking**

It allows users to enter and store the income and expenses such as food, transport and etc to the application. The application can generate the same fixed income (salary, bonus and etc) and expenses (public utility, loan, insurance and etc) automatically. Users will get tired if they have to redo the key in process for those same transactions in the application. The application will generate or should be copy the fixed income and expenses from the previous month budget to the next month budget. However, users are free to change the amount of those fixed transactions.

The application also will shows to the users that how much they enter for the particular spending and those information will be stored in the database. Users may freely to see their past daily spending in the application.

✓ **Account Maintenance**

This feature allows users to modify their personal, income and expenses information. For personal maintenance, users can modify their personal information such as password, secret question, secret answer and etc. For income and expenses maintenance, users can modify their income type, expenses type and etc. Any changes will affect this system and hence the reports will also be affected.

✓ **Reports Generating**

This feature is designed to show the reports by retrieve the data (income and expenses) from the database in order to show to the users that would like to be aware to their personal budget status. It is programmed to generate various types of reports according to users' selection. The selection can be kind of report that the users wish to view, what parameter they want such as the period of a particular time, the expenses or income type (food, transport, subsidy and etc). Those records (income and expenses) in the database application are for users to generate detailed, exception or summary reports which are useful and vital for decision-making.

1-5 Target Users

This application is create for public use. Since everyone needs to plan for their personal budget, hence this application is very useful. The application has a few groups of target users that are fresh graduate, middle age and businessman.

First group of target user will be the fresh graduate. Most of them are lack of information and experience in managing their personal budget; hence this application is created to help them to solve these problems. Besides, since they are new to the society, they may have not stable salary or low salary. Some of them also can't find a job due to their lack of experiences. In the end most of them will easily overspending if they didn't plan their budget.

The next target users will be the group of middle age. Those people are really needed to plan their personal budget. It is because most of the people in this group may have their own obligation such as marriage, children, parents, loan and insurance. If they don't have a good budget planner to keep track their spending, they are hard to plan for their future.

Businessman will be another group of target user for this application. Those businessmen are busy with their business and earning profit. Since their cash flow are very fast and hard to keep track if they don't have a good budget planner. Since they can earn and spend quite frequently, without budget planner they may face quite a lot of financial problem.

<div align="right">

Chapter 2

</div>

<div align="right">

Literature Review

</div>

Contents:

2-1 Technology Involved

Programming Language

In the development of the system, which programming language choose to be used is an important issue. Since the system is having connection to the database and considered as system-application, there are several of programming languages available, for example, *Visual Basic*, *Java*, *C#* and so on.

Visual Basic
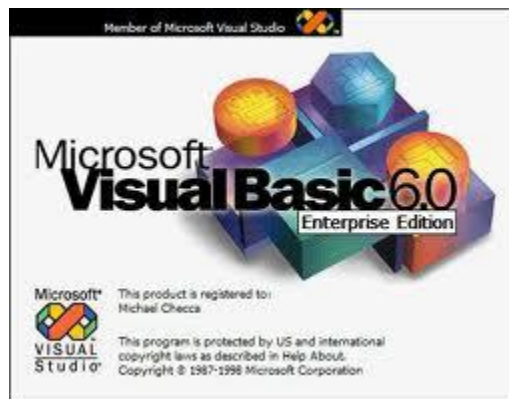
Figure 2-1-1 Visual Basic Logo

Visual Basic (VB) is the third-generation event-driven programming language and integrated development environment (IDE) from Microsoft for its COM programming model. Visual Basic is relatively easy to learn and use.

VB 1.0 was introduced in 1991. The drag and drop design for creating the user interface is derived from a prototype form generator developed by Alan Cooper and his company called *Tripod*. Microsoft contracted with Cooper and his associates to develop Tripod into a programmable form system for Windows 3.0, under the code name *Ruby*.

After some time, Microsoft decided to combine Ruby with the Basic language to create Visual Basic. The Ruby interface generator provided the "visual" part of Visual Basic and this was combined with the "EB" Embedded BASIC engine designed for Microsoft's abandoned "Omega" database system.

Advantages

1. VB provides a comprehensive interactive and context-sensitive online help system.
2. VB is not only a language but primarily an integrated, interactive development environment ("IDE").
3. The structure of the Basic programming language is very simple, particulary as to the executable code.

Disadvantages

1. The Applications which are developed in VB are working only on Windows Operating systems only.
2. Required more memory space to install and work in VB as VB is GUI based development tool. It contains Graphical components that need more space.

Overall, Visual Basic provides simple and useful programming tools but required more memory to support it.

Java

Figure 2-1-2 Java Programming Logo

Java is a programming language originally developed by James Gosling at Sun Microsystems (which is now a subsidiary of Oracle Corporation) and released in 1995 as a core component of Sun Microsystems' Java platform. The language derives much of its syntax from C and C++ but has a simpler object model and fewer low-level facilities.

Java is a general-purpose, concurrent, class-based, object-oriented language that is specifically designed to have as few implementation dependencies as possible.

Advantages

1. Java is an open source, so users do not have to struggle with heavy license fees each year.
2. Java's platform is independent.
3. Java perform supports garbage collection, so memory management is automatic.

Disadvantages

1. Java can be perceived as significantly slower and more memory-consuming than natively complied languages such as C or C++.
2. The default look and feel of GUI application written in Java using the Swing toolkit is very different from native applications. It is possible to specify a different look and feel through the pluggable look and feel system of Swing.

Overall, Java's GUI is not as good as Visual Basic but it still provide a good performance.

Database Type

Every system required a powerful database. IBP, as a budget planner, is required a powerful and complete database since it store the financial information. From the research, there are three common databases that have been used for most system. These three databases are *Microsoft Office Access, Oracle Database* and *Microsoft SQL Server Compact.*

Microsoft Office Access

Figure 2-1-3 Microsoft Office Access Logo

Microsoft Office Access is a pseudo-relational database management system from Microsoft that combines the relational Microsoft Jet Database Engine with a graphical user interface and software development tools.

Microsoft Access is used to create simple database solutions. Access tables support a variety of standard field types, indices and referential integrity. Access also includes a query interface, forms to display and enter data, and reports for printing.

Users can create tables, queries, forms and reports and connect them together with macros. Advanced users can use VBA (Visual Basic for Applications) to write rich solutions with advanced data manipulation and user control.

Microsoft Access is a file server-based database. Unlike client-server relational database management systems, Microsoft Access does not implement database triggers, stored procedures, or transaction logging.

Advantages

1.   It supports flexibility. It created basic templates that a user can go and use immediately.

2.   It is made for sharing and manipulating information through collaboration on the web quickly. With Windows Sharepoint Services, several users can move their Access files to Windows Sharepoint Services so coworkers can update, edit or work with those files, provided they have been granted permissions by the person who uploaded the files to Windows Sharepoint Services.

3.   Forms, reports are easily to be created. With simple GUI (Graphic User Interface), users can use the Access to manage their database without the knowledge of database programming.

Disadvantages

1.   It is quite expensive. The users need to purchase it in order to use it.

2.   It is not as powerful as other databases. It is because it use simple command and interface, hence it hard to build a strong database.

3.   Its file sizes will increase dramatically if graphics are included. Thus, it will increase the cost in management.

Overall, Microsoft Office Access is a simple and easy to be used database. However due to the limitation, it hard to support a powerful system since it can't support much features.

Oracle Database

Figure 2-1-4 Oracle/Sun Microsystems Logo

The Oracle Database is commonly referred to as Oracle RDBMS (relational database management system) or simply as Oracle. It is produced and marketed by Oracle Corporation.

An Oracle database system is identified by an alphanumeric system identifier or SID (system identity) that comprises at least one instance of the application, along with data storage.

Users of the Oracle databases refer to the server-side memory-structure as the SGA (System Global Area). The SGA typically holds cache information such as data-buffers, SQL (Structured Query Language) commands, and user information.

Advantages

1. The oracle company keeps upgrading and releasing new products into market, new version releases which serves better than the earlier version and thus the performance is improved much in later versions.

2. Oracle is a database that responds very well with excellent performance in demanding environments.

3. Oracle is not a platform dependency. It supports both Windows and Linux operating system and hence all the users can use it.

Disadvantages

1. It does costly. If the users wish to have oracle as their systems' databases, they have to consider the cost of oracle.
2. It will take longer to learn oracle database programming for the developers. Since it is not as simple as Microsoft Office Access or Microsoft SQL Server, the developers will face the problem in learn to use it and hence the time cost will greatly increase.
3. Do not support GUI. Users may have problems in using it.

As a conclusion, the Oracle Database can be considered as a powerful database. However due to its high cost and complexity, many developers prefer other databases instead of Oracle Database

Microsoft SQL Server Compact

Figure 2-1-5 Microsoft SQL Server Logo

Microsoft SQL Server Compact (SQL CE) is a compact relational database produced by Microsoft for applications that run on mobile devices and desktops. Prior to the introduction of the desktop platform, it was known as SQL Server for Windows CE and SQL Server Mobile Edition.

SQL Server Compact shares a common API with the other Microsoft SQL Server editions. It also includes ADO.NET providers for data access using ADO.NET APIs, and built-in synchronization capabilities, as well as support for LINQ and Entity Framework.

SQL CE databases reside in a single .sdf file, which can be up to 4 GB in size. The .sdf file can be encrypted with 128-bit encryption for data security. SQL CE runtime mediates concurrent multi-user access to the .sdf file.

Advantages

1. Support large memory addressing.

2. Have the same application code.

3. Improved bus architecture and cache.

Disadvantages

1. It is easy to view table relationships, constraints, indexes, stored procedure in database but triggers are difficult to view.

2. Triggers execute invisible to client-application application. They are not visible or can be traced in debugging code.

Overall, Microsoft SQL Server Compact has more pros than cons. Thus, the developer of IBP had chosen Microsoft SQL Server Compact as the database of the system.

2-2 Methodology Method

Methodology is a set of general principles that guide a manager to choose a particular method suited to a project. It is also considered as a formalized approach or a list of steps and deliverables to implement the SDLC (System Development Life Cycle).

Besides, methodology is a kind of process that focus on business process or data that support the business. The sequence of steps and amount of time and effort devoted to each step.

There are three main categories of methodologies:-

1. Structured design

    a. Waterfall development

    b. Parallel development

2. Rapid Application development (RAD)

    a. Phased development

    b. Prototyping/Throw-away prototyping development

3. Agile Development

    a. Extreme programming (XP)

Structured design

It is the first category of systems development methodology. This methodology adopts a formal step-by-step approach to the SDLC that moves logically from one phase to the next. The main purpose of this methodology is to replace the ad hoc and undisciplined approaches. It has to move the process logically from one to the next step. In other words, every step has to finish before the next one begins.

Waterfall Development
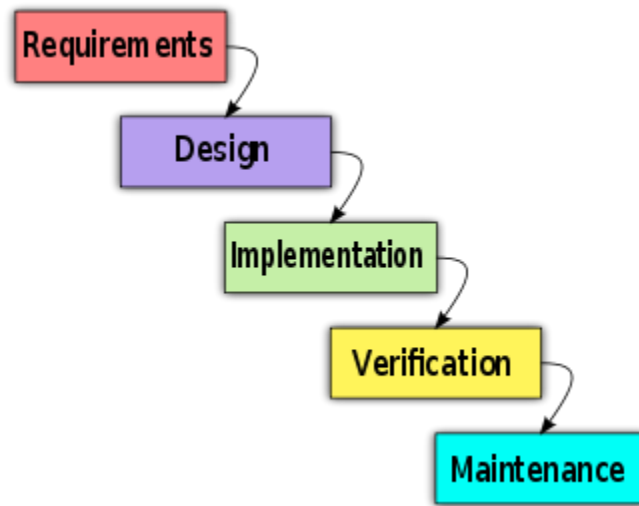
Figure 2-2-1 Main phase of Waterfall Development

Waterfall development is a process in sequence. Projects move methodically from one to the next step. The key deliverables for each phase are very long. Every time the phase is done, it needed to present to project sponsor for making approval. Once the sponsor approves, the phase only can be ended and the next phase begins. It is possible to go backward (back to previous phase) but extremely difficult.

Pros and Cons of the Waterfall Development

Pros	Cons
Identifies systems requirements long before programming begins.	Design must be specified on paper before programming begins.
Minimizes changes to the requirements as the project proceeds.	Long time between system proposal and delivery of new system.

Table 2-2-1 Advantages and Disadvantages of Waterfall Development

Parallel Development
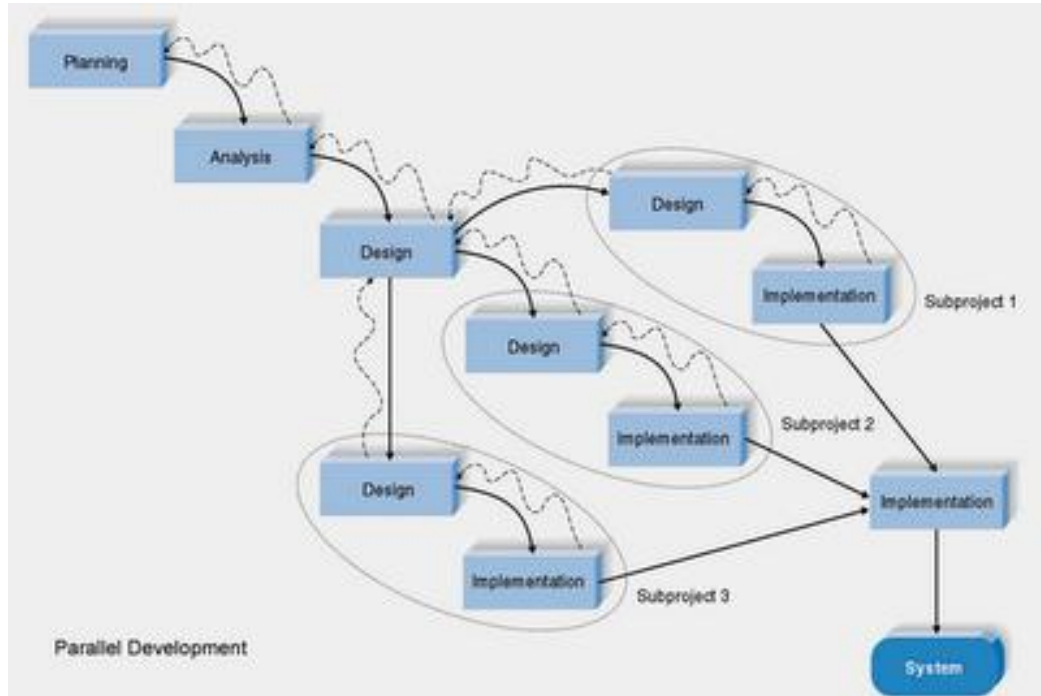
Figure 2-2-2 Main phase of Parallel Development

Parallel Development is created to address the problem of long delays between analysis phase and delivery system in waterfall development. In this methodology, the general design will be created first for the whole system. Then the project will be divided into a series of distinct subprojects. After that a final integration of the separate pieces and the system is delivered. All subprojects can be designed and implemented in parallel. Once all subprojects are completed, a final integration of separate pieces and system delivered.

Pros and Cons of the Parallel Development

Pros	Cons
Reduce schedule time.	Problems caused by paper documents.
Less chance of changes.	Subprojects not completely independent, may affect another.

Table 2-2-2 Advantages and Disadvantages of Parallel Development

Rapid Application Development (RAD)

RAD is an adjust SDLC phase to get some part of system developed quickly to users. Users can understand the system and bring closer to what is needed.

Phased Development
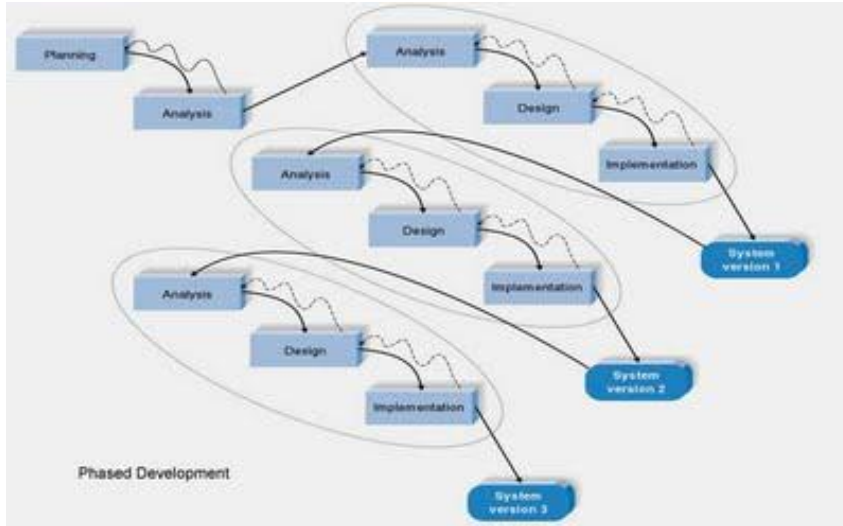
Figure 2-2-3 Main phase of Phased Development

Phased development is a process to break the overall system into a series of versions that are developed sequentially. After that, it analysis phase identifies the overall system concept and then it categories the requirements into a series of versions. However, the 1st version of the phased development is the most important and most of the fundamental requirements are bundled into it. The process will begin to work on version 2 once version 1 is implemented. The additional analysis performed based on previous requirement and combined with new ideas.

Pros and Cons of the Phased Development

Pros	Cons
Quickly getting a useful system to users.	Users begin to work with systems that are
Provide business value sooner.	intentionally incomplete.

Table 2-2-3 Advantages and Disadvantages of Phased Development

Prototyping
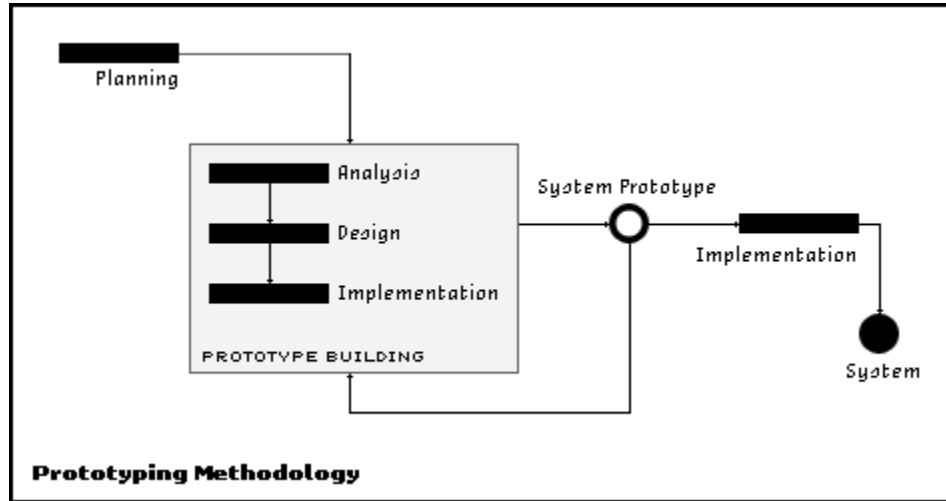
Figure 2-2-4 Main phase of Prototype Development

A prototyping-based methodology performs the analysis, design and implementation phases concurrently, and all three phases are performed repeatedly in a cycle until the system is completed. The basic of analysis and design are performed, and work immediately begins on a system prototype, a "quick-and-dirt" program that provides a minimal amount of features. The incomplete version of the software program to allow users to evaluate proposals by actually trying them out, rather than having to interpret and evaluate the design based on descriptions. With users' feedback, the three phases will be repeated a cycle until system is completed.

Pros and Cons of the Prototyping

Pros	Cons
More quickly provide a system to user	Fast-paced system releases challenge attempts to conduct careful, methodical analysis.
Reassures user working on system	
Quickly refine real requirement	Initial design decisions become poor.

Table 2-2-4 Advantages and Disadvantages of Prototype Development

Agile Development

Agile development is a kind of programming-centric methodologies. It will eliminate much of modeling and documentation so that can reduce the time spends. It is also to emphasis on simple, iterative application development.

Extreme Programming (XP)
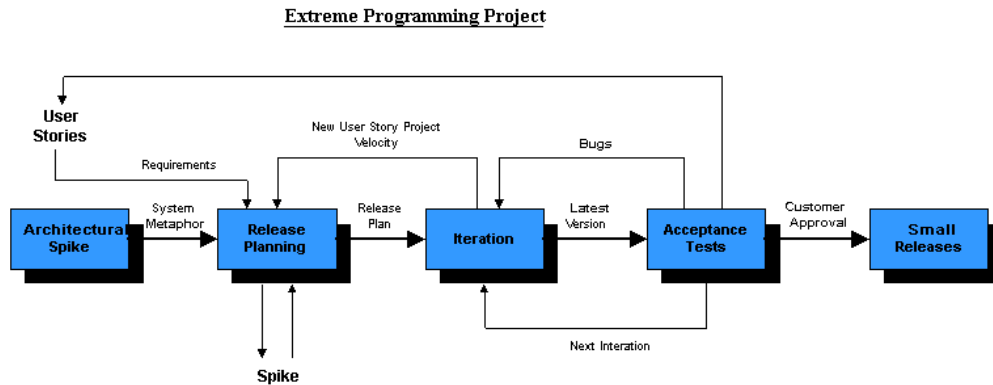
Figure 2-2-5 Main phase of Extreme Programming

XP can build system very quickly. It is more realistic and better approach than attempting to define all requirements at the beginning of a project and then expending effort to control changes to the requirements. After planning, project performs simple analysis, design and implementation phases iteratively.

XP projects deliver result sooner than even the RAD approaches. XP is more suitable for small projects that recommended for small groups of developers that no more than 10 developers. Maintenance of large system built with XP impossible due to lack of analysis and design documentation.

Pros and Cons of the Extreme Programming

Pros	Cons
Suitable for small project with highly motivated and experienced teams	Not suitable for large mission/critical systems.
Save time	

Table 2-2-5 Advantages and Disadvantages of Extreme Programming

2-3 Fact Finding

Requirements-gathering is a process to build political support for the project and establish trust and rapport between the project team building the system and the users who ultimately will choose to use or not use the system. It is very important to involve someone in the process implies that the project team view that person as an important resource and value his or her opinions. Those people who involve in the requirement-gathering are called stakeholders. The stakeholders are the people who can affect the system or who will be affected by the system. The stakeholders might include managers, employees, staff members, and even some customers and suppliers. If a key person is not involved, that individual may feel slighted, which can cause problems during implementation. There are 3 commonly used techniques: interview, JAD sessions, and questionnaires.

Interview

An interview is the most commonly used requirements-gathering technique. In general, interviews are conducted one-on-one (one interviewer and one interviewee), but sometimes, due to time constraints, several people are interviewed at the same time.

Advantages

The advantages of using interview to gather requirement are:-

- Enable system developers to learn about things that cannot be directly observed.
- Add an inner perspective to outward behaviours.
- Increase accuracy of response
- Enable modification to lines of inquiry

Disadvantages

However, interview also has its disadvantages:-

- It is very time consuming.

- Usually the sample size is small.

- It is very expensive.

- The quality of information obtained is largely dependent upon the interviewer.

Joint Application Development (JAD)

JAD is an information-gathering technique that allows the project team, users and management to work together to identify requirements for the system. The JAD group meets for several hours, several days or several weeks until all the issues have been discussed and the needed information is collected. Most JAD sessions take place in a specially prepared meeting room, away from the participants' offices so that they are not interrupted. The meeting room is usually arranged in a U-shape so that all participants can easily see each other.

Advantages

The advantages of using JAD session to gather requirement are:-

- It allows key users to participate effectively in the requirements modelling process.
- It results in a more accurate statement of system requirements.
- It allows a stronger commitment to the success of the new system.

Disadvantages

However, JAD session also has its disadvantages:-

- It is costly.
- It opens up a lot of scope for inter-personal conflict.
- It is time consuming.

Questionnaire

A questionnaire is a set of written questions used to obtain information from individuals. Questionnaire usually used when there are a large number of people from whom information and opinions are needed. It is a common technique with systems intended for use outside the organization or for systems with business users spread across many geographic locations. Nowadays questionnaire not only a technique with distributing some questions papers to public to get the information, but it is also can be done in electronic form, either via e-mail or on the Web. Electronic distribution can save a significant amount of money as compared to distributing paper questionnaires.

Advantages

There are a few advantages of questionnaire:-

- It is relatively quick to collect information.
- Potentially information can be collected from a large portion of a group of users.
- Responses are gathered in a standardized way, so questionnaires are more objective than interviews.

Disadvantages

Every technique has its own pros and cons. The disadvantages of questionnaire are:-

- It is standardized so it is not possible to explain any points in the questions that participants might misinterpret.
- Open-ended questions can generate large amounts of data that can take a long time to process and analyze.
- So users may not be willing to answer the questions.

2-4 Comparison Existing Budget Planning System

2-4-1 Product 1: You Need A Budget (YNAB)

Overview

This is a system that can help the users to create a budget for their own. YNAB teaches users on money management practices with four YNAB important rules, based on spending income already earned to avoid overdrawn accounts and personal budget deficits.

Features

1. User can live paycheck to paycheck

   Users need to record all the income no matter primary job or other available income. Then users need to key in the spending will be done in the particular month. Hence the users will live paycheck to paycheck because they can spend the money in the month that they earn it. As the users work through the system, eventually they can gather the remainder (where the income minus spending) to be carried to the next month. The remainder is called the budget buffer, hence the system has the effect to take the users off living paycheck to paycheck.

2. Every dollar will has their job

   In the system, it has been assigned every single dollar to a category. It means the users can divide those spending into several categories. It helps users to make decisions actively, rather than letting things happen.

3. Every money can be save for emergency

   In the system, it also will help the users to create various savings funds whether they are for emergencies, annual taxes, holiday spending, etc. This fits in line with the zero-based budgeting because those spending already are parts of the entries in the budget.

4. Force to reduce users' budget if overspend

   The great feature of YNAB that most of the other packages don't have that of the feature. Users will curious how the system works if the users go over their budget. Most of the other packages will warn the users by telling the users not to do it next time or probably do nothing about it. YNAB will deduct it from next month's available funds. It is a very good feature so that to ensure the budget will not be affected by the particular month because of over budget.

5. Every report can be exported

   In the report pane, all the data can be exported into Microsoft excel format. It can let the other users to view the budget on what they spend, their income etc. if they don't have the software. If the users wish to print the result of the budget, the software will offer the users to save the data into PDF file. Hence users can upload the result easily due to the PDF file with smaller file size.

Disadvantages

1. YNAB system is paid software

   It is needed to be paid quite high amount of fees in order to purchase this software. As we know, who doesn't want a freeware? It is really the more you pay, the more output you get? Before the revolution of Google, there are many companies charge for their product/software. However after the Google change their earning by advertising instead of charging the users, many users will get used to get a freeware. Since YNAB still insist of charging the users for the software, hence there will be fewer users to purchase the product.

2. Unable to control in multicurrency

    The system need to select the currency type before you create a new budget. It is not good for the users who have more than one currency in their hands. For example, a Singaporean has SGD and MYR in his hands. When he travels to Malaysia, he will spend the money with MYR but not SGD. It will let the users to confuse that whether what currency he should choose in the budget.

3. Unable to get advise

    The system will only let the user to know whether they have been over budget or not. However, most of the users will not care too much if they purposely over budget. If the system can tells the users what will happen if they over budget, maybe the users will try to control themselves in order to achieve back to the budget plan.

As a conclusion, YNAB really is a nice system that really helps the users a lot in planning their budget. It not only provides the features such as key-in the income and spending, let the users to control the budget freely, it also can shows all the reports that the users' average spending and income. However, every system also has its cons: users have to manually key in the data by keyboard. The users will get bored easily and will become lazy if they have to do so in the next month. Next, it also cannot support multicurrency, users have to calculate the currency rate themselves if they wish to use other currency for spending or income. In short, YNAB most probably is a basic budget system but doesn't give any advice to the users.

Screenshots

First, select the currency and date format.

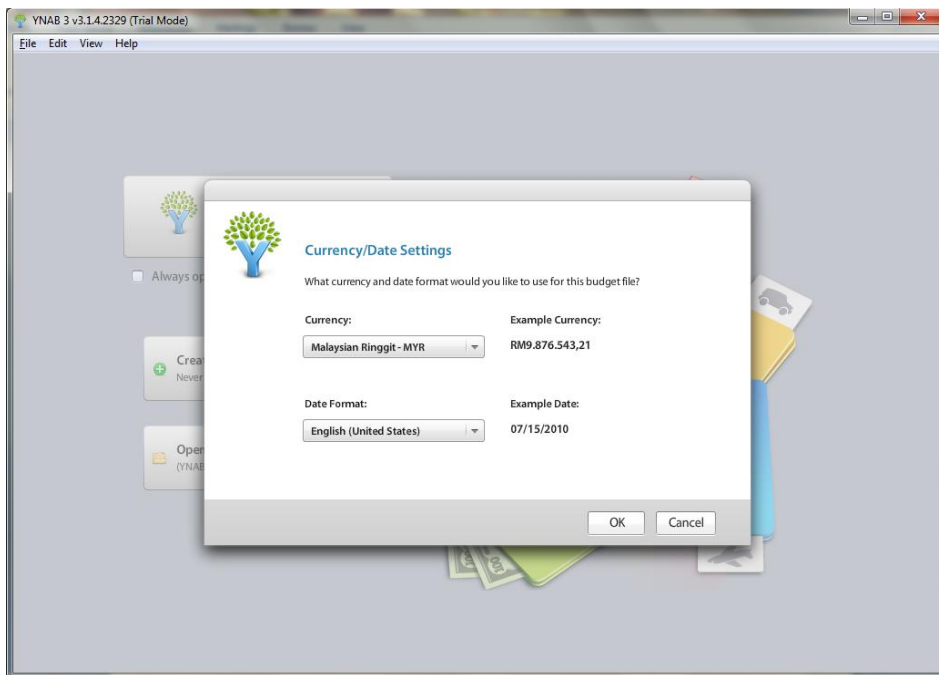Figure 2-4-1-1 Dates and Currency Selection

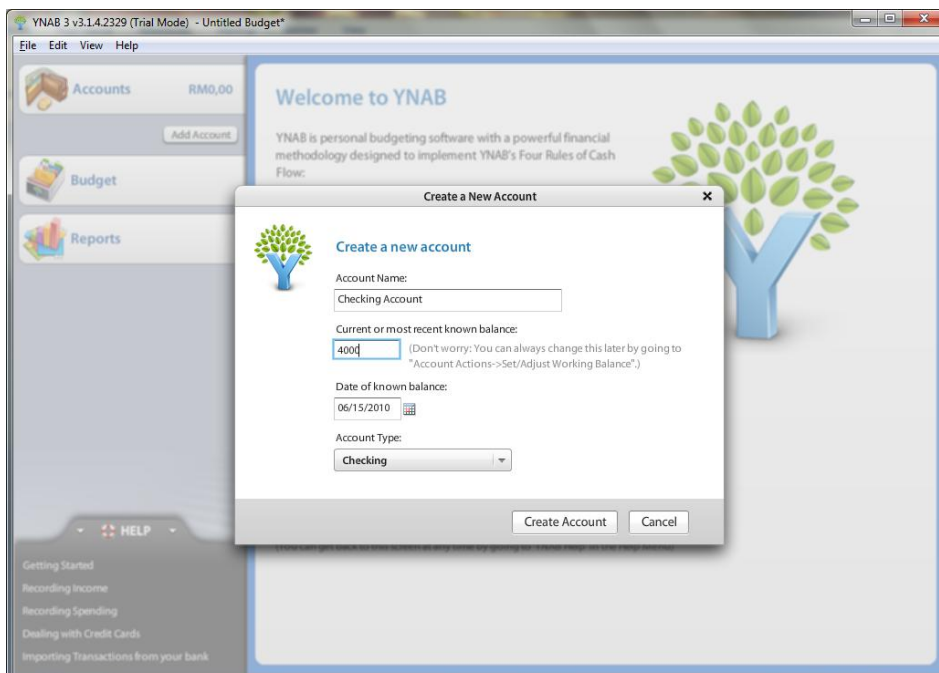Next create a new account.

Figure 2-4-1-2 Account Creation

Transaction on the account can be added or modified
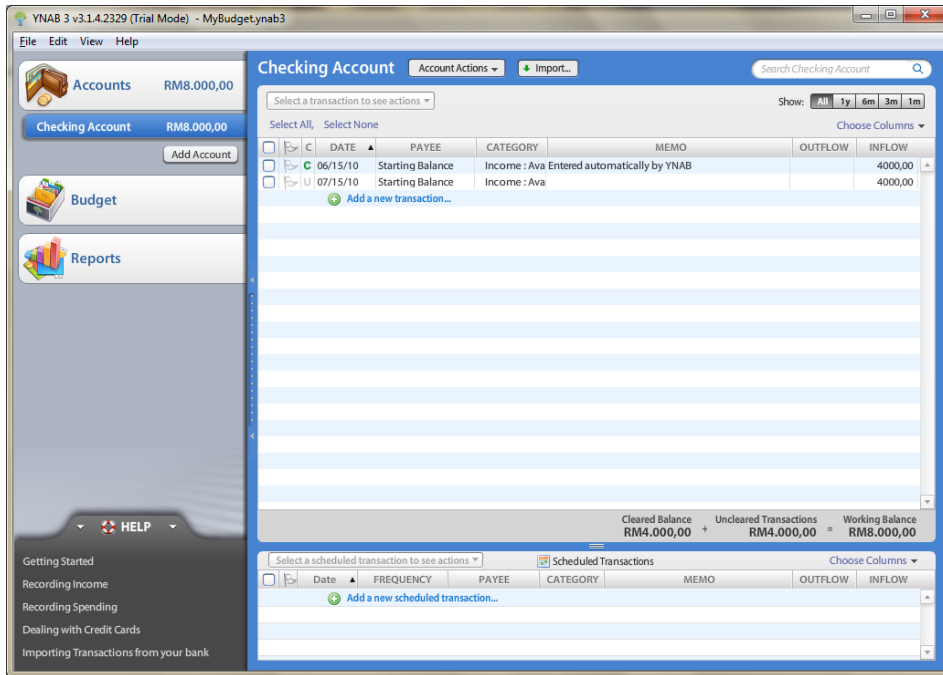

Figure 2-4-1-3 Account Screen Layout

Expenses Item can be added with a calculator
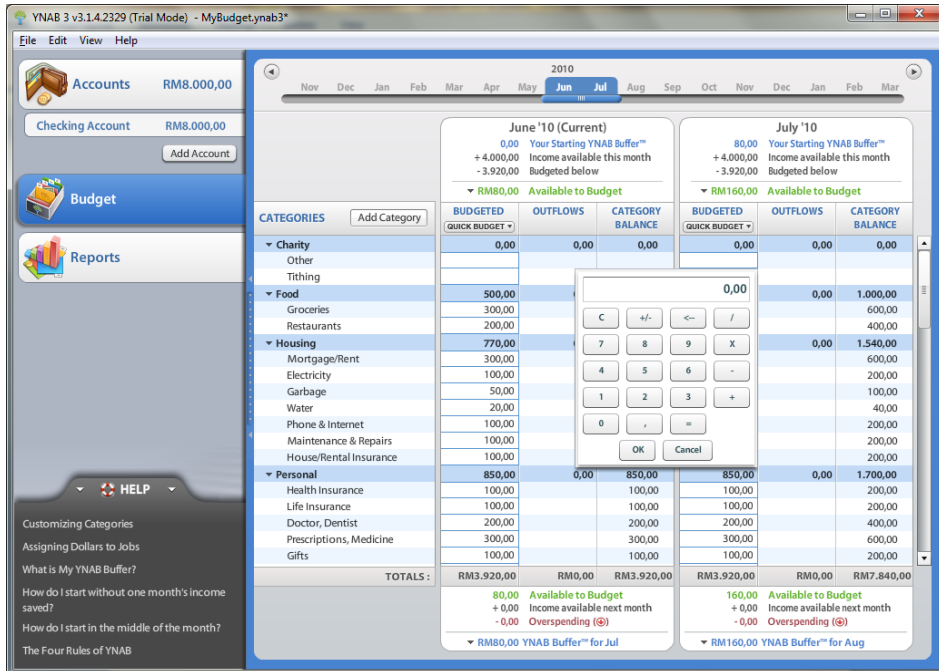

Figure 2-4-1-4 Budget Screen Layout with keypad

Key-in the entire budget
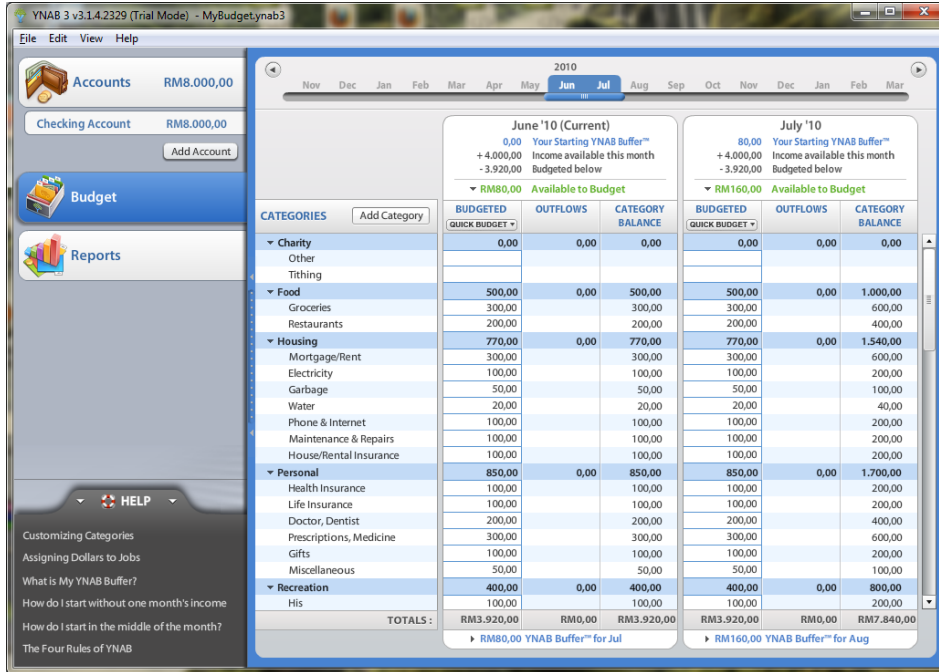
Figure 2-4-1-5 Budget Screen Layout

Show report.
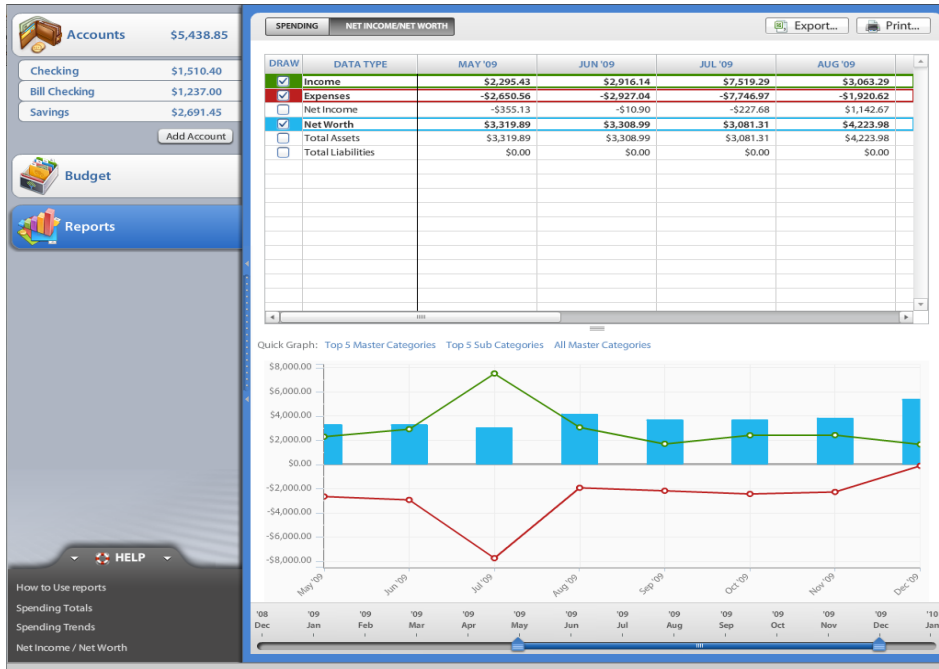
Figure 2-4-1-6 Report Screen Layout

2-4-2 Product 2: My Budget Keeper

Overview

My Budget Keeper will help the users to set a budget and track their expenses in order to put them on the path to financial health and stability. This system can be used both as a personal expense tracker and family budgeting tool.

This system has four important modules that are *Income*, *Expenses*, *Persons* and *Reports.* The Incomes panel is to show family finances and available funds. Users can indicate sources and amount of the incoming money.

The Expenses panel shows all purchases made and payments done by different family members within a specified time period. The panel allows user to make a comment for each expense, for example what kind of purchase was made, whether credit card was used or the expense was individual or the entire family.

The Persons panel is used to enter different family members. While the last panel, Reports Panel is the core and the essence of the program. This system offers four basic reports with graphs available. Those reports will show detailed breakthrough of the users' spending habits, or probably showing where most of the money goes to.

Features

1. Track all family expenses and incomes.

   Everyday food shopping and transport expenses day by day weaken users' budget and as a result users will waste their money inexpediently. The right way to control and collect an amount of budget is keeping money by keep track all the family expenses and incomes.

2. Personal expense tracker

   This system is intended for using in family, so its interface is simple and clear. Moreover, users can employ this tool as a personal expense tracker.

3. Totally control all the expenses

   This system shows to the users all available funds and finances inside family and lets the users to control all incomes. It indicates amount of the incoming money and the source from which it came so that the users can control incoming money deposited by each member of the family.

4. Plan the budget effectively

   This system can let the users plan their budget effectively. Income and expenses with planned will help the users to keep their budget in balance.

   This system also can use several currencies for money calculations. It is perfectly suits for the countries where another foreign currency is used in addition to the national currency. Adding currencies is easy in My Budget Keeper.

5. Detailed statistics of all the budget expenses/incomes

   This system can show the users detailed statistics of all their budget expenses/incomes and the persons who held them. All statistics may be shown for a specified time period in a convenient and clear form, reports with graphs available.

Disadvantages

1. Unable to get advise

   My Budget Keeper has the same disadvantages with YNAB. The advice part is a really important for the users who really don't have the knowledge on how to control their own finance. It only can show to the users that they are in over budget but not to guide users to prevent over budget.

2. A freeware chasing world

   Now, most of the software is freeware. It is because most of the software/system for the particular companies earns their profit by advertising, not charging their product to the users. However, My Budget Keeper is charging users for some fees in order to purchase it. Hence this will greatly reduce the number of users from get this product.

My Budget Keeper is a basic budget system. It has a very simple user interface and hence users can control or manage this system easily. As the same with other budget system, users need to key in the data (income and spending) manually to this system by keyboard. However, it is a paid system. Users need to pay in order to get this system. Hence it is not a popular budget system compare with other freeware. As a conclusion, it is easy to use but it provides quite limited features.

Screenshots

The home menu
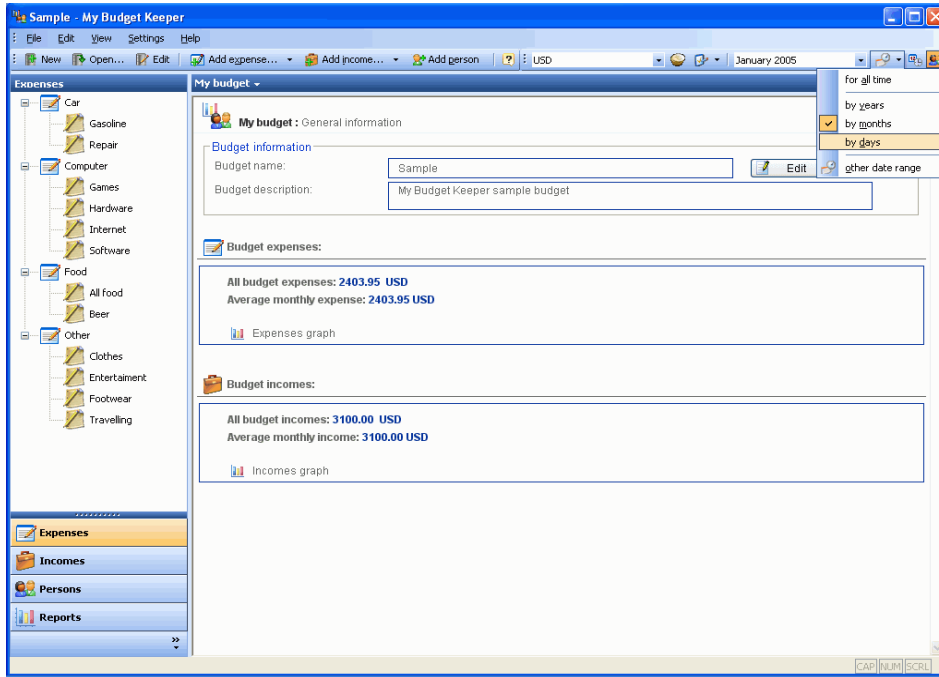
Figure 2-4-2-1 Home Screen Layout

User can key in the detail for their budget.
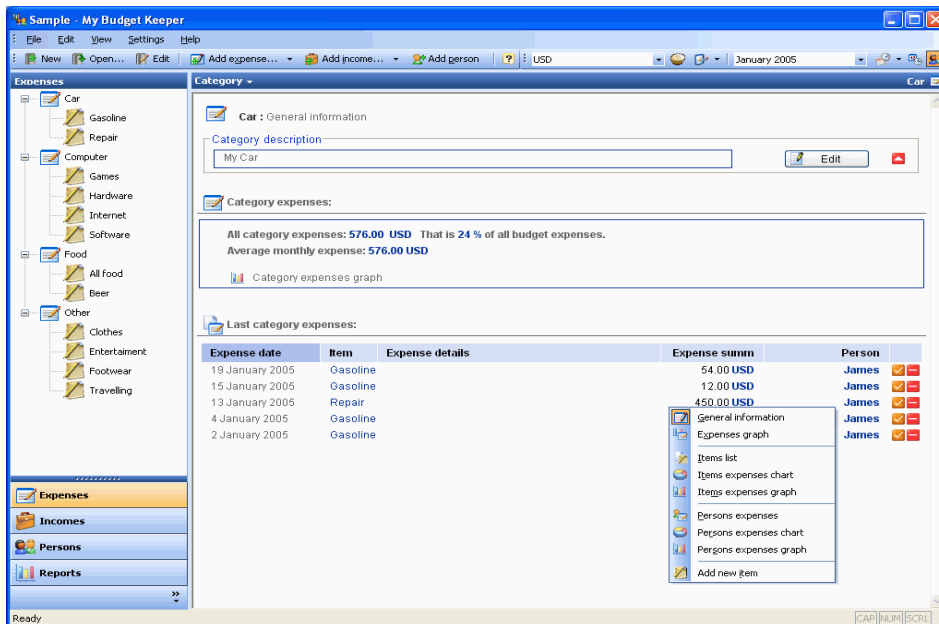
Figure 2-4-2-2 Transaction Screen Layout

Expense Item can be added by the "Add expenses" dialog with a calculator.

Figure 2-4-2-3 Transaction Screen Layout with keypad

Users can view report in chart view.
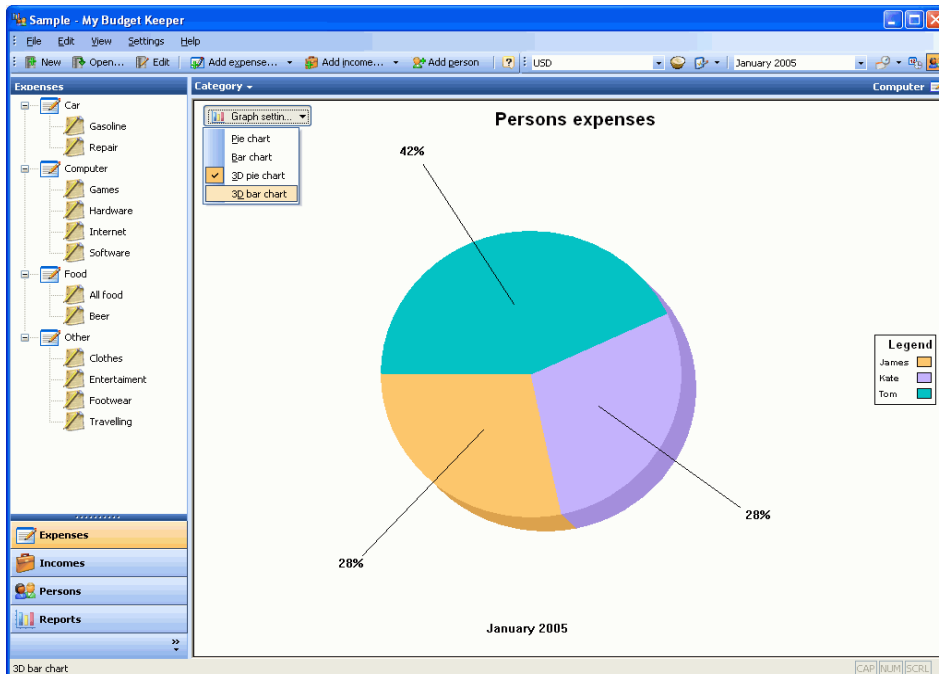
Figure 2-4-2-4 Report Screen Layout with Pie Chart

My Budget Keeper report pane.
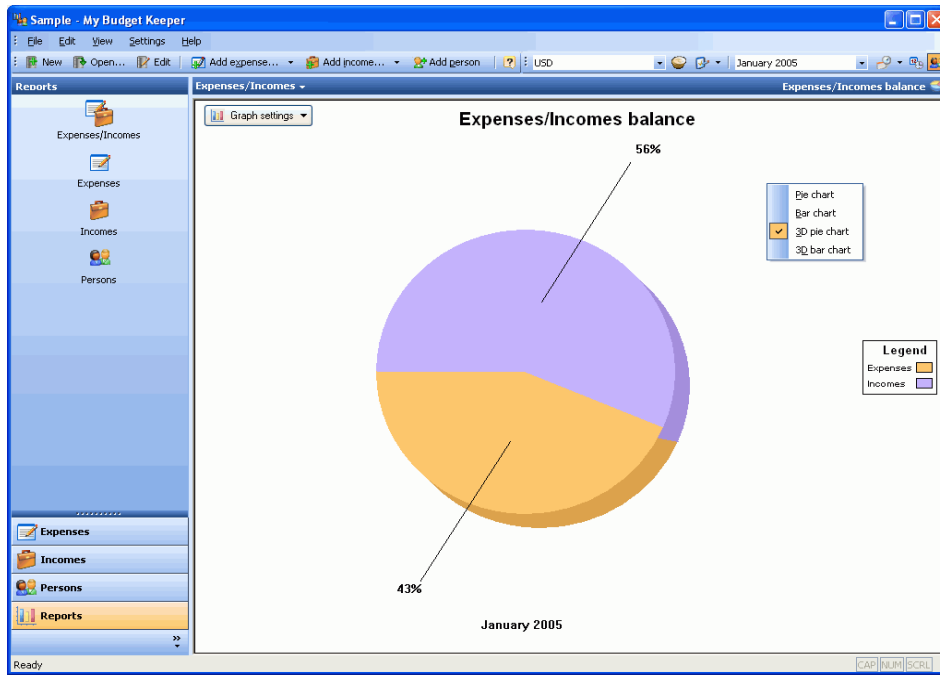
Figure 2-4-2-5 Report Screen Layout

My Budget Keeper Currency Manager.
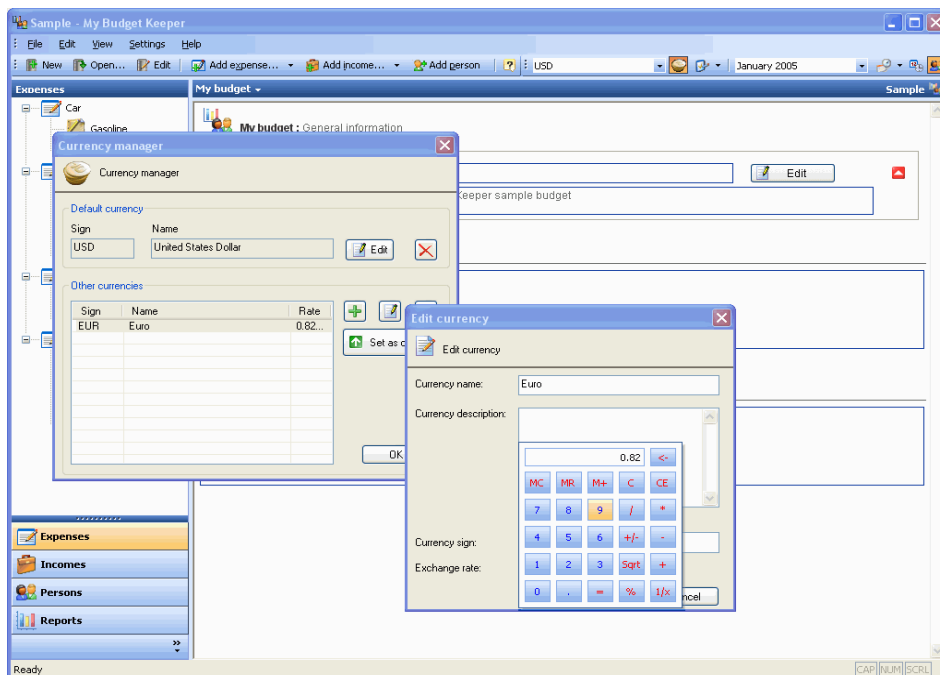
Figure 2-4-2-6 Currency Manager Screen Layout

2-4-3 Summary

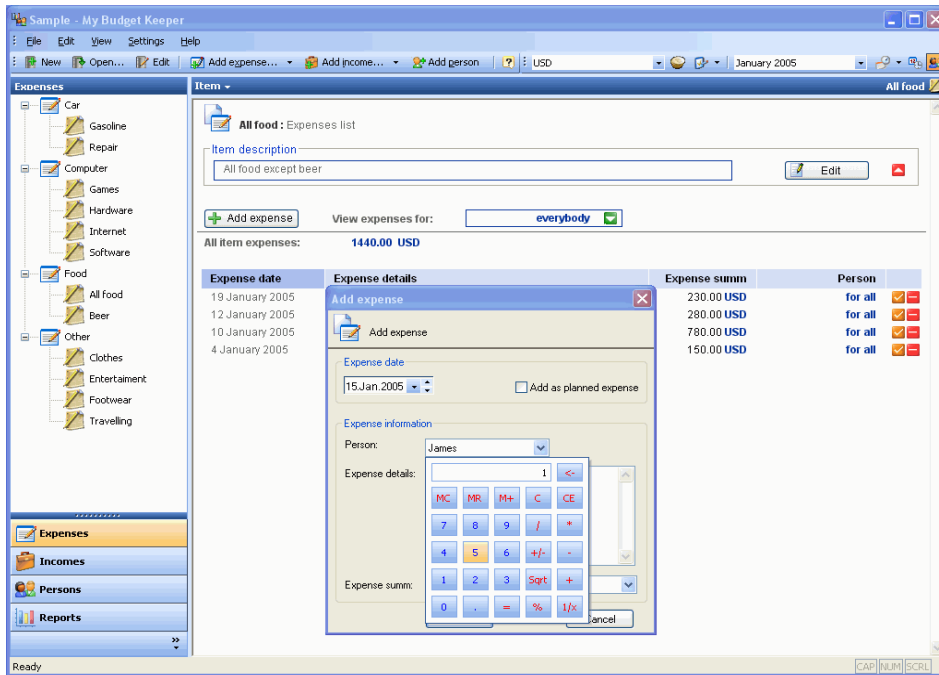| Product / Featuress	YNAB (You need a budget)	My Budget Keeper
Charge when purchase	$59.95 Approximately RM190.07	$24.95 Approximately RM79.10
Interface	Flash, colourful interface.	Normal, approximate same as Microsoft office interface.
Loading speed	Need some time to load when opening (approximately 10 to 15 seconds)	Quite fast when opening (approximately 2 to 5 seconds)
Transaction Input Type	In the table form to allow users to key in	In the drop down list to let users to choose
Transaction Category	Allow users to add and modify the existing transaction category	Allow users to add and modify the existing transaction category
Report type	Text Layout, Pie Chart, Bar Graph	Text Layout, Pie Chart, Bar Graph
Report Parameter	Transaction type, date, amount	Transaction type, date, amount

Table 2-4-3-1 Comparison between YNAB and My Budget Keeper

Chapter 3

Requirement and Specification

Contents:

3-1   Requirements Gathering Technique

3-2   System Requirements

3-1 Requirements Gathering Technique

In order to develop a powerful system, the developer had to gather all requirements from the target users. There are a few techniques to gather the requirements. The two main techniques to be chosen are *Research* and *Questionnaire*.

Research

Research is a technique to get all the information from the other sources such as Internet, documentation, and etc. The existing budget planners will be the main research target. The developer had studied on how those system works and what functionalities they provide. Besides, the developer had gathered the information that the users would like to improve for the existing system. Thus, the developer learned from information of the existing system and develops a more powerful system with completed features.

From the research, the developer had learned some important features for a budget planner. Following are some explanations of these features:-

1. Income and Expenses Tracking: The budget planner can keep track how the users' expenses flow. This system can calculate and show the users what is available budget to the users.

2. Report Generating: The budget planner can show report form in order to give a hint to the users that how and what have they spend on their daily life.

3. Account Access Right: The budget planner can control the users' access right since the users' financial information is private and confidential.

Questionnaire

Questionnaire technique was chosen as one of the technique in gather requirements since IBP is created for different group of target users. With questionnaire, the developer will learn features that the users really want to be included in IBP. Different group of target users need different type of features, hence developer can learn from it and develop a users' favour features system. For example, the questions can be asking the users what they mainly spend on their daily, are they going to record down their daily spending and etc.

From this technique, the developer can get more detailed user requirements for the IBP. Following are some features which are proposed by the users:-

1. Report Generating: From the questionnaire, most of the users would like to view the report that what and how they spend on a particular time.

2. Fixed Expenses and Income input: Users would like to have an application that can let them to carry on their fixed income (such as salary) and expenses (such as insurance and etc) from month to month.

All the results are gathered from different group of target users. For question set by the developer, please refer to Appendix A-1.

3-2 System Requirements

This application is created mainly focus on the budget tracking and planning to the users. The features will be explained further in the following:-

1.0 Income and Expenses Tracking

    1.1 This system should allow users to key in their monthly fixed income (such as salary, subsidy, bonus and etc) and expenses (such as public utility, insurance, loan - mortgage and car, education fee and etc).

        1.1.1 For the fixed income, this system should allow users decide the normal income to the fixed income so that they no need to key in the same record in the next month.

        1.1.2 For the fixed expenses, this system should allow users to decide the normal expenses to the fixed expenses so that they no need to key in the same record in the next month.

    1.2 This system should be able to let the users to key in their daily spending such as food, transport, entertainment and etc.

    1.3 This system should let the users to choose their spending type when key in the expenses, example: food (can be breakfast, lunch or dinner), entertainment (can be shopping), makeup and etc.

    1.4 This system should be able to calculate the available budget that left of the particular month after subtracts the fixed expenses.

    1.5 This system should allow the users able to check the previous records by letting the users to search with inputs such as date, expenses type, description and etc.

2.0 Report Generating

  2.1 This system should let the users to choose to view report with different parameters such as timeline, type of spending, type of income and etc.

  2.2 This system should allow the users to export the report to different types of file formats such as PDF file, Excel file and etc.

  2.3 This system should be able to let the users to preview and print the reports.

3.0 Account Creation

  3.1 This system should support multiple users.

  3.2 This system should allow the users to create several accounts with different user name and password.

  3.3 This system should allow the users to key in the question (can be selected in drop down list) and their own password. It is used for request the username and password if the users failed to remember their own username and password

4.0 Account Login

  4.1 This system should let the users to key in their username and password in order to access the application.

  4.2 This system should let the users to log out their account.

  4.3 This system should not allow multiple users at the same time.

  4.4 This system should let the users to remind their password by choosing their questions (in drop down list) and key in their answer.

5.0 Account Maintenance

   5.1 This system should let the users to customize their own spending category.

       5.1.1   By default, the spending category should be food, transport and entertainment. This system should let the users to add or modify the spending category such as makeup, clothes and etc.

   5.2 This system should include the monthly fixed income list.

       5.2.1   This system should allow the users to add the new income type or modify the existing income type according to their preferences.

   5.3 This system should include the monthly fixed expenses list.

       5.3.1   This system should allow the users to add the new expenses type or modify the existing expenses type.

Chapter 4

Methodology Application

Contents:

4-1 Methodologies Chosen

The methodologies will be chosen for IBP are the Waterfall SDLC (System Development Life Cycle) model and the Incremental Prototyping. Since Waterfall model has several disadvantages, by only using it as the development of this system is not enough. The main disadvantage for Waterfall model is for every stage of development has to be completed before a new stage started. Since the nature of Waterfall model is no way to turn back to the previous stage, there will be cost a lot of time in implementing this system.

However Waterfall model does have its advantages that are it focuses on documentation. It is also one of the drawbacks for Incremental Prototyping model. Thus, an Incremental Prototyping model will be used too along with the Waterfall model when developing this system.

The Increment Prototyping will first gather some requirements and develop the first version of prototype. Then it will let the users to test the first prototype and get the feedbacks from the users. The feedbacks that noted down in the first prototype will be learned and analyzed by the developer on how to enhance onto the first prototype.

The process on developing and testing are repeated done until the users satisfy the result of the latest prototype and it will be turned into this system. By combination of two methodologies model, this system can be developed without any troubles.

4-2 Application of Chosen Methodologies

This section consists of how the methodologies (waterfall and incremental prototype) will be implemented in the project. The phase involved in the development would be based on the SDLC that are *Planning, Analysis, Design* and *Implementation.*

Phase 1: Planning

Planning is the most important task in creating a software product. The developer needed to think carefully on how the project to be developed because once the developer plan it wrongly, the whole system will not be done. The project planning involves the use of schedule such as Gantt chart to plan and subsequently report the progress along the project execution.

In this stage, planning on how this system looks like would be the priority activity. First, research on the existing system will be made in order to learn more detail about budget planner. Next, a set of questionnaire will be started to be distributed to the public. The questionnaire will be distributed to different group of users in order to get different type of opinion and information.

Project time planning is very critical in this project. Duration for each activity in the development process must be specified in this stage. It is because if the time for each activity is not allocated wisely, this system will not be completed on time.

The developer will identify the tasks after verifying the requirements with the users. It is a very important process because it can determines the dependency of all processes in this system. If not, system operations would not be smooth thus reducing efficiency and effectiveness. The Gantt chart has been created in this stage. The information of the chart will be explained in Section Appendix B-1.

Phase 2: Analysis

In this stage, all the information about budget planning and the requirements from the target users are gathered. The purpose of these activities is to more understand the existing work flow before developing a system that suits to IBP. From the previous stage (planning), the requirement study can only provide the conceptual idea of this system. Thus, studies in the existing system in term of its processes, problems and solutions should be in more detail. By doing this, the developer will be able to understand how the work should be done through the studies.

After studying the requirements in full detail, a finalized requirement document can be produced. The document can be updated anytime since users' requirements may change from time to time. Thus, the developer needed to keep on doing research in order to match with the users' requirements. The result of questionnaire will be shown in Appendix A-2.

Next, before moving to the next phase, a few work flow diagrams will be constructed. It is because those diagrams can give a clearer idea to the developer in developing this system. The diagrams can be data flow diagram, use case diagram, context diagram and entity relationship diagram.

Phase 3: Design

This system work flow, program design, interface design and the database structure of this system is created in this stage. This system work flow is based on the requirements documentation from previous phase. It has to be designed carefully so that they can able to work with each other. After the first version of system work flow is created, the developer will present it to the users so that can get the users' feedbacks and confirmation. If the users do not satisfy the result, this system work flow will be redesign or modified and presented to them again until they satisfy the result.

For the program and interface design, a first version of prototype will be created according to the users' requirements. This prototype will be presented to the users to get their opinions on it. Once the users can point out what they do not like or what they really want this system, the prototype will be redesign again.

Next is the database structure. The tables in the database have to be organized properly so that data retrieval can be efficient. In order to avoid the time consuming in retrieving data, normalization on the database are required.

Phase 4: Implementation

This stage can be considered as a complicated process. During implementation, the tasks as following will be included: ***Implementing IBP in NetBean, Implementing database in MySQL*** and ***System Testing.***

Implementing IBP in Visual Studio 2010

Visual Studio 2010 supports Visual Basic 6.0 Programming language and is an open source platform; hence the developer can get solutions easily once some problems occur. Besides, Visual Studio 2010 and Visual Basic 6.0 support GUI interface so the developer can design the interface that the users want.

Implementing database in Microsoft SQL Server Compact 3.5

The database of this system is created using Microsoft SQL Server Compact 3.5. The main reason to use this is because it is a freeware and open source. Developer will get solutions when handle problems in development.

System Testing

Testing will be done after several functionalities are completed. This will allow the developer to keep track the errors in this system. It could be easier to fix the errors when this system do not consists of too much of coding. This will save a lot of time when developing the system.

Chapter 5

System Design

Contents:

5-1 Interface Conceptual Design

Before designing the actual system, a conceptual design is being used. A conceptual design is drawn after done some researches and getting the questionnaire from the public. 800 pixels width and 600 pixels height form is the most common size for financial applications. It makes sense since 800 pixels width and 600 pixels height can be supported by most monitors' resolution. Besides, most people prefer an application with light blue and white in colour. After gathered all the information from the public, the conceptual design is done by following the public information.

There are several forms used in this system. Each form has 800 pixels width and 600 pixels height. There are buttons, labels, link labels, radio buttons and panels in each form. Refer to Appendix: User Manuals for functionary of each form.

The following are the main forms conceptual design and information of every control:

```
┌─────────────────────────────────────────────────────────────┐
│ Title bar                                                     │
├─────────────────────────────────────────────────────────────┤
│                                                               │
│   ┌───────────────────────────────────────────────────────┐  │
│   │ Content                                                 │  │
│   │                                                         │  │
│   │    -   Welcome                                          │  │
│   │    -   Introduction                                     │  │
│   │                                                         │  │
│   │                                                         │  │
│   │                                                         │  │
│   │                                                         │  │
│   └───────────────────────────────────────────────────────┘  │
│                                                               │
│              ┌──────────────────────────────────┐            │
│              │                                    │            │
│              │  Username:  ┌───────────────────┐  │            │
│              │             └───────────────────┘  │            │
│              │                                    │            │
│              │  Password:  ┌───────────────────┐  │            │
│              │             └───────────────────┘  │            │
│              │           Forgot password          │            │
│              │        ┌─────────┐  ┌──────────┐   │            │
│              │        │  Login  │  │ Register │   │            │
│              │        └─────────┘  └──────────┘   │            │
│              └──────────────────────────────────┘            │
└─────────────────────────────────────────────────────────────┘
```

Figure 5-1-1 Login Form

Name	Description	Size (pixels)
loginBTN	Login Button	75 x 23
registerBTN	Register Button	75 x 23
forgotPassLink	Forget Password Link Label	117 x 13
usernameTXT	Username Text Box	100 x 22
passwordTXT	Password Text Box	100 x 22
usernameLBL	Username Label	83 x 16
passwordLBL	Password Label	80 x 16
introPNL	Intro content Panel	680 x 260
Title Bar	Title Bar	784 x 24

Table 5-1-1 Login Form Information

```
┌─────────────────────────────────────────────────────┐
│  Title bar                                            │
├─────────────────────────────────────────────────────┤
│                                                       │
│   ┌───────────────────────────────────────────────┐  │
│   │                                               │  │
│   │                                               │  │
│   │                                               │  │
│   │                                               │  │
│   │                                               │  │
│   │                                               │  │
│   │              User personal details           │  │
│   │                                               │  │
│   │                                               │  │
│   │                                               │  │
│   │                                               │  │
│   │                                               │  │
│   │                                               │  │
│   └───────────────────────────────────────────────┘  │
│                                                       │
│          ┌──────────────┐  ┌──────────────┐          │
│          │   Register    │  │    Cancel    │          │
│          └──────────────┘  └──────────────┘          │
└─────────────────────────────────────────────────────┘
```

Figure 5-1-2 Register Form

Name	Description	Size (pixels)
registerCategoryRegisterBTN	Register Button	75 x 23
registerCancelBTN	Cancel Button	75 x 23
registerPNL	Register Panel	629 x 448
Title Bar	Title Bar	784 x 24

Table 5-1-2 Register Form Information

Title bar

Username: [   ]

Secret Question: [▽]

Secret Answer: [   ]

[Submit]   [Cancel]

Figure 5-1-3 Forget Password Form

Name	Description	Size (pixels)
forgotpwSubmitBTN	Submit Button	75 x 23
forgotpwCancelBTN	Cancel Button	75 x 23
forgotpwUsernameTXT	Username Text Box	330 x 22
forgotpwSAnswerTXT	Secret Answer Text Box	330 x 22
forgotpwSQuestionCMB	Secret Question Combo Box	330 x 22
usernameLBL	Username Label	102 x 16
sQuestionLBL	Secret Question Label	133 x 16
sAnswerLBL	Secret Answer Label	125 x 16
Title Bar	Title Bar	784 x 24

Table 5-1-3 Forget Password Form Information

```
┌─────────────────────────────────────────────────────────────┐
│ Title bar                                                     │
├─────────────────────────────────────────────────────────────┤
│  ┌──────┐  ┌───────────────────────────────────────────────┐ │
│  │      │  │ ┌──────────────┐ ┌──────────────┐ ┌──────────┐ │ │
│  │      │  │ │Add Transaction│ │Edit Transaction│ │Delete    │ │ │
│  │      │  │ └──────────────┘ └──────────────┘ └──────────┘ │ │
│  │      │  │                                                 │ │
│  │      │  │   Date:      Current date (default)             │ │
│  │      │  │   Type:      Please select your type.      ▽    │ │
│  │      │  │   Amount:    Please enter your amount.          │ │
│  │      │  │   Description: Please enter your description     │ │
│  │      │  │                                                 │ │
│  │ Nav  │  │   Fixed?     □                                  │ │
│  │      │  │        Submit    Cancel    Reset                │ │
│  │      │  ├─────────────────────────────────────────────┬──┤ │
│  │      │  │ Table list down all the income              │Sc│ │
│  │      │  │                                             │ro│ │
│  │      │  │ - Carried balance                           │ll│ │
│  │      │  │ - Monthly income                            │ba│ │
│  │      │  │ - Bonus                                     │r │ │
│  │      │  │                              M&Y ▽ Filter:     │ │
│  │      │  └─────────────────────────────────────────────┘  │ │
│  │      │  ┌─────────────────────────────────────────────┐  │ │
│  │      │  │ Conclusion Panel (Show this month income,   │  │ │
│  │      │  │ money on hand, money on bank)               │  │ │
│  └──────┘  └─────────────────────────────────────────────┘  │ │
└─────────────────────────────────────────────────────────────┘
```

Figure 5-1-4 Incomes Form

Name	Description	Size (pixels)
incomeDateTXT	Income Date Text Box	238 x 20
incomeAmountTXT	Income Amount Text Box	238 x 20
incomeDescTXT	Income Description Text Box	238 x 20
addTransactionBTN	Add new income transaction Button	159 x 23
editTransactionBTN	Edit selected income transaction Button	159 x 23
deleteTransactionBTN	Delete selected income transaction Button	159 x 23
incomeSbmBTN	Income Submit Button	75 x 23
incomeCnlBTN	Income Cancel Button	75 x 23
incomeRstBTN	Income Reset Button	75 x 23
incomeFilterBTN	Income Filter Button	45 x 23
incomeTypeCMB	Income Type Combo Box	238 x 20
incomeMnYCMB	Income month and year Combo Box	80 x 21
incomeFixCKB	Fix income Check Box	15 x 14
incomeDateLBL	Income Date Label	30 x 13
incomeAmountLBL	Income Amount Label	43 x 13
incomeDescLBL	Income Description Label	60 x 13
incomeTypeLBL	Income Type Label	31 x 13
incomeFixLBL	Income Fix Label	38 x 13
incomeDataTable	Income data grid view	639 x 149
incomeConclusionPNL	Income conclusion Panel	672 x 73
navigationBar	Shared navigation bar	105 x 536
Title Bar	Title Bar	784 x 24

Table 5-1-4 Income Form Information

Figure 5-1-5 Expenses Form

Name	Description	Size (pixels)
expensesAmountTXT	Expenses Amount Text Box	238 x20
expensesDescTXT	Expenses Description Text Box	238 x 20
addExpRecordBTN	Add new expenses transaction Button	163 x 23
editExpRecordBTN	Edit selected expenses transaction Button	163 x 23
deleteExpRecordBTN	Delete selected expenses transaction Button	163 x 23
expensesSbmBTN	Expenses Submit Button	75 x 23
expensesCnlBTN	Expenses Cancel Button	75 x 23
expensesRstBTN	Expenses Reset Button	75 x 23
expensesCalendarBTN	Expenses Calendar Button	200 x 20
expensesAddCatBTN	Add new expenses category Button	96 x 23
expensesEditCatBTN	Edit expenses category Button	96 x 23
expensesAddTypeBTN	Add new expenses type Button	96 x 23
expensesEditTypeBTN	Edit expenses type Button	96 x 23
expensesFixCKB	Fix expenses Check Box	15 x 14
navigationBar	Shared navigation bar	105 x 536
Title Bar	Title Bar	784 x 24

Table 5-1-5 Expenses Form Information
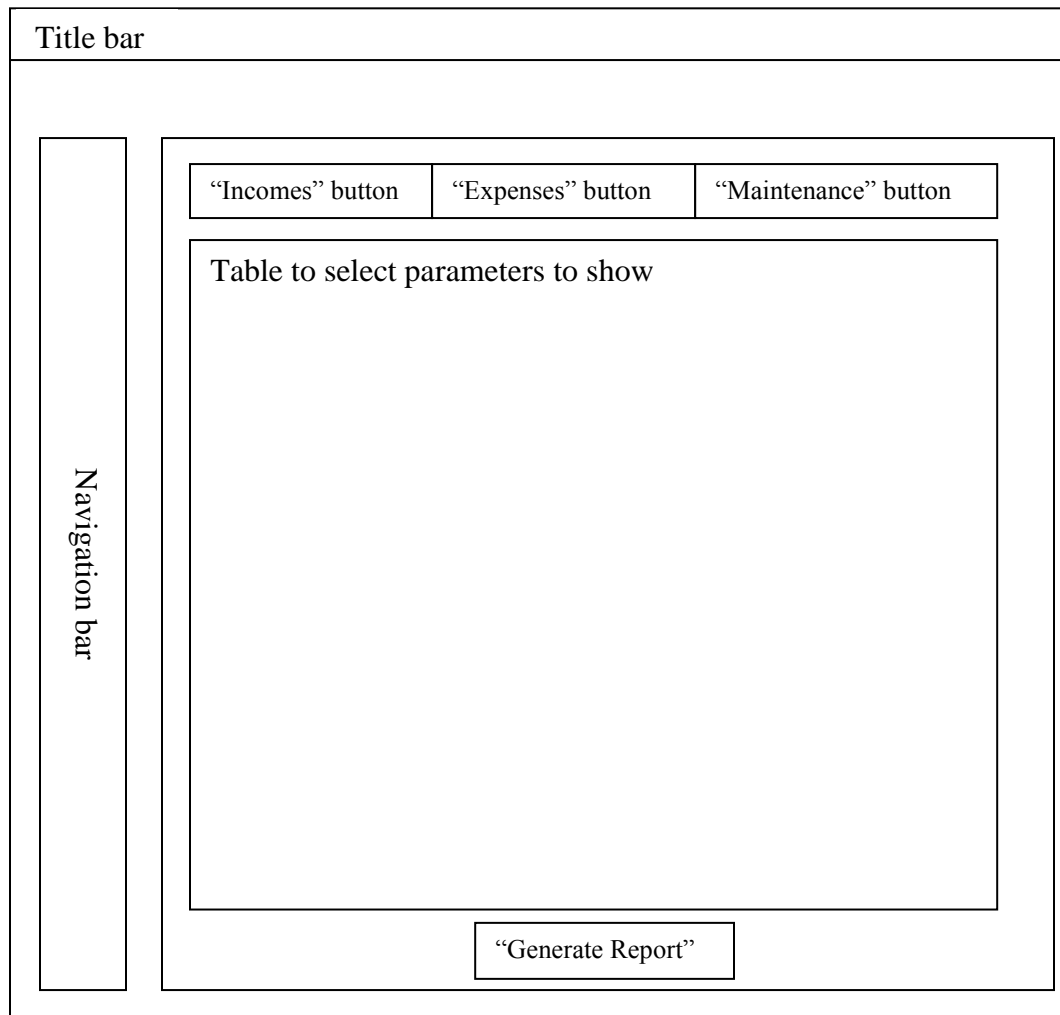
Figure 5-1-6 Reports Form

Name	Description	Size (pixels)
reportIncomeBTN	Income Record Report Button	133 x 17
reportExpensesBTN	Expenses Record Report Button	133 x 17
reportMaintenanceBTN	Maintenance Report Button	133 x 17
reportGenerateBTN	Generate Report BTN	109 x 23
navigationBar	Shared navigation bar	105 x 536
Title Bar	Title Bar	784 x 24

Table 5-1-6 Reports Form Information
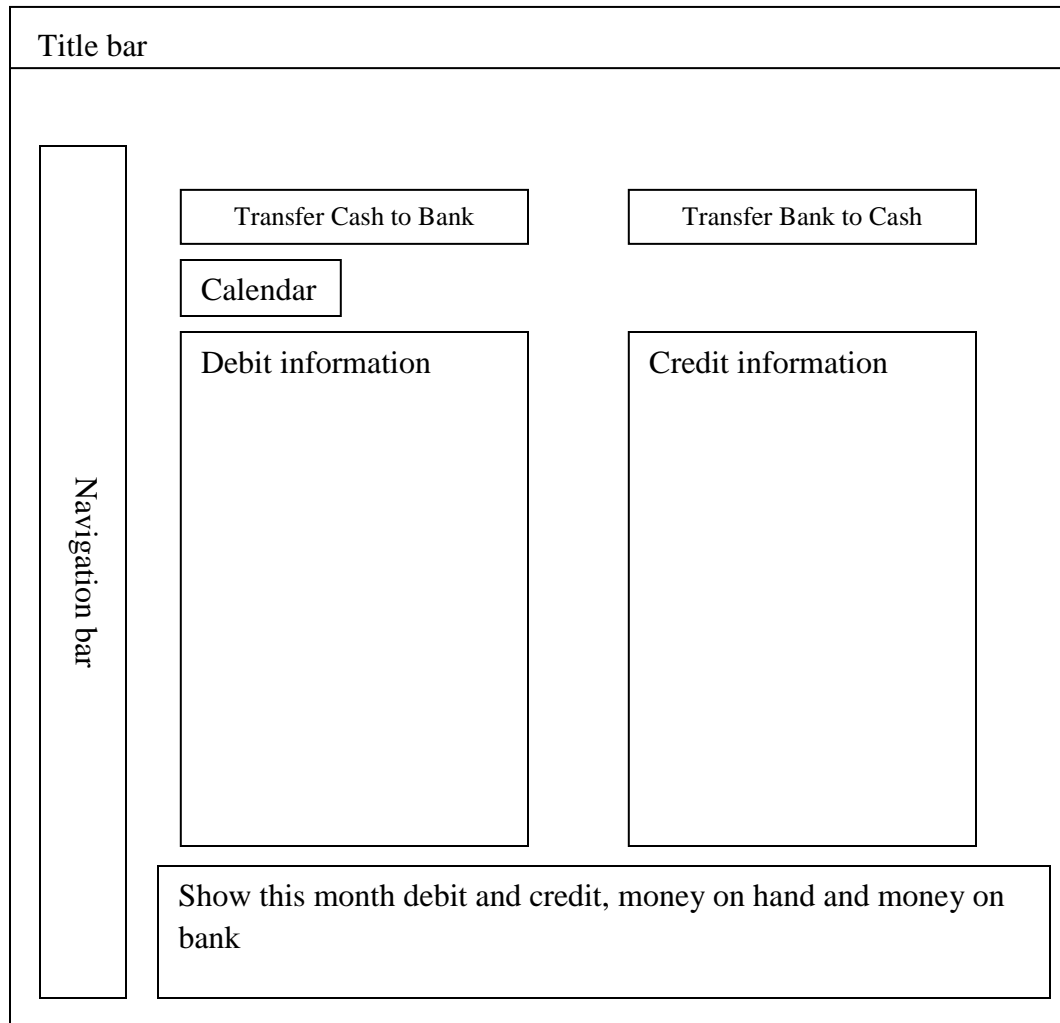
Figure 5-1-7 Bank Form

Name	Description	Size (pixels)
cashBankBTN	Transfer Cash to Bank Button	159 x 23
bankCashBTN	Transfer Bank to Cash Button	159 x 23
bankCalendarBTN	Bank Calendar Button	128 x 20
navigationBar	Shared navigation bar	105 x 536
Title Bar	Title Bar	784 x 24

Table 5-1-7 Bank Form Information

Figure 5-1-8 Account Maintenance Form

Name	Description	Size (pixels)
maintenancePersonalRB	Personal Maintenance Radio Button	121 x 17
maintenanceIncomeRB	Income Maintenance Radio Button	121 x 17
maintenanceExpensesRB	Expenses Maintenance Radio Button	121 x 17
maintenanceSbmBTN	Maintenance submit Button	75 x 23
maintenanceCncBTN	Maintenance cancel Button	75 x 23
navigationBar	Shared navigation bar	105 x 536
Title Bar	Title Bar	784 x 24

Table 5-1-8 Account Maintenance Form Information
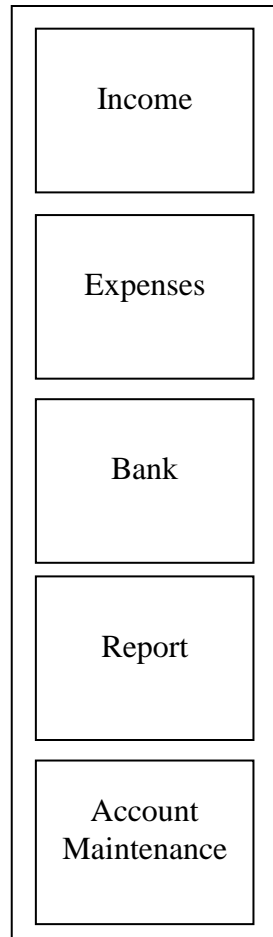
Figure 5-1-9 Navigation Bar

Name	Description	Size (pixels)
incomeBTN	Personal Maintenance Radio Button	121 x 17
expensesBTN	Income Maintenance Radio Button	121 x 17
maintenanceExpensesRB	Expenses Maintenance Radio Button	121 x 17
maintenanceSbmBTN	Maintenance submit Button	75 x 23
maintenanceCncBTN	Maintenance cancel Button	75 x 23
navigationBar	Shared navigation bar	105 x 536

Table 5-1-9 Navigation Bar Information

Icon	Project Title	-	X

Figure 5-1-10 Title Bar

Name	Description	Size (pixels)
Icon	Intelligent Budget Planner Icon	20 x 20
-	Minimize Button	20 x 20
X	Close Button	5 x 5
Project Title	Intelligent Budget Planner Title	730 x 20

Table 5-1-10 Title Bar Information

5.2 Interface Design

During interface design phase, the design of all forms is developed based on the conceptual design ideas. The colour and size of each form also based on the conceptual designs that are light blue and white colour and 800 pixels width and 600 pixels height.

At the first stage in interface design, title bar is firstly to be developed then only follow by each form contents. During the interface design, some verification and functional coding are developed right the way to make sure that the layout and screen interface suit the functional of this system.

Below are the interfaces of this system. Refer to Appendix: User Manual for functional description of each form.

Title Bar

The figure below showing title bar after the users opens this system

Figure 5-2-1 Title Bar Screen Shot

Main Form / Login Form

The figure below showing the main form / login form of Intelligent Budget Planner
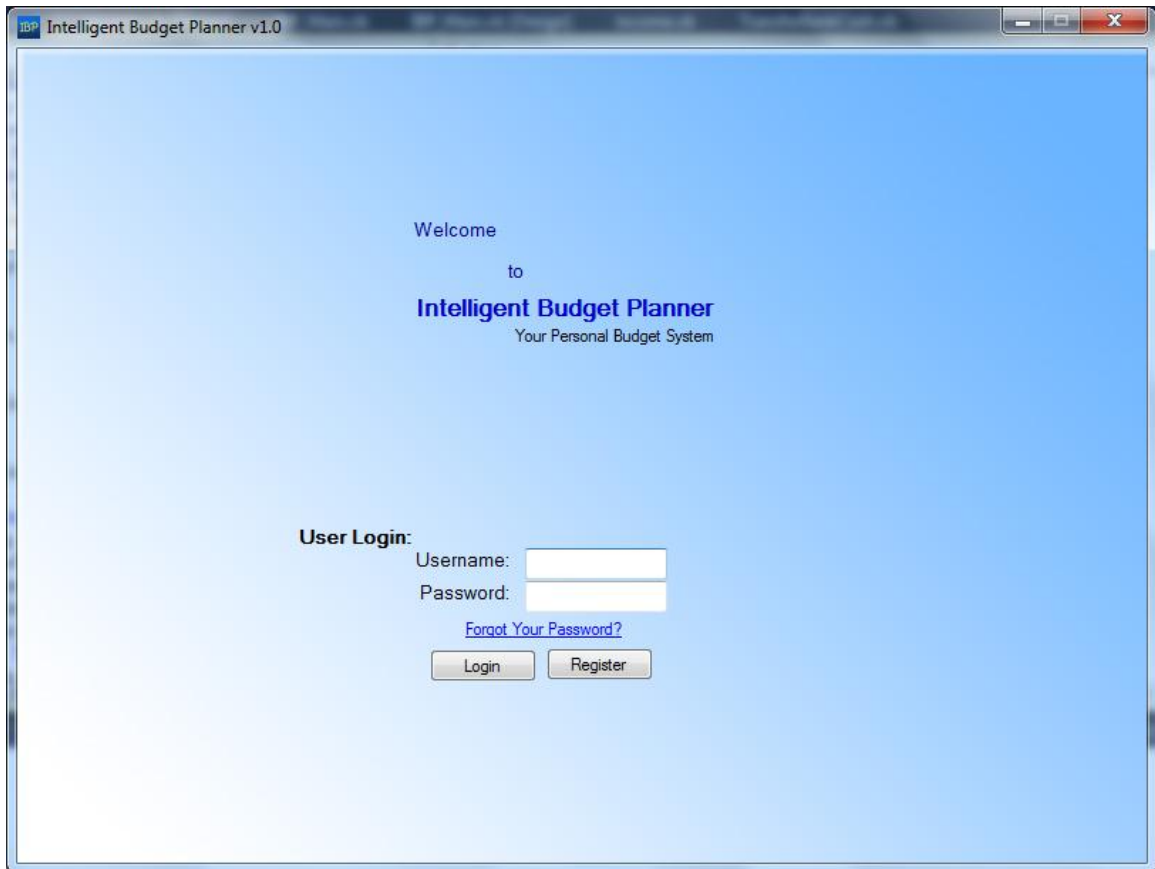
Figure 5-2-2 Login Form Screen Shot

Registration Form (Personal)

The figure below showing the registration page – personal detail of Intelligent Budget Planner

Figure 5-2-3 Register Form (Personal) Screen Shot

Register Form (Expenses Category and Type)

The figure below showing the registration page – expenses category and type detail of Intelligent Budget Planner

Figure 5-2-4 Register Form (Expenses Category and Type) Screen Shot

Forgot Password Form

The figure below showing the forgot password form of Intelligent Budget Planner

Figure 5-2-5 Forgot Password Form Screen Shot

Income Form

The figure below showing the income form of Intelligent Budget Planner (records shown are as example only)

Figure 5-2-6 Income Form Screen Shot

Expenses Form (Daily)

The figure below showing the expenses form – daily expenses of Intelligent Budget Planner (records shown are as example only)

Figure 5-2-7 Expenses Form (Daily) Screen Shot

Expenses Form (Monthly)

The figure below showing the expenses form – monthly expenses of Intelligent Budget Planner (records shown are as example only)

Figure 5-2-8 Expenses Form (Monthly) Screen Shot

Bank Form

The figure below showing the bank form of Intelligent Budget Planner (records shown are as example only)

Figure 5-2-9 Bank Form Screen Shot

Reports Form

The figure below showing the reports form of Intelligent Budget Planner

Figure 5-2-10 Reports Form Screen Shot

Account Maintenance Form (Personal Information)

The figure below showing the account maintenance – personal information form of Intelligent Budget Planner (records shown are as example only)

Figure 5-2-11 Account Maintenance (Personal Information) Form Screen Shot

Account Maintenance Form (Income Maintenance)

The figure below showing the account maintenance – income maintenance form of Intelligent Budget Planner (records shown are as example only)

Figure 5-2-12 Account Maintenance (Income Maintenance) Form Screen Shot

Account Maintenance Form (Expenses Maintenance)

The figure below showing the account maintenance – expenses maintenance form of Intelligent Budget Planner (records shown are as example only)

Figure 5-2-13 Account Maintenance (Expenses Maintenance) Form Screen Shot

Add Income Type Form

The figure below showing the add income type form of Intelligent Budget Planner
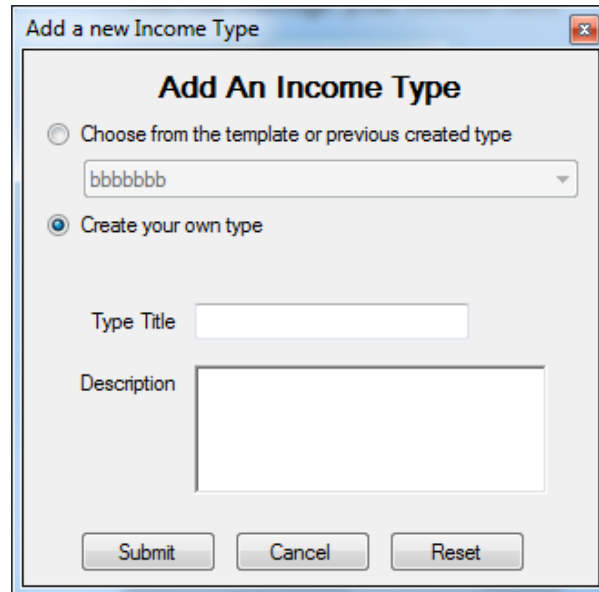
Figure 5-2-14 Add Income Type Form Screen Shot

Edit Income Type Form

The figure below showing the edit income type form of Intelligent Budget Planner
(records shown are as example only)
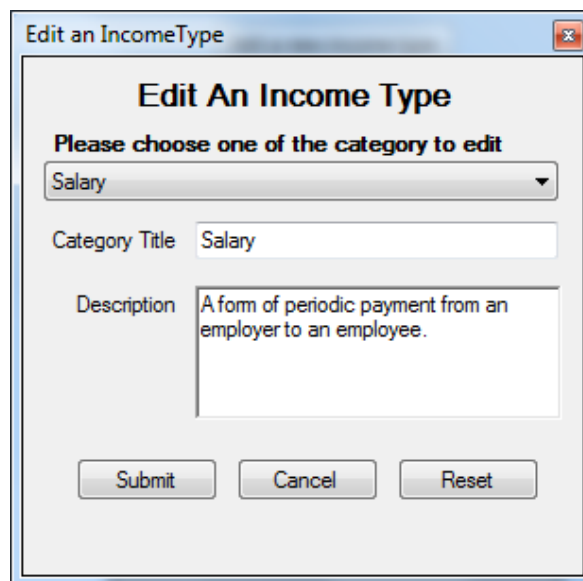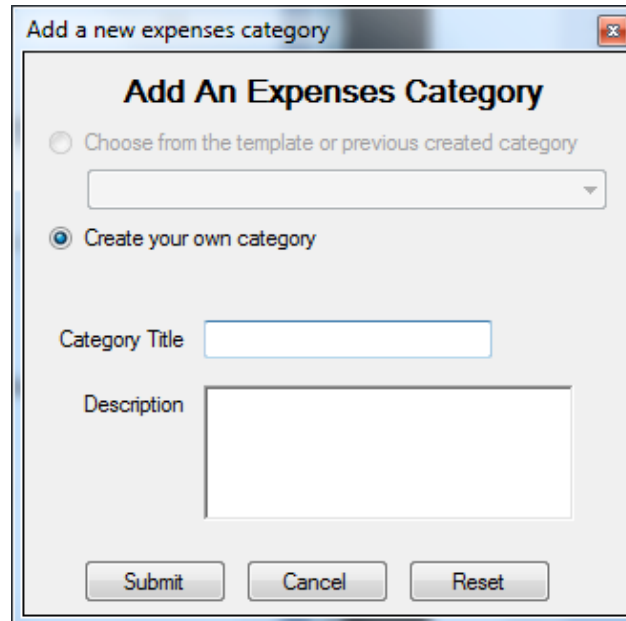
Figure 5-2-15 Edit Income Type Form Screen Shot

Add Expenses Category Form

The figure below showing the add expenses category form of Intelligent Budget Planner
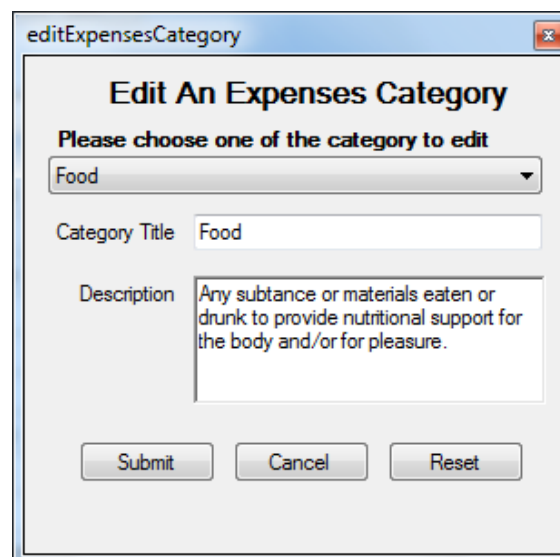
Figure 5-2-16 Add Expenses Category Form Screen Shot

Edit Expenses Category Form

The figure below showing the edit expenses category form of Intelligent Budget Planner (records shown are as example only)

Figure 5-2-17 Edit Expenses Category Form Screen Shot

Add Expenses Type Form

The figure below showing the add expenses type form of Intelligent Budget Planner
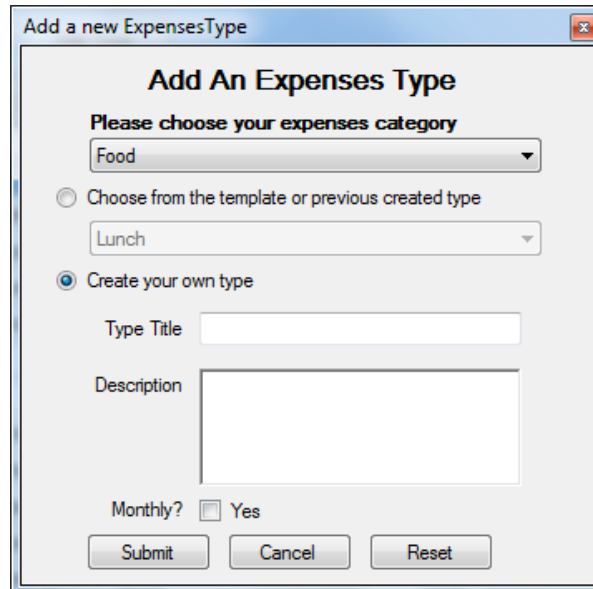
Figure 5-2-18 Add Expenses Type Form Screen Shot

Edit Expenses Type Form

The figure below showing the edit expenses type form of Intelligent Budget Planner
(records shown are as example only)
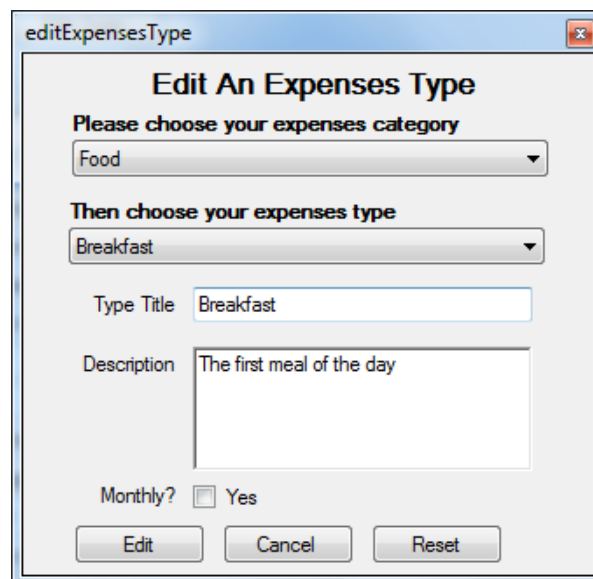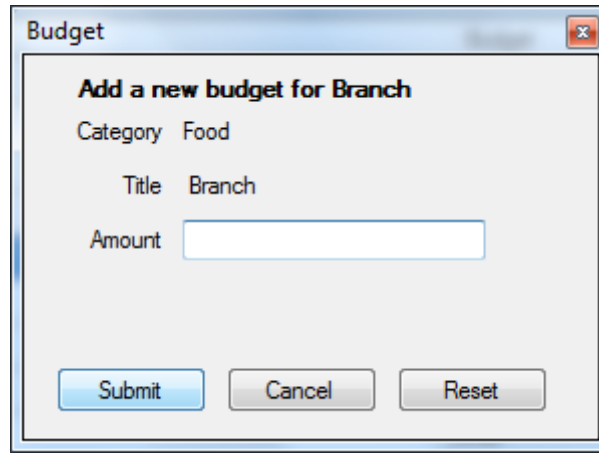
Figure 5-2-19 Edit Expenses Type Form Screen Shot

Add Budget Form

The figure below showing the add budget form of Intelligent Budget Planner
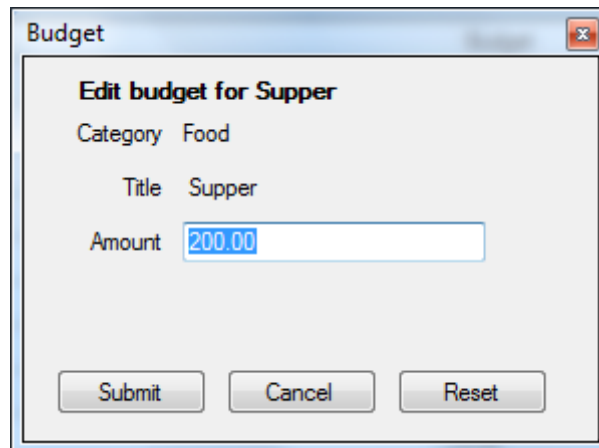
Figure 5-2-20 Add Budget Form Screen Shot

Edit Budget Form

The figure below showing the edit budget form of Intelligent Budget Planner (records shown are as example only)
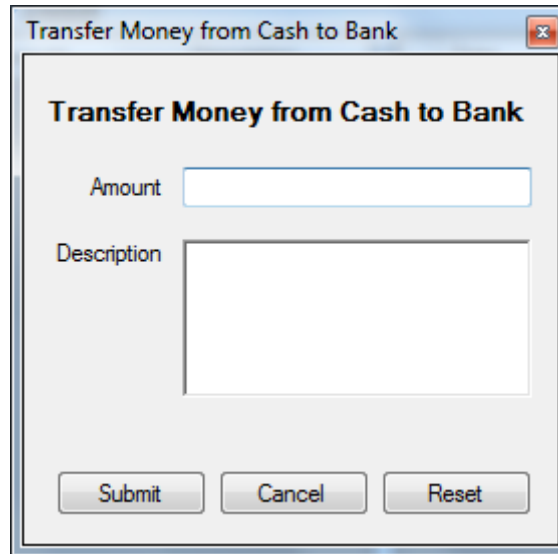
Figure 5-2-21 Edit Budget Form Screen Shot

Transfer Cash to Bank Form

The figure below showing the transfer cash to bank form of Intelligent Budget Planner
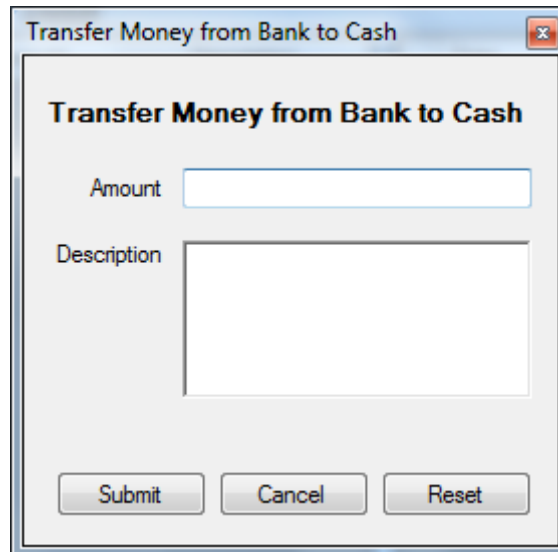
Figure 5-2-23 Transfer Cash to Bank Form Screen Shot

Transfer Bank to Cash Form

The figure below showing the transfer bank to cash form of Intelligent Budget Planner

Figure 5-2-24 Transfer Bank to Cash Form Screen Shot

5.3 Data Flow Diagram

Before start to develop this system, several data flow diagram (DFD) have been designed in order to suit the requirements. There are one level 0 diagram (context diagram), one level 1 diagram and nine level 2 diagrams have been designed. By these diagrams, this system can work with the requirement without any problems. These are the 4th version of DFD and also the last version because this version is the best version that most suitable to the requirements.

Refer the following figures for more information about the workflow of Intelligent Budget Planner.

Level 0

Context Diagram for Intelligent Budget Planner
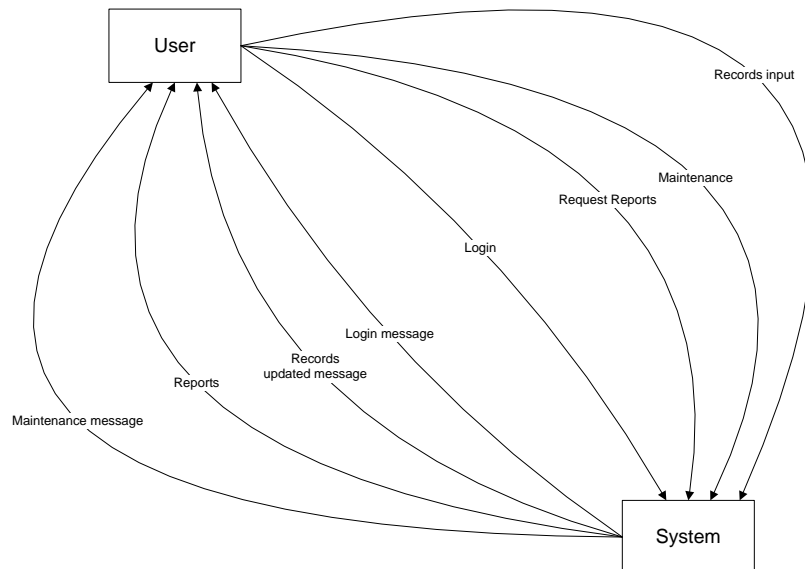
Figure 5-3-1 Context Diagram

Level 1

Overview Diagram for Intelligent Budget Planner
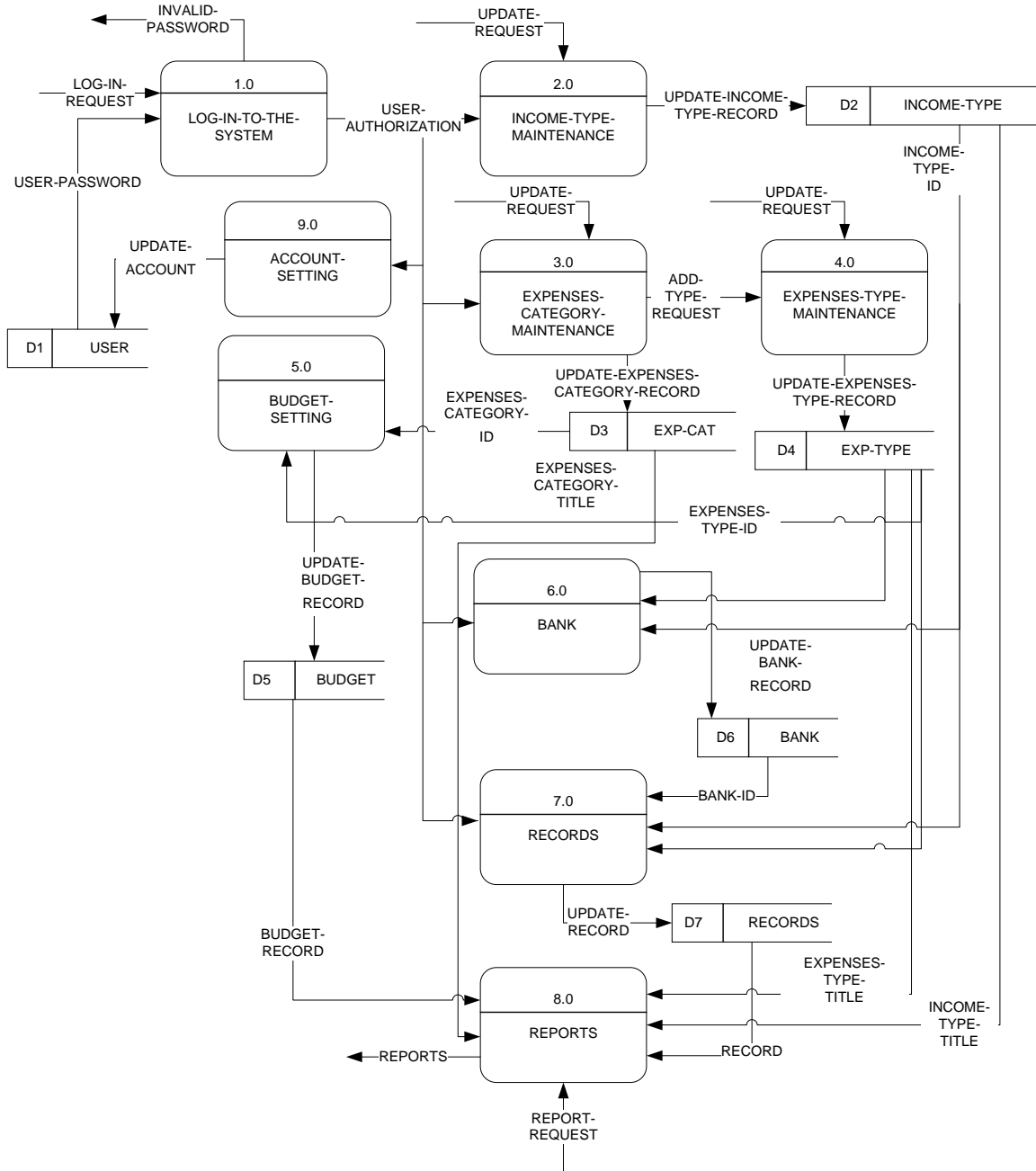
Figure 5-3-2 Overview Flow

Level 2

1.0 Log In To System for Intelligent Budget Planner
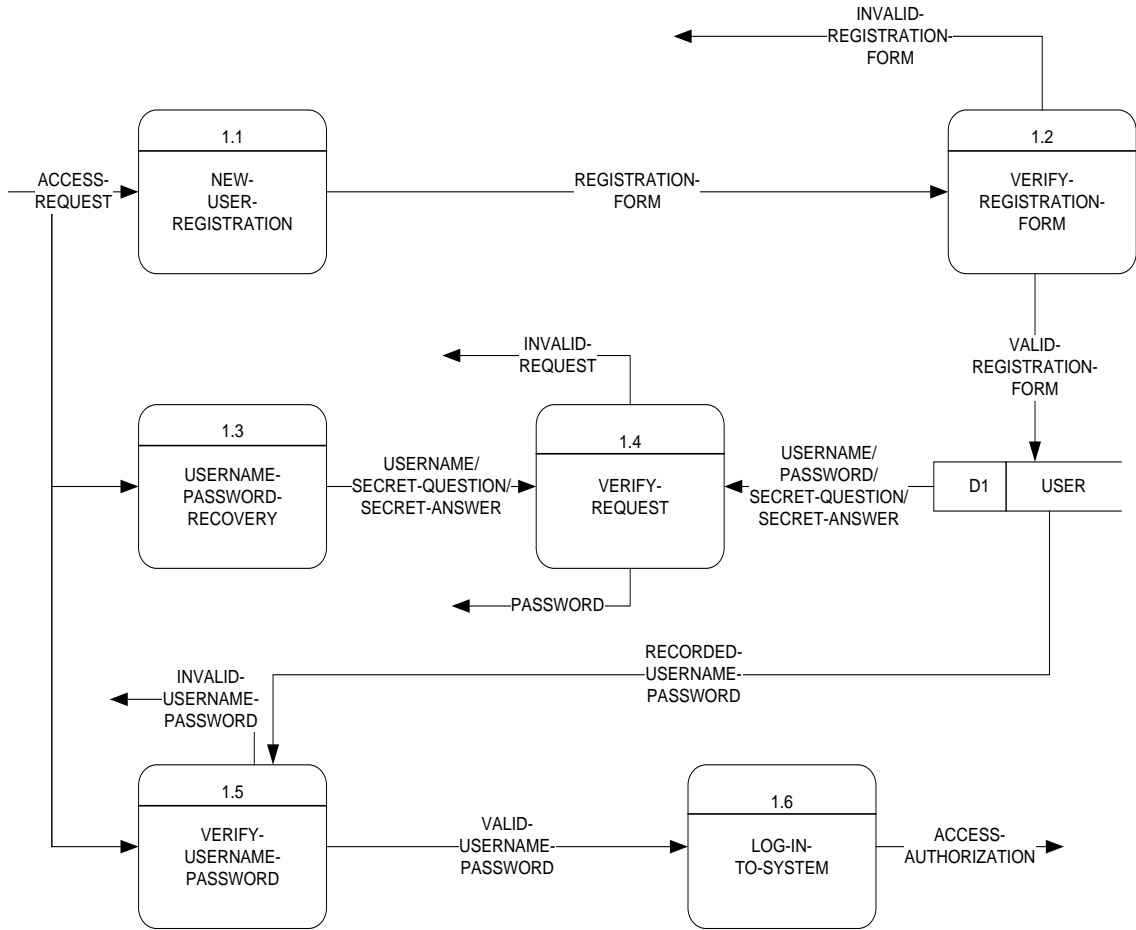
Figure 5-3-3 Login Flow

2.0 Income Type Maintenance for Intelligent Budget Planner
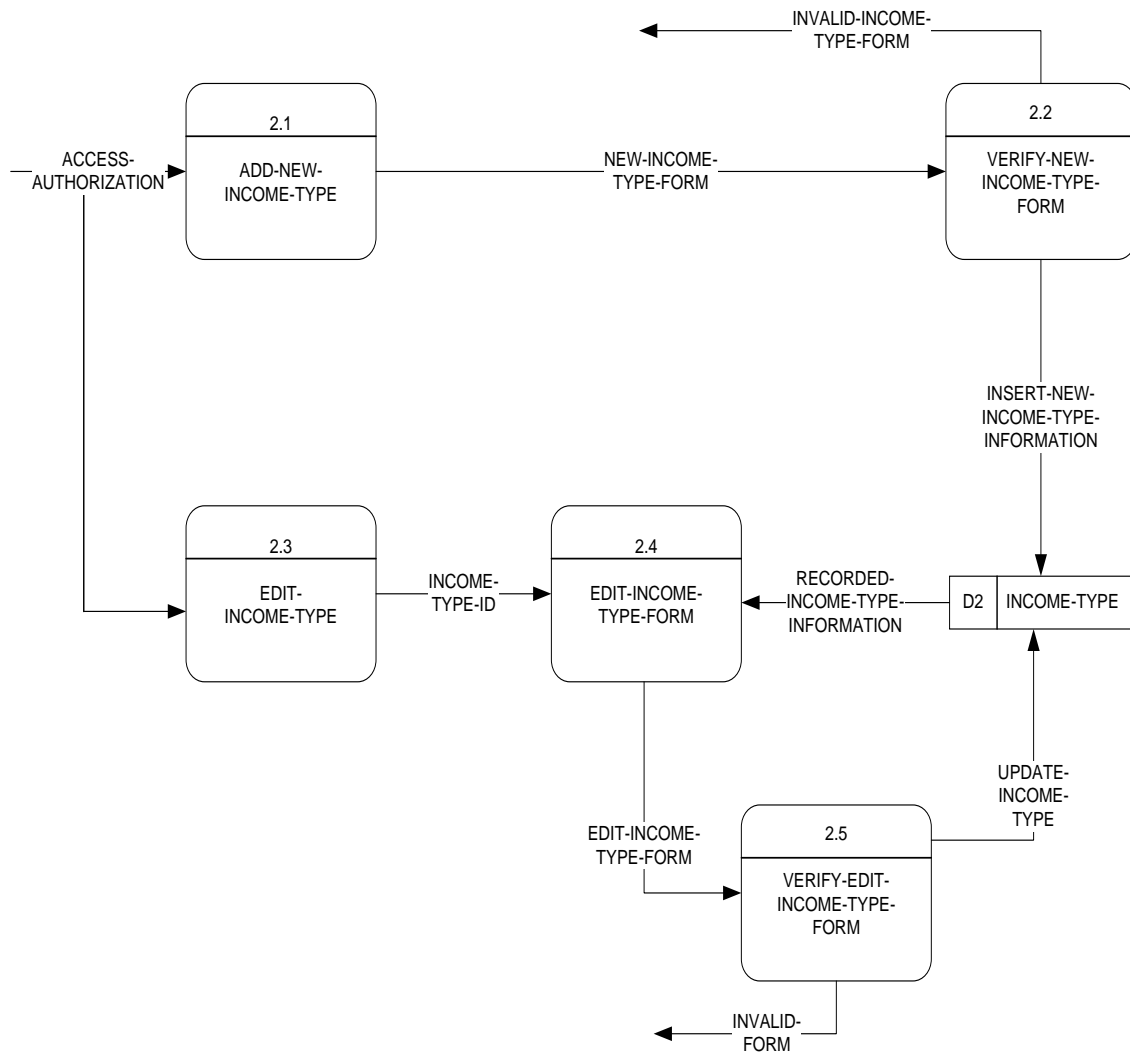
Figure 5-3-4 Income Type Maintenance Flow

3.0 Expenses Category Maintenance for Intelligent Budget Planner
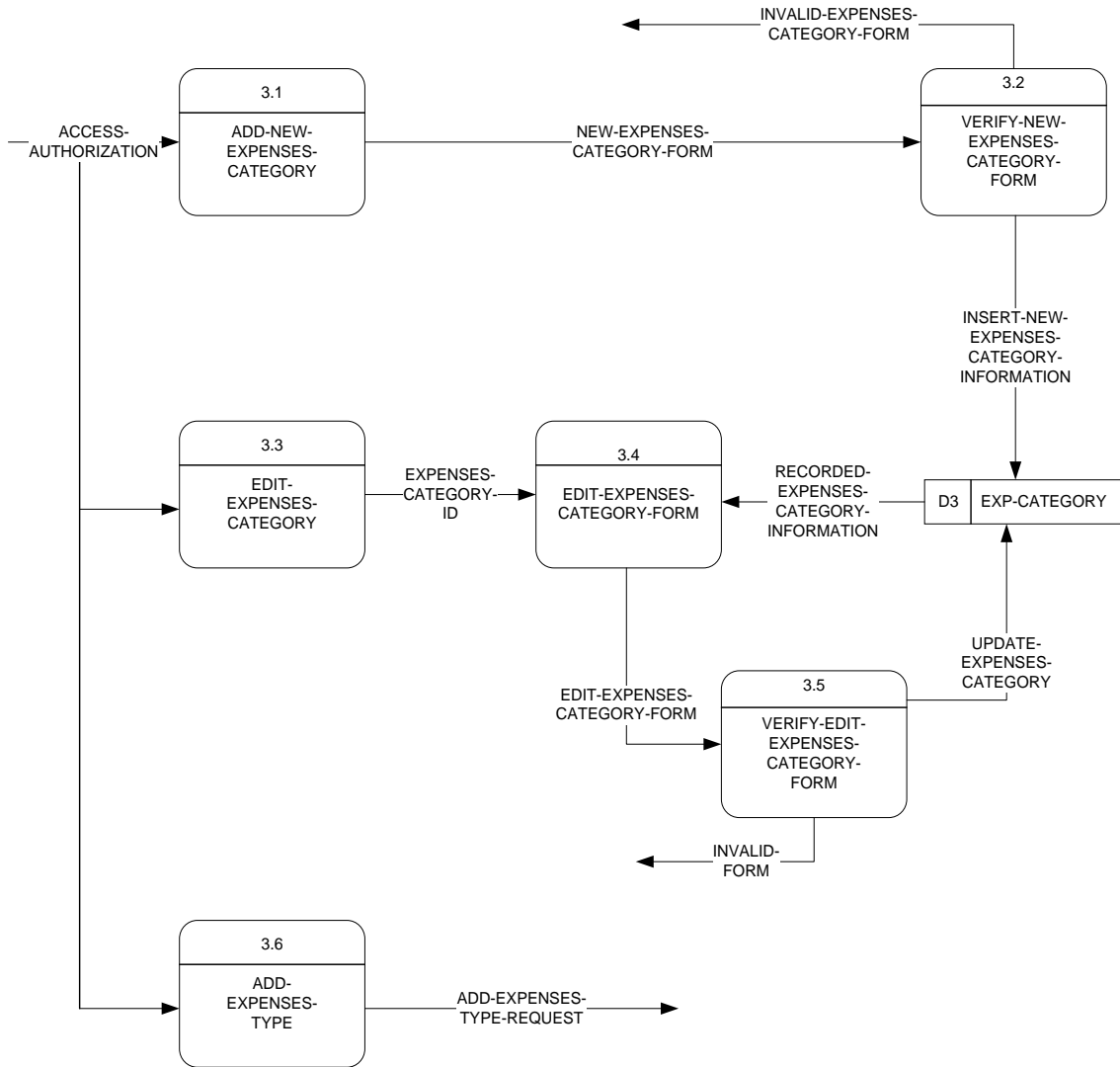
Figure 5-3-5 Expenses Category Maintenance Flow

4.0 Expenses Type Maintenance for Intelligent Budget Planner
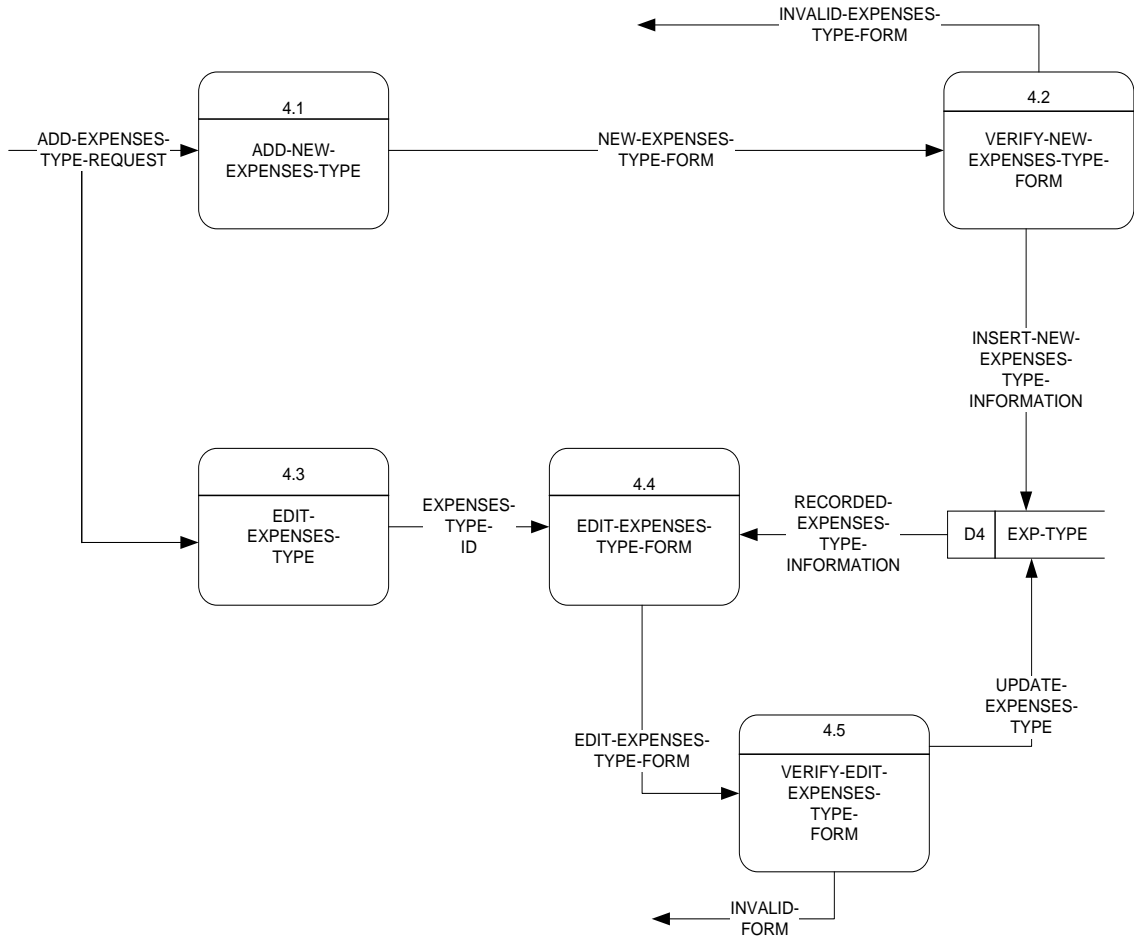
Figure 5-3-6 Expenses Type Maintenance Flow

5.0 Budget Setting for Intelligent Budget Planner
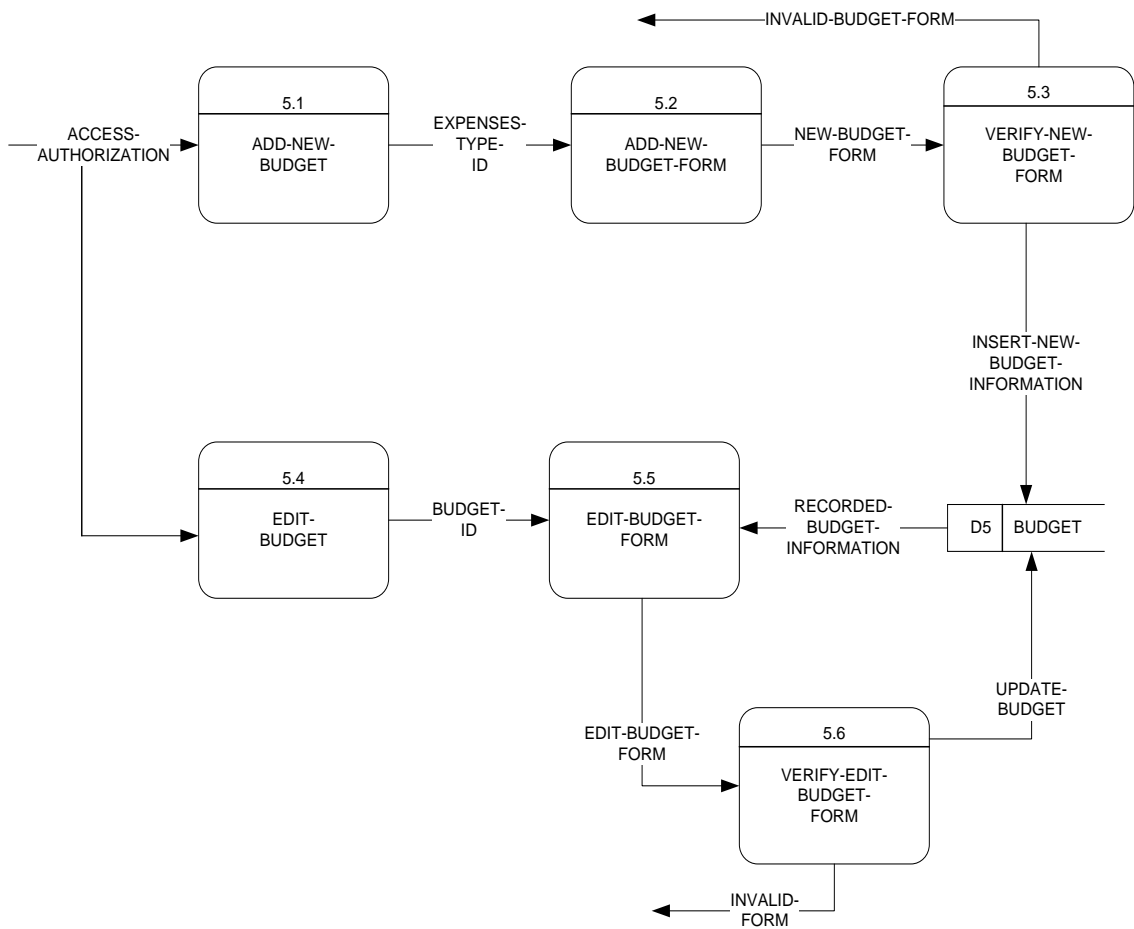
Figure 5-3-7 Budget Setting Flow

6.0 Bank for Intelligent Budget Planner
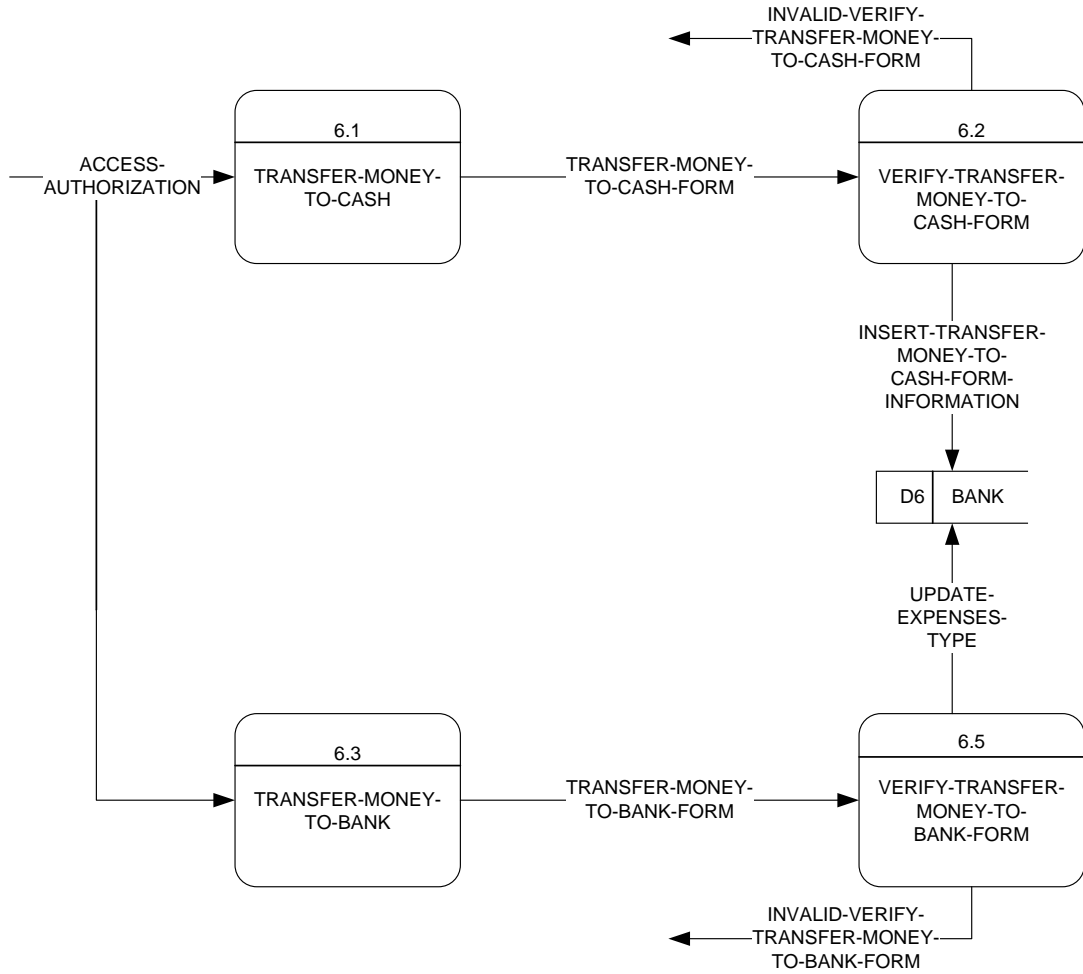
Figure 5-3-8 Bank Flow

7.0 Records for Intelligent Budget Planner
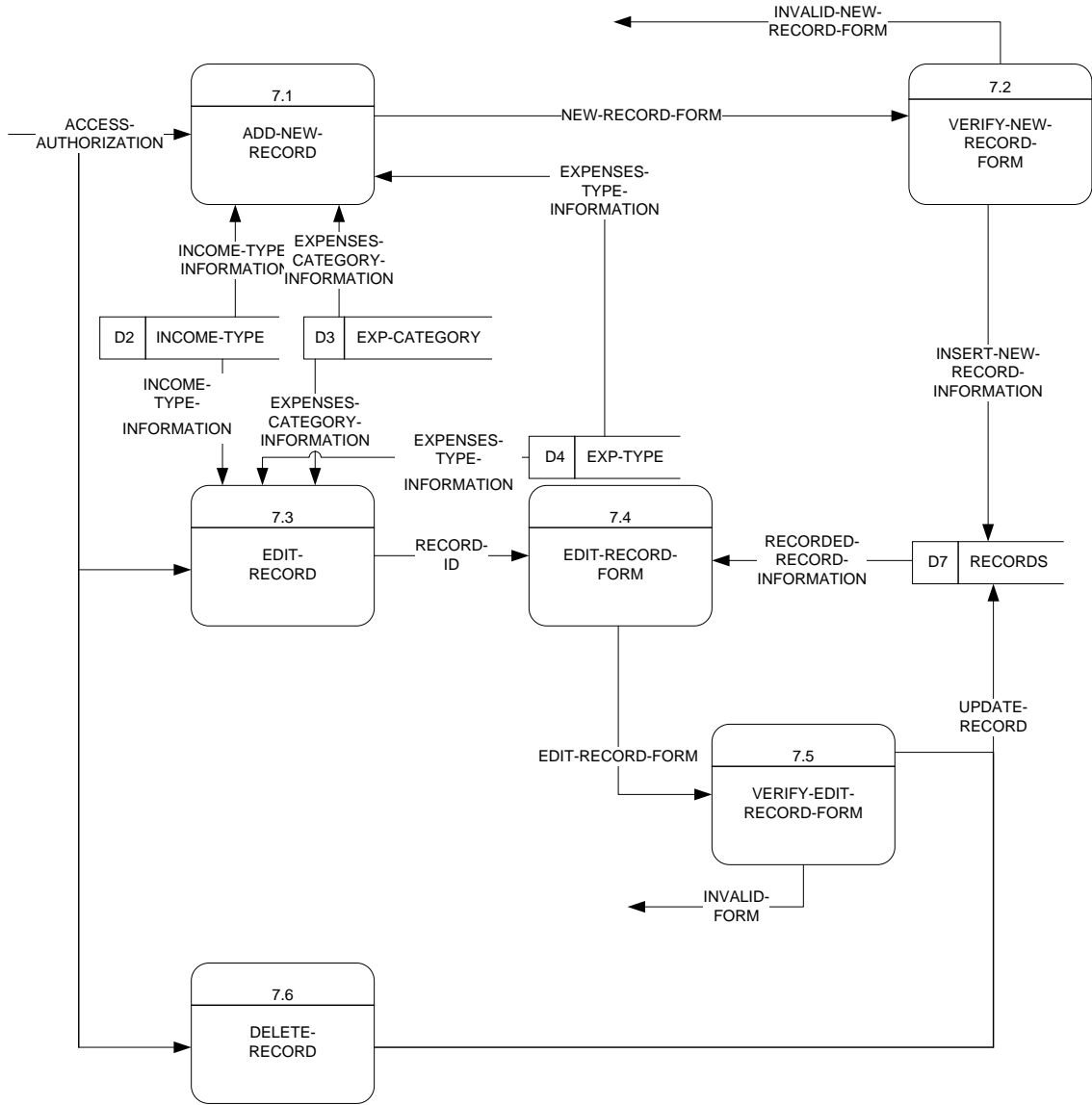
Figure 5-3-9 Records Flow

8.0 Reports for Intelligent Budget Planner
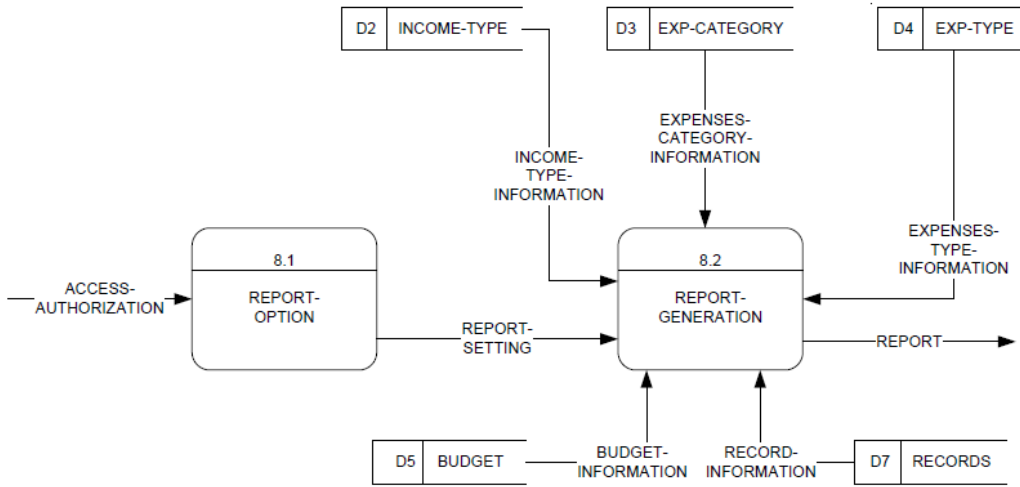
Figure 5-3-10 Report Maintenance Flow

9.0 Account Setting for Intelligent Budget Planner
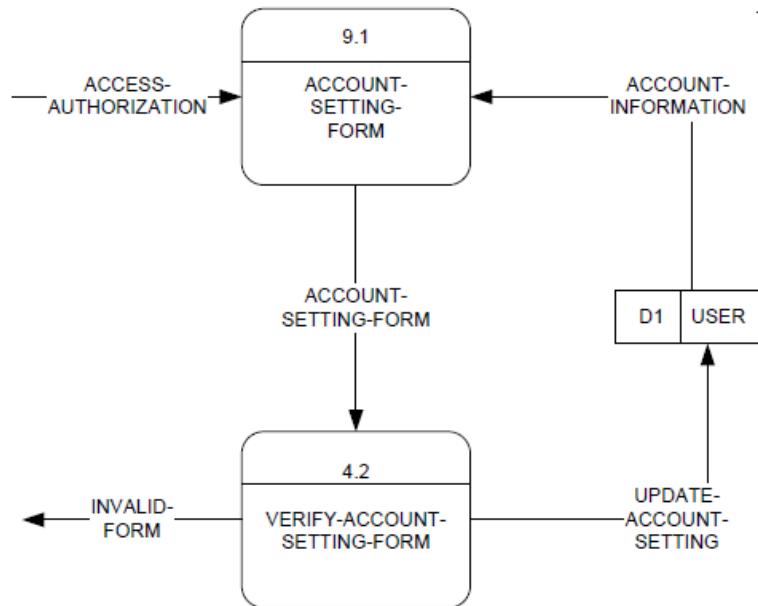
Figure 5-3-11 Account Setting Flow

Chapter 6

Database Design

Contents:

6-1   Database Environment

6-2   Naming Convention

6-3   Entity Dictionary

6-4   Data Dictionary

6-5   Entity Relationship Diagram

6-6   Database Logical Design

6-1 Database Environment

The database for Intelligent Budget Planner is developed using Microsoft SQL Server Compact 3.5. There are 9 tables in the database.

Tables for this system include:

- usertbl (for users' particulars records)
- secretQuestiontbl (for secret questions records)
- dobtbl (for days, months and years records)
- incomeTypetbl (for income type records)
- expensesCategorytbl (for expenses category records)
- expensesTypetbl (for expenses type records)
- budgettbl (for budget records)
- recordtbl (for daily and monthly records)
- savingtbl (for bank records)

Refer to section 6-3 Entity Dictionary for more information.

6-2 Naming Convention

There are a few naming conventions in Intelligent Budget Planner's database. Every table name is end with "tbl", while every column in the table must start with first letter of its table's name. For the user table is name as "usertbl" while its column will be "uID".

Refer the following table for more details about naming convention.

Name	Type	Description
tbl	Table ending name	Every table must end with this naming convention.
u	User table's starting column name	Every column in user table must start with this naming convention.
s	Secret Question table's starting column name	Every column in secret question table must start with this naming convention.
d	DOB table's starting column name	Every column in dob table must start with this naming convention.
it	IncomeType table's starting column name	Every column in incomeType table must start with this naming convention.
ec	ExpensesCategory table's starting column name	Every column in expensesCategory table must start with this naming convention.
et	ExpensesType table's starting column name	Every column in expensesType table must start with this naming convention.
b	Budget table's starting column name	Every column in budget table must start with this naming convention.
r	Record table's starting column name	Every column in record table must start with this naming convention.
sv	Saving table's starting column name	Every column in saving table must start with this naming convention.

Table 6-2-1 Naming Convention

6-3 Entity Dictionary

The following table is showing the description of each table in the database:

Table Name	Description
usertbl	Store users' information
secretQuestion	Store secret questions' information
Dob	Store years, months and days
incomeType	Store income types' information
expensesCategory	Store expenses categories' information
expensesType	Store expenses types' information
budget	Store budgets' information
record	Store records' information in income and expenses
saving	Store savings' information such as debit records and credit records

Table 6-3-1 Intelligent Budget Planner Entity Dictionary

Refer to 6-4 Data Dictionary for every column's information.

6-4 Data Dictionary

Every column will be explained in detail in this section. Refer the following tables for more information.

usertbl (for Users' particulars records)

Field Name	Data Type	Key	Description
uID	numeric(10)	PK	User ID
uname	nvarchar(32)		User login name
upassword	nvarchar(15)		User login password
uQuestionID	numeric(2)	FK – secretQuestiontbl (sQuestionID)	Secret question ID
uAnswer	nvarchar(30)		Secret answer
ufName	nvarchar(20)		First name
ulName	nvarchar(20)		Last name
ugender	nvarchar(6)		Gender
umonth	nvarchar(10)		Date of Birth: Month
uday	numeric(2)		Date of Birth: Day
uyear	numeric(4)		Date of Birth: Year
ulogin	numeric(1)		First time login: 1 = Yes, 0 = No

Table 6-4-1 usertbl Data Dictionary

secretQuestiontbl (for secret questions records)

Field Name	Data Type	Key	Description
sQuestionID	numeric(2)	PK	Secret question ID
sQuestion	nvarchar(50)		Secret question

Table 6-4-2 secretQuestiontbl Data Dictionary

dobtbl (for days, months and years records)

Field Name	Data Type	Key	Description
dyear	numeric(4)	PK	Year
dmonth	nvarchar(10)		Month
dday	numeric(2)		Day

Table 6-4-3 dobtbl Data Dictionary

incomeTypetbl (for income type records)

Field Name	Data Type	Key	Description
itID	numeric(3)	PK	Income Type ID
itTitle	nvarchar(20)		Income type title
itDesc	nvarchar(300)		Income type description
ituID	numeric(10)	FK – usertbl (uID)	User ID
itVisible	numeric(1)		Visibility: 1 = shown, 0 = hidden, 2 = Saving

Table 6-4-4 incomeTypetbl Data Dictionary

expensesCategorytbl (for expenses category records)

Field Name	Data Type	Key	Description
ecID	numeric(3)	PK	Expenses Category ID
ecTitle	nvarchar(20)		Expenses Category title
ecDesc	nvarchar(200)		Expenses category description
ecuID	numeric(10)	FK – usertbl (uID)	Expenses category user ID
ecVisible	numeric(1)		Visibility: 1 = shown, 0 = hidden, 2 = Saving

Table 6-4-5 expensesCategorytbl Data Dictionary

expensesTypetbl (for expenses type records)

Field Name	Data Type	Key	Description
etID	numeric(3)	PK	Expenses Type ID
etecID	numeric(3)	FK – expensesCategorytbl (ecID)	Expenses Category ID
etTitle	nvarchar(20)		Expenses type title
etDesc	nvarchar(200)		Expenses type description
etuID	numeric(10)	FK – userTbl (uID)	Expenses type user ID
etmonthly	nvarchar(3)		Monthly type: Yes = Monthly, No = Daily
etVisible	numeric(1)		Visibility: 1 = shown, 0 = hidden, 2 = Saving

Table 6-4-6 expensesTypetbl Data Dictionary

budgettbl (for budget records)

Field Name	Data Type	Key	Description
bID	numeric(10)	PK	Budget ID
buID	numeric(10)	FK – usertbl (uID)	User ID
bTypeID	numeric(3)	FK – expensesTypetbl (etID)	Budget Type ID
bAmount	numeric(10, 2)		Budget amount

Table 6-4-7 budgettbl Data Dictionary

r*ecordtbl* (for daily and monthly records)

Field Name	Data Type	Key	Description
rID	numeric(10)	PK	Daily record ID
ruID	numeric(10)	FK – usertbl (uID)	User ID
rType	numeric(1)		Record type: 1=Income, 0=Expenses
rTypeID	numeric(3)	FK – expensesTypetbl (etID)	Daily record Type ID
rDate	datetime		Daily record Date
rDesc	nvarchar(200)		Daily record Description
rAmount	numeric(10,2)		Daily record Amount
rStatus	nvarchar(3)		Status: Yes: Fixed, No: Not fixed
rCheck	nvarchar(1)		Fixed record generation status
rFrom	nvarchar(10)		Record source

Table 6-4-8 recordtbl Data Dictionary

savingtbl (for bank records)

Field Name	Data Type	Key	Description
svID	numeric(10)	PK	Saving ID
svuID	numeric(10)	FK – usertbl (uID)	User ID
svAmount	numeric(10, 2)		Saving amount
svDate	datetime		Saving Date
svType	nvarchar(10)		Check is credit or debit
svrID	numeric(10)	FK – recordtbl (rID)	Record ID, for checking
svDesc	nvarchar(200)		Saving description

Table 6-4-9 savingtbl Data Dictionary

6-6 Entity Relationship Diagram
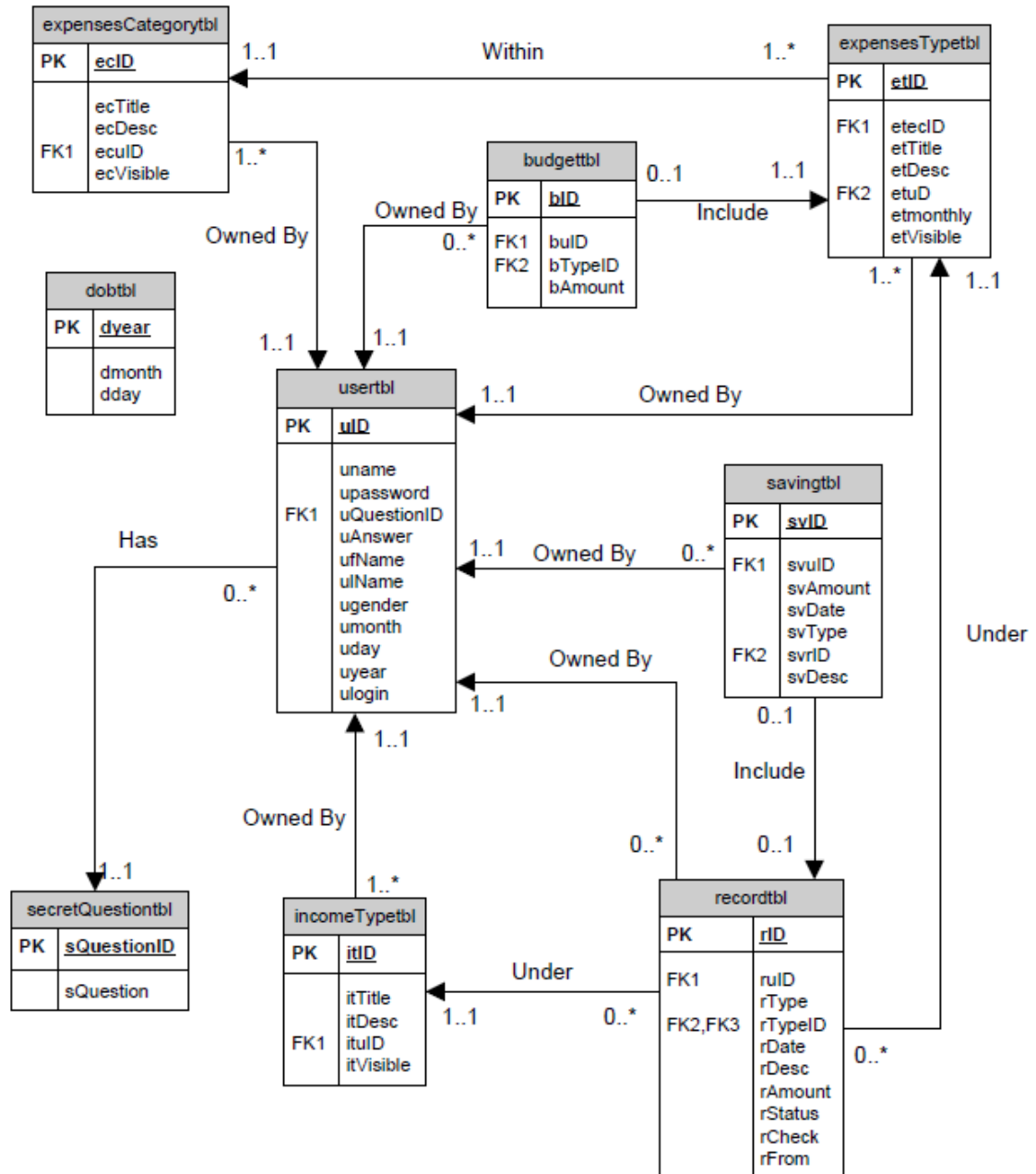
Figure 6-5-1 Intelligent Budget Planner Entity Relationship Diagram

This entity relationship diagram (ERD) is the 11th version. The ERD has to change after the requirement changed. From this ERD, the usertbl table is the most important table in the database. Almost every table has the usertbl table's column, uID. It is because every user has different records, income types, expenses categories, expenses types, budgets and savings. For example, user A has an income type called "Salary", but user B has an income type called "Part-Time Salary". In order to keep track the integrity, every table must has the usertbl table's column, uID. For the dobtbl table, it does no has any relationship with other tables, however the usertbl table are referring the dobtbl table to input users' date of birth.

Refer to section 6-6 Database Logical Design for more details.

6-6 Database Logical Design

There are 3 logical designs for this database such as *security*, *duplication of same records*, and *deletion of data*. Every logical design has an important role in this database.

Refer the following paragraph for more information.

Security

Users need to login in order to access this system. However, there are 3 forms that without login: login form, register form and forgot password form. This system also must ensure that a user cannot view, modify or delete other users' records. For example, user A can only login and view, modify or delete his records.

Duplications of same records

Intelligent Budget Planner will restrict duplication of same records. For *income type, expenses category* and *expenses type*, users are not allow to insert more than one of same record. Before the record is insert into the database, this system will check is there any duplicate record in the user records database. If duplicated record is found, this system will notify the user that the record is already existed and stop the user to insert that record.

This restriction also applies on editing a record. For example, in *income type*, there already a record name "Salary", if the user tries to edit another record and update the record to "Salary", this system will stop the update and notify the user that the record already existed.

During user registration, users are not allowed to use a same username with other users. For example, if there is a user registered as "USER", this "USER" only can owned by 1 person.

Duplication of same record only allow in *income record* and *expenses record*. Since the users may have more than one income or expenses records every day.

Deletion of records

In Intelligent Budget Planner, users only can delete their *income record* and *expenses record* permanently from the database. However, the users cannot delete maintenance type records such as *income type*, *expenses category*, *expenses type*, *username* and *password*. For example, once the user A insert an income type called "Part-Time Salary", all the users including user A cannot delete this income type. However, only user A can modify this income type to other name as long as not duplication.

<div align="right">**Chapter 7**</div>

Implementation and Deployment

Contents:

7-1 System Implementation Overview

After all the forms of Intelligent Budget Planner are developed, this system is implemented in normal personal computer which means a normal computer can access to this system as long as this system is installed in the computer.

Users will need to install this system first in order to access this system. Before a user can use the features of Intelligent Budget Planner, he/she must first register his/herself as a user to Intelligent Budget Planner. After login to this system, users will first bring to *Account Maintenance* form. For the first time users, it is recommended that the users create their own income types in *Income Maintenance*, expenses category, expenses types and budget in *Expenses Maintenance*. Then users now may start to add their daily or monthly records.

Since this is a new developed system, there is no any changeover process need to be taken during system implementation. Software that required for the implementation of Intelligent Budget Planner is Microsoft SQL Server 2008 and Microsoft Windows 7 Basic.

Refer to Appendix: Installation Guide for installation quick guide.

7-2 System Implementation

Intelligent Budget Planner is a financial based application. It is developed by *Visual Studio 2010 Ultimate* and *Microsoft SQL Server Compact 3.5*. The following will briefly explain about these software:

Visual Studio 2010 Ultimate

Since Intelligent Budget Planner used Visual Basic to support the whole system, a powerful compiler is needed. Visual Studio 2010 Ultimate has been chosen by the developer because it supports GUI and it quick easy to be used. Develop can just simply drag and drop the controls to the forms and hence design the form easily.

Microsoft SQL Server Compact 3.5

Every application needs a powerful database and hence Microsoft SQL Server Compact 3.5 has been chosen for Intelligent Budget Planner. Since Microsoft SQL Server Compact 3.5 is a Visual Studio built-in database, the developer can connect the database easily. Microsoft SQL Server Compact 3.5 is fairly easy to be used; hence it is a very good choice for developing application.

7-3 System Requirements

For the installation of Intelligent Budget Planner, there are some requirements which are as stated below:

Software		
	Minimum	*Recommended*
Operating System (OS):	Microsoft Windows XP Professional	Microsoft Windows 7 Basic
OS Service Pack:	Service Pack 2	Service Pack 2
Service:	Microsoft .Net Framework 2	Microsoft .Net Framework 4
Database Model:	Microsoft SQL Server 2000	Microsoft SQL Server 2008
Hardware		
	Minimum	*Recommended*
CPU:	Intel Pentium 4 D / AMD64 Athlon	Intel Core Duo / AMD 64 X2
RAM:	2GB	4GB or more
Hard Drive:	80GB	160GB or more

Table 7-3-1 System Requirements

<div align="right">

Chapter 8

</div>

<div align="right">

Testing

</div>

Contents:

8-1 Unit Testing

In unit testing, each program or function is tested base on a stand-alone basis. In Intelligent Budget Planner, there are some functions are tested right after the developer finish creating them. For example, an add income transaction function is tested with mock data right after the developer create the function. Usually the developer will try to add an amount of income and check whether the function is run correctly or not. If got any bugs or errors, the developer will fix it easily. Refer to section 8-3 Test Steps for further information.

8-2 System Testing

The purpose of system testing is to test the behavior of an entire system or independent subsystem. In this system testing, this system was test thoroughly and carefully. Besides, it also tests for discrepancies between this system and its original objective, current specifications and system documentation.

In Intelligent Budget Planner, the system testing is performed after the developer finishes all the functions of the system. For example, the developer tries to register and use that username and password to log in to the system. If there are any bugs or errors, the developer can fix it. Beside, the developer also will test the documentation of this system by examine it. Usually both of the tests will be performed by more than 1 person so that can find the errors or bugs easily. Refer to section 8-3 Test Steps for more information.

8-3 Test Steps

The following test steps were taken out to perform unit and system test.

Test for Main/Login Page

ID	Test Step	Actual Result	Remarks
1	Open Intelligent Budget Planner, the login form should be appeared with 2 text fields for the input of username and password.	YES | NO	
2	Try to login without filling any fields of the username or password. This system shall notify you that the fields cannot be blanked.	YES | NO	
3	Try to login with any unregistered username and password. This system shall notify you that either the username or password is incorrect.	YES | NO	
4	Click on Register button, the registration form shall appear.	YES | NO	
5	Click on "Forgot Your Password" link, the forgot password form shall appear.	YES | NO	
6	Try to login with username and password, this system shall authorize you to use this system and show your first name and last name.	YES | NO	
7	Close the Login Form, this system shall ask you to confirm exit this system.	YES | NO	
8	Click the Yes button after this system asks you to confirm exit, this system shall exited.	YES | NO	
9	Click the No button after this system asks you to confirm exit, this system shall remain unchanged.	YES | NO	

Table 8-3-1 Main / Login Form Testing

Test for Registration Page

ID	Test Step	Actual Result	Remarks
1	Try to register with a registered username and fill all the essential fields (marked with *), this system should notify you that the username is already registered.	YES | NO	
2	Try to click the Register button without filling any of the registration form fields, this system shall notify you that the essential fields should not be blanked.	YES | NO	
3	Try to fill all the essential fields with valid value and click on the Register button, this system shall notify you that you are registered successful and link back to Login Form.	YES | NO	
4	Try to click on the Next button, the registration form shall change to Expenses Category and Type Registration Form.	YES | NO	
5	Try to click on the Back button, the registration form shall change to Personal Detail Registration Form.	YES | NO	
6	Try to click on the Cancel button, the registration form shall closed and Login Form.	YES | NO	

Table 8-3-2 Registration Form Testing

Test for Password Recovery

ID	Test Step	Actual Result	Remarks
1	Click on the Submit button without filling any of the forgot password form fields, this system shall notify you that the essential field should not be blanked.	YES | NO	
2	Try to fill in the wrong information and click on the Submit button, this system shall notify you that fail to retrieve the user's password.	YES | NO	
3	Try to fill in the correct information and click on the Submit button, this system shall notify your password and link back to Login Form.	YES | NO	
4	Try to click on the Cancel button, this system shall link back to Login Form.	YES | NO	

Table 8-3-3 Password Recovery Testing

Test for Income Records

ID	Test Step	Actual Result	Remarks
1	After login to this system, the income form shall appear.	YES | NO	
2	Click on Add New Income Transaction button, a top right form shall enable.	YES | NO	
3	Click on Edit this income transaction button, a top right form filled with the selected income record's information shall enable.	YES | NO	
4	Try to click on Submit button without filling any information on the top right form, this system shall notify you that the essential fields should not be blanked.	YES | NO	

5	Try to click on Submit button after fill in the information on the top right form, this system shall update the income form.	YES | NO	
6	Try to click on Cancel button, this system shall discard the text and disable the top right form.	YES | NO	
7	Try to click on Reset button, this system shall discard the text of the top right form.	YES | NO	
8	Try to click on Delete this income transaction button, a delete transaction confirmation form shall appear.	YES | NO	
9	Try to click on Yes button of delete transaction confirmation form, this system shall update the income form.	YES | NO	
10	Try to click on No button of delete transaction confirmation form, this system shall remain unchanged.	YES | NO	
11	Try to click on Transfer money from bank, a Transfer Money from Bank to Cash form shall appear.	YES | NO	
12	Try to click the Submit button of Transfer Money from Bank to Cash form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
13	Try to click the Submit button of Transfer Money from Bank to Cash form with filled information, this system shall update the bank table and link back to income form.	YES | NO	
14	Try to click the Cancel button of Transfer Money from Bank to Cash form, this system shall discard all the text of that form and link back to income form without any changed.	YES | NO	

15	Try to click the Reset button of Transfer Money from Bank to Cash form, this system shall discard all the text of that form.	YES | NO	
16	Click on Add a new income type button, an Add a new income type form shall appear.	YES | NO	
17	Try to click on Submit button of Add a new Income Type form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
18	Click on Submit button of Add a new Income Type form with filled information, this system shall update the income type and link back to income form.	YES | NO	
19	Try to click the Cancel button of Add a new Income Type form, this system shall discard all the text of that form and link back to income form without any changed.	YES | NO	
20	Try to click the Reset button of Add a new Income Type form, this system shall discard all the text of that form.	YES | NO	
21	Click on Edit an income type button, an Edit an income type form shall appear.	YES | NO	
22	Try to click on Submit button of Edit an Income Type form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
23	Click on Submit button of Edit an Income Type form with filled information, this system shall update the income type and link back to income form.	YES | NO	
24	Try to click the Cancel button of Edit an Income	YES | NO	

	Type form, this system shall discard all the text of that form and link back to income form without any changed.		
25	Try to click the Reset button of Edit an Income Type form, this system shall discard all the text of that form.	YES | NO	
26	Click the Previous Month button, this system shall change the income form's data with the previous month of this system date.	YES | NO	
27	Click the This Month button, this system shall change the income form's data with the same month of this system date.	YES | NO	
28	Click the Next Month button, this system shall change the income form's data with the next month of this system date.	YES | NO	
29	Click the Filter button, this system shall change the income form's data with the month and year of the selected data from the combo boxes besides the filter button.	YES | NO	
30	Try to close the income form, a log out confirmation message shall appear.	YES | NO	
31	Try to click Yes button of the confirmation message, this system shall log out the current user and link back to Login Form.	YES | NO	
32	Try to click No button of the confirmation message, this system shall link back to income form and remain unchanged.	YES | NO	

Table 8-3-4 Income Records Testing

Test for Expenses Records

ID	Test Step	Actual Result	Remarks
1	Click on Expenses button, this system shall link to Expenses Form.	YES | NO	
2	Click on Daily Radio button, the expenses form shall change to daily expenses form.	YES | NO	
3	Click on Monthly Radio button, the expenses form shall change to monthly expenses form.	YES | NO	
4	Click on Add A New Expenses Record button, a top right form shall enable.	YES | NO	
5	Click on Edit Expenses Record button, a top right form filled with the selected expenses record's information shall enable.	YES | NO	
6	Try to click on Submit button without filling any information on the top right form, this system shall notify you that the essential fields should not be blanked.	YES | NO	
7	Try to click on Submit button after fill in the information on the top right form, this system shall update the expenses form.	YES | NO	
8	Try to click on Cancel button, this system shall discard the text and disable the top right form.	YES | NO	
9	Try to click on Reset button, this system shall discard the text of the top right form.	YES | NO	
10	Try to click on Delete this expenses record button, a delete expenses record confirmation form shall appear.	YES | NO	
11	Try to click on Yes button of delete expenses record confirmation form, this system shall update the expenses form.	YES | NO	

12	Try to click on No button of delete expenses record confirmation form, this system shall remain unchanged.	YES | NO	
13	Try to click on Transfer money to bank button, a Transfer Money from Cash to Bank form shall appear.	YES | NO	
14	Try to click the Submit button of Transfer Money from Cash to Bank form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
15	Try to click the Submit button of Transfer Money from Cash to Bank form with filled information, this system shall update the bank table and link back to expenses form.	YES | NO	
16	Try to click the Cancel button of Transfer Money from Bank to Cash form, this system shall discard all the text of that form and link back to expenses form without any changed.	YES | NO	
17	Try to click the Reset button of Transfer Money from Cash to Bank form, this system shall discard all the text of that form.	YES | NO	
18	Click on Add a new expenses category button, an Add a new expenses category form shall appear.	YES | NO	
19	Try to click on Submit button of Add a new expenses category form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
20	Click on Submit button of Add a new expenses category form with filled information, this system shall update the expenses category and link back to expenses form.	YES | NO	

21	Try to click the Cancel button of Add a new expenses category form, this system shall discard all the text of that form and link back to expenses form without any changed.	YES | NO	
22	Try to click the Reset button of Add a new expenses category form, this system shall discard all the text of that form.	YES | NO	
23	Click on Edit expenses category button, an Edit an expenses category form shall appear.	YES | NO	
24	Try to click on Submit button of Edit an expenses category form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
25	Click on Submit button of Edit an expenses category form with filled information, this system shall update the expenses category and link back to expenses form.	YES | NO	
26	Try to click the Cancel button of Edit an expenses category form, this system shall discard all the text of that form and link back to expenses form without any changed.	YES | NO	
27	Try to click the Reset button of Edit an expenses category form, this system shall discard all the text of that form.	YES | NO	
28	Click on Add a new expenses type button, an Add a new expenses type form shall appear.	YES | NO	
29	Try to click on Submit button of Add a new expenses type form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
30	Click on Submit button of Add a new expenses type	YES | NO	

	form with filled information, this system shall update the expenses type and link back to expenses form.		
31	Try to click the Cancel button of Add a new expenses type form, this system shall discard all the text of that form and link back to expenses form without any changed.	YES | NO	
32	Try to click the Reset button of Add a new expenses type form, this system shall discard all the text of that form.	YES | NO	
33	Click on Edit expenses type button, an Edit an expenses type form shall appear.	YES | NO	
34	Try to click on Submit button of Edit an expenses type form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
35	Click on Submit button of Edit an expenses type form with filled information, this system shall update the expenses type and link back to expenses form.	YES | NO	
36	Try to click the Cancel button of Edit an expenses type form, this system shall discard all the text of that form and link back to expenses form without any changed.	YES | NO	
37	Try to click the Reset button of Edit an expenses type form, this system shall discard all the text of that form.	YES | NO	
38	Change the date of the calendar picker, the daily expenses form's data shall change to that selected date.	YES | NO	
39	Click the Previous Month button, this system shall	YES | NO	

	change the monthly expenses form's data with the previous month of this system date.		
40	Click the This Month button, this system shall change the monthly expenses form's data with the same month of this system date.	YES | NO	
41	Click the Next Month button, this system shall change the monthly expenses form's data with the next month of this system date.	YES | NO	
42	Click the Filter button, this system shall change the monthly expenses form's data with the month and year of the selected data from the combo boxes besides the filter button.	YES | NO	
43	Try to close the expenses form, a log out confirmation message shall appear.	YES | NO	
44	Try to click Yes button of the confirmation message, this system shall log out the current user and link back to Login Form.	YES | NO	
45	Try to click No button of the confirmation message, this system shall link back to expenses form and remain unchanged.	YES | NO	

Table 8-3-5 Expenses Records Testing

Test for Bank Records

ID	Test Step	Actual Result	Remarks
1	Click on Bank button, this system shall link to Bank Form.	YES | NO	
2	Try to click on Transfer cash to bank button, a Transfer Money from Cash to Bank form shall appear.	YES | NO	
3	Try to click the Submit button of Transfer Money from Cash to Bank form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
4	Try to click the Submit button of Transfer Money from Cash to Bank form with filled information, this system shall update the bank table and link back to bank form.	YES | NO	
5	Try to click the Cancel button of Transfer Money from Bank to Cash form, this system shall discard all the text of that form and link back to bank form without any changed.	YES | NO	
6	Try to click the Reset button of Transfer Money from Cash to Bank form, this system shall discard all the text of that form.	YES | NO	
7	Try to click on Transfer bank to cash, a Transfer Money from Bank to Cash form shall appear.	YES | NO	
8	Try to click the Submit button of Transfer Money from Bank to Cash form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
9	Try to click the Submit button of Transfer Money from Bank to Cash form with filled information, this	YES | NO	

	system shall update the bank table and link back to bank form.		
10	Try to click the Cancel button of Transfer Money from Bank to Cash form, this system shall discard all the text of that form and link back to bank form without any changed.	YES | NO	
11	Click the Previous Month button, this system shall change the bank form's data with the previous month of this system date.	YES | NO	
12	Click the This Month button, this system shall change the bank form's data with the same month of this system date.	YES | NO	
13	Click the Next Month button, this system shall change the bank form's data with the next month of this system date.	YES | NO	
14	Click the Filter button, this system shall change the bank form's data with the month and year of the selected data from the combo boxes besides the filter button.	YES | NO	
15	Try to close the bank form, a log out confirmation message shall appear.	YES | NO	
16	Try to click Yes button of the confirmation message, this system shall log out the current user and link back to Login Form.	YES | NO	
17	Try to click No button of the confirmation message, this system shall link back to bank form and remain unchanged.	YES | NO	

Table 8-3-6 Bank Records Testing

Test for Report Generation

ID	Test Step	Actual Result	Remarks
1	Click on Report button, this system shall link to Report Form.	YES | NO	
2	Click the Income Record Report radio button, the report form shall change to income record report form.	YES | NO	
3	Click the Expenses Record Report radio button, the report form shall change to expenses record report form.	YES | NO	
4	Click the Budget with Expenses Record Report radio button, the report form shall change to budget with expenses report record report form.	YES | NO	
5	Click the Budget Report radio button, the report form shall change to budget report form.	YES | NO	
6	Click the Expenses Type Report radio button, the report form shall change to expenses type report form.	YES | NO	
7	Click the Expenses Category Report radio button, the report form shall change to expenses category report form.	YES | NO	
8	Click the Income Type Report radio button, the report form shall change to income type report form.	YES | NO	
9	On Income Record Report, after choosing the options and click the generate report, an income record report shall appear.	YES | NO	
10	On Expenses Record Report, after choosing the options and click the generate report, an expenses record report shall appear.	YES | NO	
11	On Budget with Expenses Record Report, after	YES | NO	

	choosing the options and click the generate report, a budget with expenses record report shall appear.		
12	On Budget Report, after choosing the options and click the generate report, a budget report shall appear.	YES | NO	
13	On Expenses Type Report, after choosing the options and click the generate report, a expenses type report shall appear.	YES | NO	
14	On Expenses Category Record Report, after choosing the options and click the generate report, an expenses category report shall appear.	YES | NO	
15	On Income Type Report, after choosing the options and click the generate report, an income type report shall appear.	YES | NO	
16	On the report, click the export report button, an export report window dialog shall appear.	YES | NO	
17	On the export report window dialog, click the save button, this system shall allow users to save the report into the format that users selected.	YES | NO	
18	On the report, click the print report button, the printer option menu shall appear and ready to print the report.	YES | NO	
19	Try to close the bank form, a log out confirmation message shall appear.	YES | NO	
20	Try to click Yes button of the confirmation message, this system shall log out the current user and link back to Login Form.	YES | NO	
21	Try to click No button of the confirmation message, this system shall link back to bank form and remain unchanged.	YES | NO	

Table 8-3-7 Report Generation Testing

Test for Maintenance

ID	Test Step	Actual Result	Remarks
1	Click on Account Maintenance button, this system shall link to Account Maintenance Form.	YES | NO	
2	Click the Personal Information radio button, the report form shall change to personal information form.	YES | NO	
3	Click the Income Maintenance radio button, the report form shall change to income maintenance form.	YES | NO	
4	Click the Expenses Maintenance radio button, the report form shall change to budget with expenses maintenance form.	YES | NO	
5	On Personal Information form, try to click save changes without entering any field for password, a "Your profile has been updated without updating the password" message shall appear.	YES | NO	
6	On Personal Information form, try to click save changes without entering any field for password, a "Your profile has been updated without updating the password" message shall appear.	YES | NO	
7	On Personal Information form, try to click save changes after entered the old password but without new password, this system shall notify you that essential fields should not be blanked.	YES | NO	
8	On Personal Information form, try to click save changes after enter all the information, this system shall notify you that the profile has been changed.	YES | NO	
9	On Income Maintenance form, click on Add a new income type button, an Add a new income type form	YES | NO	

	shall appear.		
10	Try to click on Submit button of Add a new Income Type form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
11	Click on Submit button of Add a new Income Type form with filled information, this system shall update the income type and link back to income maintenance form.	YES | NO	
12	Try to click the Cancel button of Add a new Income Type form, this system shall discard all the text of that form and link back to income maintenance form without any changed.	YES | NO	
13	Try to click the Reset button of Add a new Income Type form, this system shall discard all the text of that form.	YES | NO	
14	On the Income Maintenance form, Click on Edit an income type button, an Edit an income type form shall appear.	YES | NO	
15	Try to click on Submit button of Edit an Income Type form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
16	Click on Submit button of Edit an Income Type form with filled information, this system shall update the income type and link back to income maintenance form.	YES | NO	
17	Try to click the Cancel button of Edit an Income Type form, this system shall discard all the text of that form and link back to income maintenance form without any changed.	YES | NO	

18	Try to click the Reset button of Edit an Income Type form, this system shall discard all the text of that form.	YES | NO	
19	On the Expenses Maintenance form, click on Add a new expenses category button, an Add a new expenses category form shall appear.	YES | NO	
20	Try to click on Submit button of Add a new expenses category form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
21	Click on Submit button of Add a new expenses category form with filled information, this system shall update the expenses category and link back to expenses maintenance form.	YES | NO	
22	Try to click the Cancel button of Add a new expenses category form, this system shall discard all the text of that form and link back to expenses maintenance form without any changed.	YES | NO	
23	Try to click the Reset button of Add a new expenses category form, this system shall discard all the text of that form.	YES | NO	
24	On the Expenses Maintenance form, Click on Edit expenses category button, an Edit an expenses category form shall appear.	YES | NO	
25	Try to click on Submit button of Edit an expenses category form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
26	Click on Submit button of Edit an expenses category form with filled information, this system shall update the expenses category and link back to	YES | NO	

	expenses maintenance form.		
27	Try to click the Cancel button of Edit an expenses category form, this system shall discard all the text of that form and link back to expenses maintenance form without any changed.	YES | NO	
28	Try to click the Reset button of Edit an expenses category form, this system shall discard all the text of that form.	YES | NO	
29	On the Expenses Maintenance form, click on Add a new expenses type button, an Add a new expenses type form shall appear.	YES | NO	
30	Try to click on Submit button of Add a new expenses type form without fill in any information, this system shall notify you that essential fields should not be blanked.	YES | NO	
31	Click on Submit button of Add a new expenses type form with filled information, this system shall update the expenses type and link back to expenses maintenance form.	YES | NO	
32	Try to click the Cancel button of Add a new expenses type form, this system shall discard all the text of that form and link back to expenses maintenance form without any changed.	YES | NO	
33	Try to click the Reset button of Add a new expenses type form, this system shall discard all the text of that form.	YES | NO	
34	On the Expenses Maintenance Form, click on Edit expenses type button, an Edit an expenses type form shall appear.	YES | NO	
35	Try to click on Submit button of Edit an expenses type form without fill in any information, this	YES | NO	

	system shall notify you that essential fields should not be blanked.		
36	Click on Submit button of Edit an expenses type form with filled information, this system shall update the expenses type and link back to expenses maintenance form.	YES | NO	
37	Try to click the Cancel button of Edit an expenses type form, this system shall discard all the text of that form and link back to expenses maintenance form without any changed.	YES | NO	
38	Try to click the Reset button of Edit an expenses type form, this system shall discard all the text of that form.	YES | NO	

Table 8-3-8 Maintenance Testing

Test for Fixed Records

ID	Test Step	Actual Result	Remarks
1	After a month the fixed records create, this system shall automatically generate new records with the same information of the previous month.	YES | NO	

Table 8-3-9 Fixed Records Testing

8-4 Test of System's User Friendliness and Usability

The following test cases are used to test the level of user friendliness and usability of this system. During the test, guidance only will be given when tester have difficulties. An observer is observing in each test and gives guidance if the tester has problem. The observer will write down the result/remarks of each test case.

ID	Test Cases	
1	Register yourself as a member in Intelligent Budget Planner.	
	Observer:	
	Remarks:	
2	After registration, try to retrieve your password.	
	Observer:	
	Remarks:	
3	Login yourself into this system.	
	Observer:	
	Remarks:	
4	Add an income type.	
	Observer:	
	Remarks:	
5	Edit an income type.	
	Observer:	
	Remarks:	

6	Add an expenses category.	
	Observer:	
	Remarks:	
7	Edit an expenses category.	
	Observer:	
	Remarks:	
8	Add an expenses type.	
	Observer:	
	Remarks:	
9	Edit an expenses type.	
	Observer:	
	Remarks:	
10	Add and Edit a budget.	
	Observer:	
	Remarks:	
11	Add a few income transactions.	
	Observer:	
	Remarks:	
12	Edit an income transaction.	
	Observer:	
	Remarks:	
13	Delete an income transaction.	

	Observer:	
	Remarks:	
14	Add a few daily expenses records.	
	Observer:	
	Remarks:	
15	Edit a daily expenses record.	
	Observer:	
	Remarks:	
16	Delete a daily expenses record.	
	Observer:	
	Remarks:	
17	Add a few monthly expenses records.	
	Observer:	
	Remarks:	
18	Edit a monthly expenses record.	
	Observer:	
	Remarks:	
19	Delete a monthly expenses record.	
	Observer:	
	Remarks:	
20	Transfer money from cash to bank.	
	Observer:	
	Remarks:	

21	Transfer money from bank to cash	
	Observer:	
	Remarks:	
22	Generate an income record report.	
	Observer:	
	Remarks:	
23	Generate an expenses record report.	
	Observer:	
	Remarks:	
24	Generate a budget with expenses record report.	
	Observer:	
	Remarks:	
25	Generate a budget report.	
	Observer:	
	Remarks:	
26	Generate an expenses type report.	
	Observer:	
	Remarks:	
27	Generate an expenses category report.	
	Observer:	
	Remarks:	
28	Generate an income type report.	

	Observer:	
	Remarks:	
29	Export a report.	
	Observer:	
	Remarks:	
30	Print a report.	
	Observer:	
	Remarks	
31	Change your particular information (Example: password to login and etc).	
	Observer:	
	Remarks:	

Table 8-4-1 System's User Friendliness and Usability Testing Plan

8-5 Test Results

Machine used for testing

Operating System:	Microsoft Windows 7 Basic with Service Pack 2
Database Server:	Microsoft SQL Server 2008
CPU:	Intel® Core™ 2 Duo CPU T5450 @ 1.66 GHz
RAM:	4 x 1024MB Dual-DDR (4GB)
Hard Drive:	Seagate 160 GB SATA

Table 8-5-1 Software and Hardware of Testers' Computer

Test Results

There were 10 beta testers participate in this system testing. Below are the summary of the testing:

ID	System Module	
1	Main Form/Login Form	
	Functionalities:	OK
	User friendliness:	OK
	Usability:	OK
2	Registration Form	
	Functionalities:	OK
	User friendliness:	OK
	Usability:	OK

3	Password Recovery Form	
	Functionalities:	OK
	User friendliness:	OK. More guidelines should include in the form.
	Usability:	OK
4	Income Records	
	Functionalities:	OK
	User friendliness:	Confusion with the buttons. (Solution: After users try to use for more than 1 time, they will understand flow of the form.) Guidelines should be included.
	Usability:	OK
5	Expenses Records	
	Functionalities:	OK
	User friendliness:	Confusions with daily expenses and monthly expenses. (Solution: After the users try to use for more than 1 time, they will understand the flow of the form.) Guidelines should be included.
	Usability:	OK
6	Bank Records	
	Functionalities:	OK
	User friendliness:	OK
	Usability:	OK. If this system able to connect to bank and synchronize account, it would be better. (Solution: This enhancement will be carried out in the next phase of development/maintenance.)
7	Report Generation	
	Functionalities:	OK
	User friendliness:	OK

	Usability:	The report should contain more customization settings, example summary on specific income records, provide bar chart etc. (Solution: This enhancement will be carried out in the next phase of development/maintenance.)
8	Maintenance	
	Functionalities:	OK
	User friendliness:	OK
	Usability:	OK

Table 8-5-2 Test Results

Chapter 9

Conclusion and Future

Enhancement

Contents:

9-1 Conclusion

The development Intelligent Budget Planner approximately taken four months time to complete. The Intelligent Budget Planner is a personal budget management which is supported by Microsoft Windows Operating System only. The programming language used by this system is Visual Basic 6.0 (VB6). End users will only need to install the application to use this system.

In Intelligent Budget Planner, the main objective is to provide end users a place to record down their daily and monthly money transaction (income and expenses). This system will generate reports such as Income Record Report, Expenses Record Report and etc to summarize the money transaction that taken place. With Intelligent Budget Planner, users will able to create their own income types, expenses categories, expenses types and budget. Besides, end users also may retrieve their password in case they had forgotten them.

At the very first stage of the project, the scope and objectives of the project are defined clearly. Then, the task and schedule for the project was carefully planned to avoid project's delay incident occurs. After the project management phase, fact gathering task was carried out. The fact gathering technique that used is questionnaire.

After obtaining system requirements, the design of this system interfaces and database is carried out. During the design, the functions of every interface were code and enhance rapidly to achieve perfection. After the completion of this system development and implementation, this system was then tested in the area of unit testing and system testing.

In overall, the targets and objectives of the project was achieved and met. However, there are some limitations of this system. Refer to Section 9-2 Limitation for more information. Further enhancements to this system will be carried out from time to time in order to deliver end users with better and more powerful personal budget management system. Refer to Section 9-3 Future Enhancement for more information.

9-2 Limitation

Every system needs some limitations in order to perform it perfectly. There are some limitations in Intelligent Budget Planner. Refer the following paragraph for more information.

Continuous Access this system

In Intelligent Budget Planner, some fixed records will be automatically generated every month. However, if the users do not use this system continuously, there are some problems in generating those fixed records. Hence, users have to often use this system in order to avoid this problem.

Unable to retrieve username

Since Intelligent Budget Planner is not a web based application, thus users cannot retrieve username if they have forgotten. However, users may retrieve their password with the username, secret question and secret answer.

9-3 Future Enhancement

There are a few enhancements that may carry out in the future to make Intelligent Budget Planner to become more powerful system. Refer the following paragraphs for more details about future enhancement.

Report Generation

For current report generation, it only limited to a few options. Hence, it will be better if the report can generate graph (bar or line graph) showing all kind of reports. Besides, it will better if users can generate summarize whole year reports.

Mobile Application

Current system can only supported by personal computer. Hence, it will be better if this system can be supported by mobile phone. With mobile phone, users can enter their records every time and everywhere they like. After that, the users synchronize the mobile base application with the desktop based application to generate reports and other actions.

Bank Synchronization

Currently, users have to key in the bank records manually. Hence, enhancements in bank synchronization that help the users keep track their records easily. This enhancement is very helpful if the users can synchronize with the electronic banking system.

References

Alan Dennis, Barbara Haley Wixom, David Tegarden (2010). Systems Analysis and Design with UML (3rd Edition). New Jersey: John Wiley & Sons, Inc.

Bill Jennerich, BLUEBIRD ENTERPRISES INC (2007). *Joint Application Design.* Retrieved: August 1, 2010, from http://www.bee.net/bluebird/jaddoc.htm

Blue Claw Database Design (2008). *Why Choose Microsoft Access Database.* Retrieved: July 24, 2010, from http://www.blueclaw-db.com/microsoft_access.htm

CQUniversity Library (June 2010). *What is literature review?* Retrieved: July 16, 2010, from http://libguides.library.cqu.edu.au/litreview

GeekInterview (2006). *Advantages of Using Oracle.* Retrieved: July 26, 2010, from http://www.learn.geekinterview.com/database/oracle/advantages-of-using-oracle.html

HR-Guide to the Internet (2001). *Personnel Selection: Methods: Interview.* Retrieved: July 30, 2010, from http://www.hr-guide.com/data/G311.htm

IEEExplore (29 October, 2010). *Telecommunication and information exchange between systems.* Retrieved: July 22, 2010, from http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=5307322

John Milne, Learning Technology Dissemination Initiative (25 March 1999). *Questionnaires: Advantages and Disadvantages*. Retrieved: August 2, 2010, from http://www.icbl.hw.ac.uk/ltdi/cookbook/info_questionnaires/index.html

Microsoft Office Official Website (2010). *Access 2010 features and benefits.* Retrieved: July 24, 2010, from http://office.microsoft.com/en-us/access/access-2010-features-and-benefits-HA101809011.aspx

Office Of Consumer (11 October 2003). *OCC: water terms*. Retrieved: July 16, 2010, from http://www.ct.gov/occ/cwp/view.asp?a=1415&q=260514

Oracle Database Official Website (2010). *Oracle Database.* Retrieved: July 26, 2010, from http://www.oracle.com/us/products/database/index.html

Ryan, Cash Money Life (2 March 2009). *You need a Budget Review.* Retrieved: August 3, 2010, from http://cashmoneylife.com/2009/03/02/you-need-a-budget-ynabpro-review/

SoftSea (10 October 2005). *My Budget Keeper Review and Download.* Retrieved: July 18, 2010, from http://www.softsea.com/review/My-Budget-Keeper.html

Wikipedia (18 June 2010). *Problem Statemen.* Retrieved: July 16, 2010, from http://en.wikipedia.org/wiki/Problem_statement

Wikipedia (20 May 2010). *Objective (goal).* Retrieved: July 16, 2010, from http://en.wikipedia.org/wiki/Objective_(goal)

Appendix A

Questionnaire

Contents:

A-1 Question Set

Questionnaire for Intelligent Budget Planner

Occupation: _____

Age   :   _____

Gender: _____

Personal Information

1. Are you currently (tick only one):

☐ married   ☐ separated   ☐ windowed

☐ single   ☐ divorced

2   Your currently income (tick only one):

☐ < RM 1000

☐ RM 1000 – 1999

☐ RM 2000 – 2999

☐ RM 3000 – 3999

☐ RM4000 – 4999

☐ > RM 5000

Budget Information

1. Do you know what a budget planner is?   _____

   Please write Yes/No/Maybe for the rest of the questions

2. Do you wish to have a budget planner to help you?   _____

3. Will you feel annoy if you have to key in your fixed transaction?   _____

4. Do you wish a system can calculate your budget?   _____

5. Do you want a report to view all your daily spending?   _____

6. Please put some comments (optional)

   _____

   _____

A-1 Results

From the questionnaire, the developer has gathered the requirements from 80 users. The following pie chart will explain the result from the users.
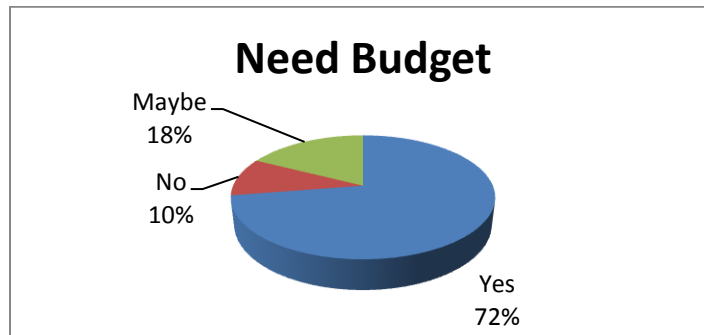
Figure A-1 Pie Chart of Need Budget

From the figure A-1, there are 58 of 80 users would like to have a budget planner to help them to plan their budget. There are only 8 users do not want to have a budget planner while 14 users think they considering whether want to have a budget planner.
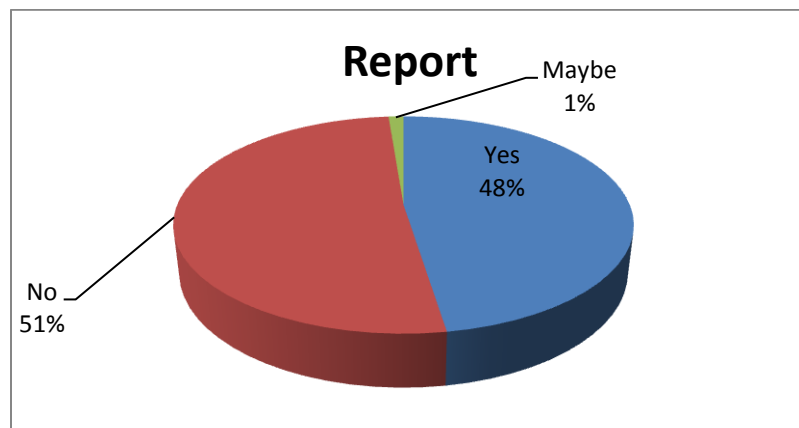
Figure A-2 Pie Chart of Report Viewing

Figure A-3 shows that there are 75 users out of 80 wish to have a system to allow them to view their daily spending in report form. There are only 3 users do not want to have this features and there is 2 users choose the maybe option.
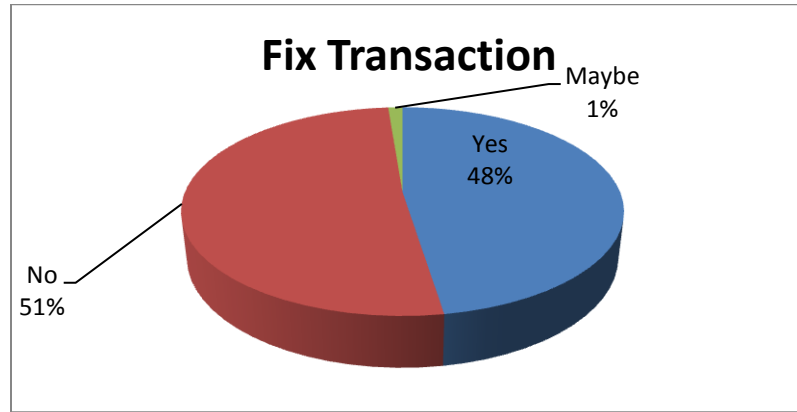
Figure A-3 Pie Chart of Fixed Transaction

Figure A-4 shows that there is 38 out of 80 users will feel annoy if they have to keep key in the same income and expenses. While there are 41 users will not feel annoy and 1 user choose maybe option.

Appendix B

Gantt Chart

Contents:

B-1 Project Scheduling

Tasks	Start Date	Duration (Days)	End Date
Chp 1: Introduction	23/6/2010	2	25/6/2010
Chp 1: Problem Statement	25/6/2010	2	27/6/2010
Chp 1: Objective	26/6/2010	2	28/6/2010
Chp 1: Scope of Work	28/6/2010	3	1/7/2010
Chp 1: Target User	1/7/2010	1	2/7/2010
Chp 2: Technology Involved	6/7/2010	5	11/7/2010
Chp 2: Methodology	12/7/2010	2	14/7/2010
Chp 2: Fact Finding	15/7/2010	2	17/7/2010
Chp 2: Existing System	8/7/2010	14	22/7/2010
Chp 3: Requirement Gathering Method	23/7/2010	7	30/7/2010
Chp 3: System Requirement	31/7/2010	6	6/8/2010
Chp 4: Methodologies Chosen	7/8/2010	1	8/8/2010
Chp 4: Application of Chosen Methodologies	9/8/2010	3	12/8/2010
Chp5: Use Case Design	4/10/2010	8	12/10/2010
System Interface Design	13/10/2010	15	28/10/2010
Chp6: Data Dictionary	29/10/2010	10	8/11/2010
Chp6: Entity Relationship Diagram	9/11/2010	5	14/11/2010
Database Design	15/11/2010	15	30/11/2010
Chp7: Implementation	1/12/2010	5	6/12/2010
System Functionalities Design	7/12/2010	10	17/12/2010
System Functionalities Programming	18/12/2010	45	1/2/2011
System Interface Implementation	2/2/2011	15	17/2/2011
Chp7: Technical Specification	18/2/2011	5	23/2/2011
System Finalisation	24/2/2011	2	26/2/2011
Chp8: Testing Plan	27/2/2011	2	1/3/2011
System Testing	2/3/2011	3	5/3/2011
Chp9: Future Recommendation	6/3/2011	1	7/3/2011
Chp9: Limitation of this system	8/3/2011	1	9/3/2011
Chp9: Conclusion	10/3/2011	1	11/3/2011
Report Finalisation	12/3/2011	2	14/3/2011

Table B-1 Work Breakdown Structure

B-2 Gantt Chart

	23/6	12/8	1/10	20/11	9/1	28/2
Chp 1: Introduction						
Chp 1: Problem Statement						
Chp 1: Objective						
Chp 1: Scope of Work						
Chp 1: Target User						
Chp 2: Technology Involved						
Chp 2: Methodology						
Chp 2: Fact Finding						
Chp 2: Existing System						
Chp 3: Requirement Gathering Method						
Chp 3: System Requirement						
Chp 4: Methodologies Chosen						
Chp 4: Application of Chosen Methodologies						
Chp5: Use Case Design						
System Interface Design						
Chp6: Data Dictionary						
Chp6: Entity Relationship Diagram						
Database Design						
Chp7: Implementation						
System Functionalities Design						
System Functionalities Programming						
System Interface Implementation						
Chp7: Technical Specification						
System Finalisation						
Chp8: Testing Plan						
System Testing						
Chp9: Future Recommentation						
Chp9: Limitation of the system						
Chp9: Conclusion						
Report Finalisation						

Figure B-1 Gantt Chart

Intelligent Budget Planner

Your Personal Budget Management System

- User Manual -

Manual Rev: 1.0

Release Date: April 2011

Copyright Notice

The material in this document is the intellectual property of **Intelligent Budget Planner**. We take every care in the preparation of this documentation, but no guarantee is given as to the correctness of its contents. **Intelligent Budget Planner** is under continual improvement and we reserve the right to make changes without notice.

Revision History

Revision	Revision History	Date
V1.0	First release for Intelligent Budget Planner	April 2011

Technical Support

If a problem arises with the usage of Intelligent Budget Planner and no solution can be obtained from the user manual, please try to contact the developer at:

sengkiat.tan@gmail.com for further guidance.

CONTENTS

Chapter 1

System Setup

Contents:

1-1 System Specifications

System's Name: Intelligent Budget Planner

Version: 1.0

Programming Language: Visual Basic 6.0 (VB 6.0)

Database type: Microsoft SQL Server Compact 3.5

1-2 Installation's Guide

Minimum Requirements:

Operating System:	Microsoft Windows XP Professional with Service Pack 2
Database Model:	Microsoft SQL Server 2000
Service:	Microsoft .Net Framework 2
System Processor:	Intel Pentium 4 D / AMD64 Athlon
System RAM:	2GB or more
System Storage:	80GB or more

Installation of Intelligent Budget Planner

After you open the setup file from the CD, a setup wizard will load as shown below.

Next >

Proceed to the next page.

Cancel

Cancel the installation of Intelligent Budget Planner.
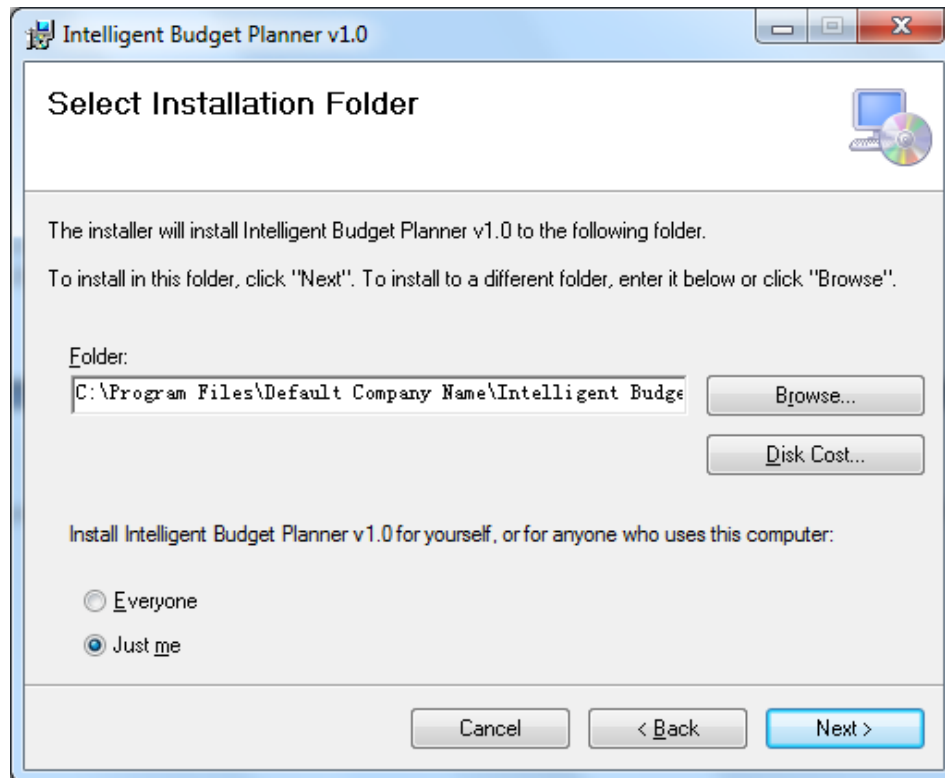
You can choose your system path to install by changing the folder field or click on Browse button. You also can choose who have the right to use this system.

Disk Cost

Click on this button to allow you to view the storage cost of Intelligent Budget Planner.

Next >

Proceed to the next page.

< Back

Back to the previous page.

Cancel

Cancel the installation of Intelligent Budget Planner.
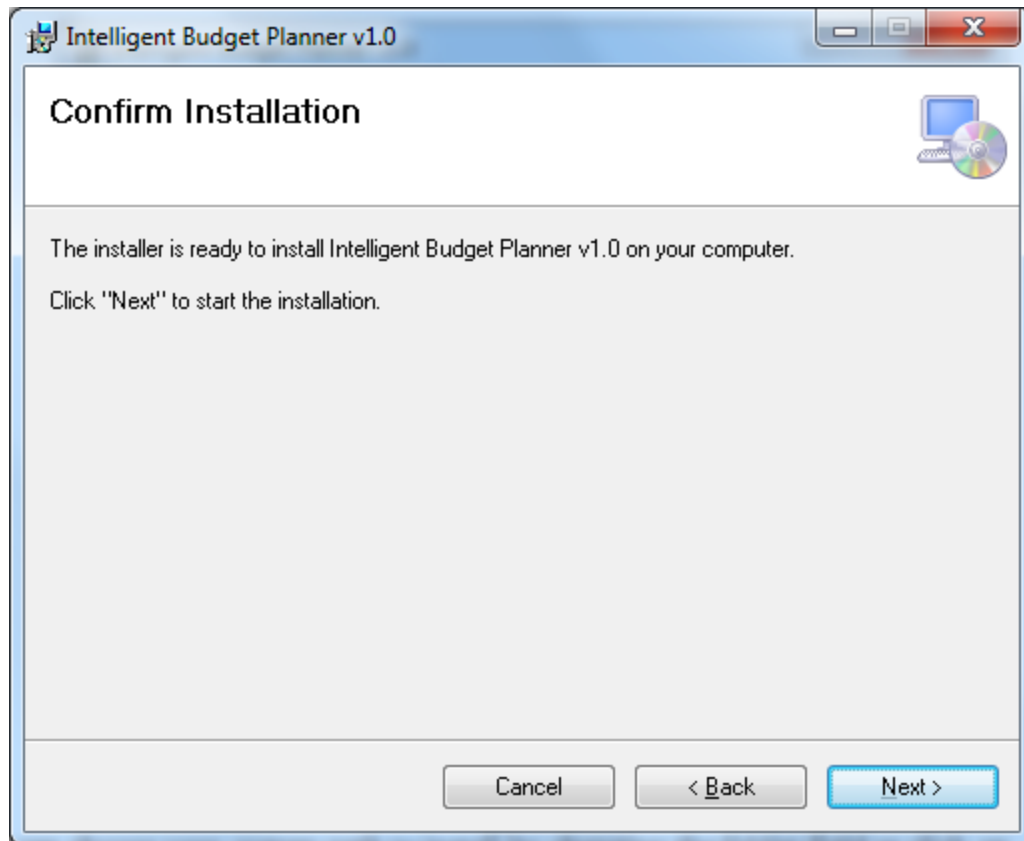
Next >

Confirm start to install Intelligent Budget Planner.

< Back

Back to the previous page.

Cancel

Cancel the installation of Intelligent Budget Planner.
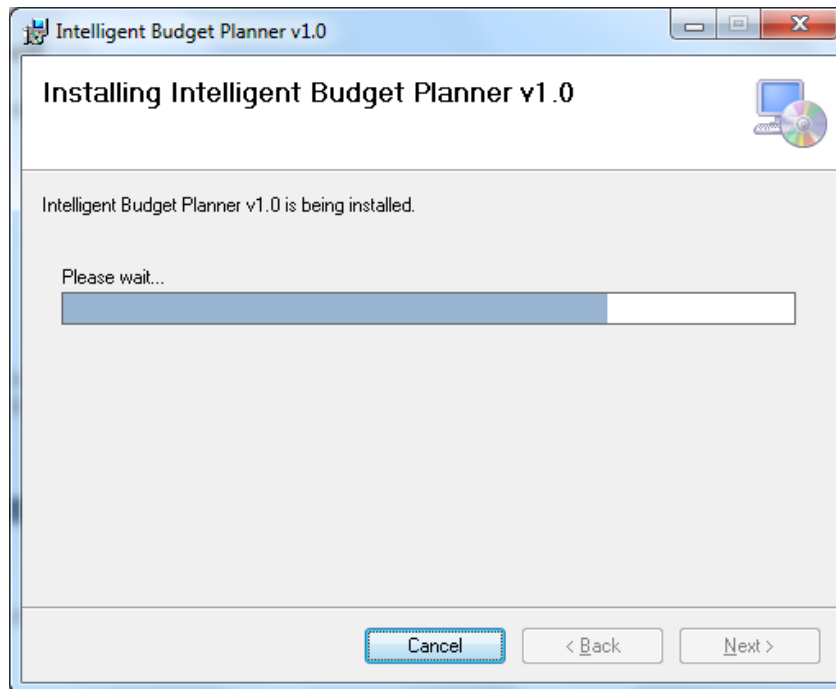
Please wait for this system to be installed. You can click **Cancel** to cancel installation.
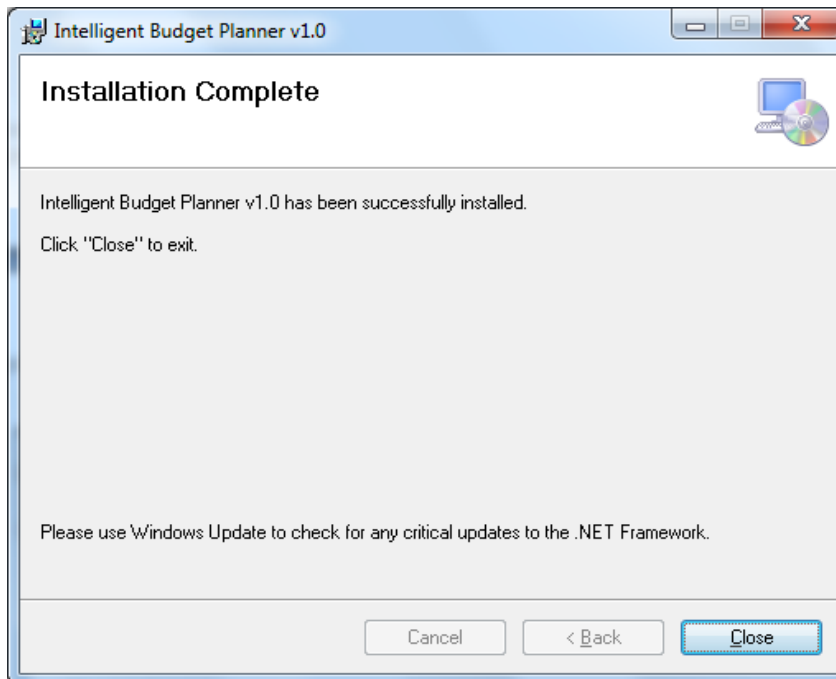
Congratulation! You have installed Intelligent Budget Planner. Thanks for using
Intelligent Budget Planner as your personal budget management system. Click **Close** to
exit the setup.

Installation for Microsoft .Net Framework 4

Open dotNetFx40_Full_x86_x64 File in Microsoft .Net Framework 4 Folder to begin installation.

Follow the instructions as shown.

Installation for Microsoft SQL Server Compact 3.5 SP2

Open SSCERuntime_x86-ENU File in Microsoft SQL Server Compact 3.5 Folder if your processor is 86 bit (x86) to begin installation.

Open SSCERuntime_x64-ENU File in Microsoft SQL Server Compact 3.5 Folder if your processor is 64 bit (x64) to begin installation.

Follow the instructions as shown.

Installation for Crystal Report

Open CRRuntime_32bit_13_0 file in Crystal Report Setup Folder to begin installation.

Follow the instructions as shown.

Chapter 2

Getting Started

Contents:

2-1 System Main Page
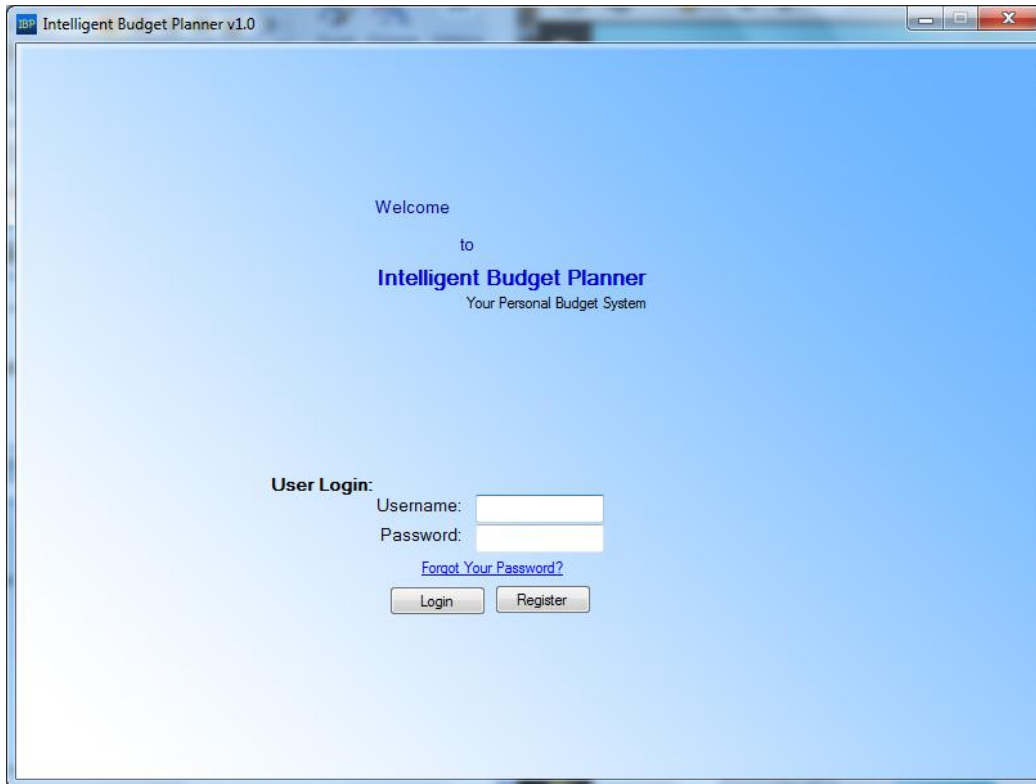
Login

Click on this button to login to this system.
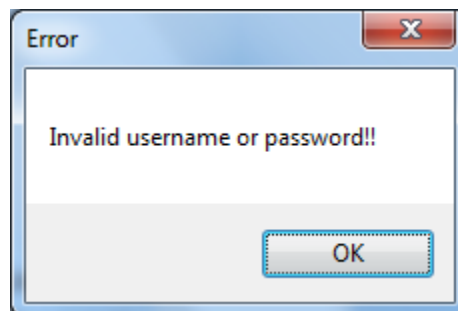
This warning message will appear when user try to login without key in username or password or user had entered username or password incorrectly.

Register
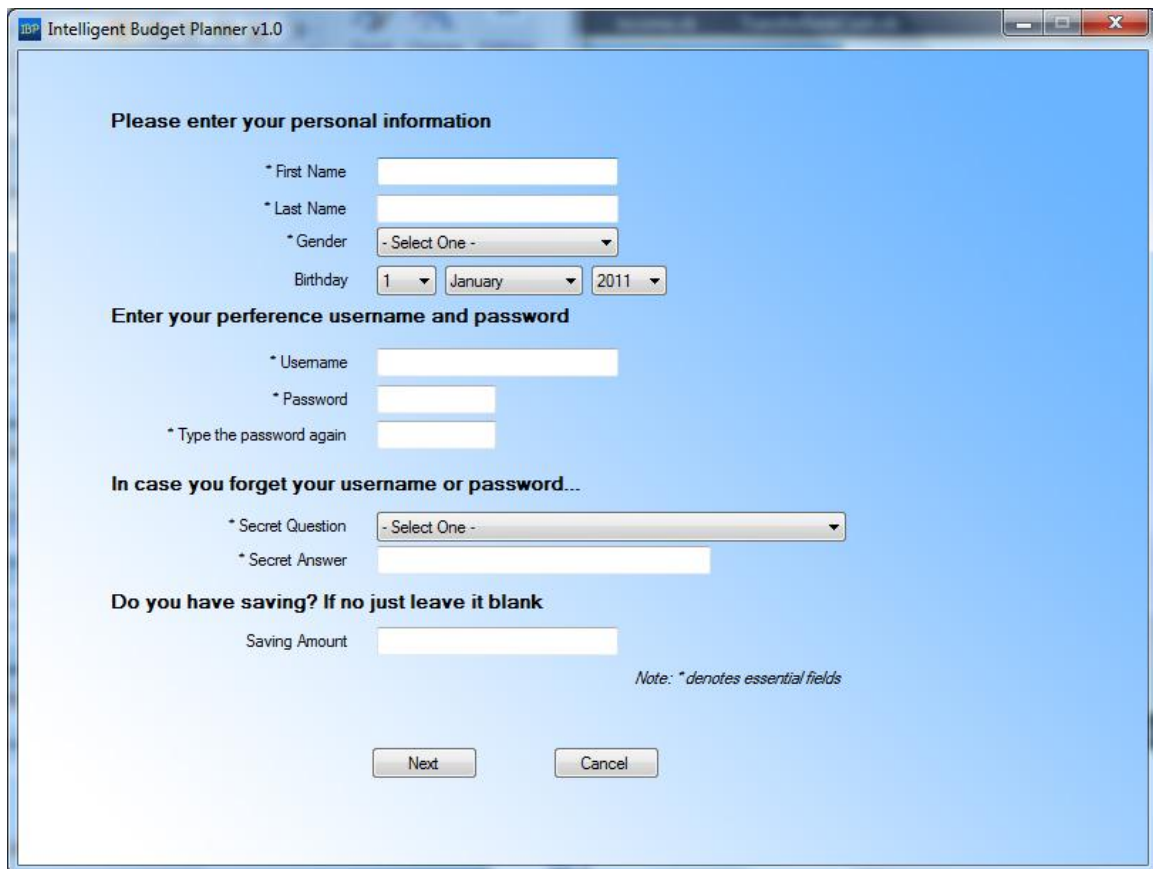
Click on this button to open Registration Page

Forgot Your Password?

Click on this link to retrieve your password in case of forgotten them.

2-2 User's Registration

Personal Detail Registration Form

First Name

Enter your first name here.

Last Name

Enter your last name here.

Gender

Choose your gender here.

Birthday

Choose your date of birth here. (Optional)

Username

Enter your preferred login name here.

Password & Type the password again

Enter your password for login to this system

Note: Warning Message will prompt if the value of password field and type the password again field are not match.

Secret Question

Select your secret question. Intelligent Budget Planner will ask you with this question when you having difficulties to recall your password to login to this system.

Secret Answer

Enter your secret answer here.

Saving Amount

Enter your saving amount. Intelligent Budget Planner will create a bank record according to the amount entered. (Optional)

Next

Click on this button to proceed to Expenses Category and Type Registration Page

Cancel

Click on this button to cancel registration and back to Main/Login Page

Expenses Category and Type Registration Form

Expenses Categories

Tick particular expenses categories to store them in Intelligent Budget Planner.

Expenses Types

Tick particular expenses types to store them in Intelligent Budget Planner.

Back

Click on this button to proceed to Personal Details Registration Form.

Register
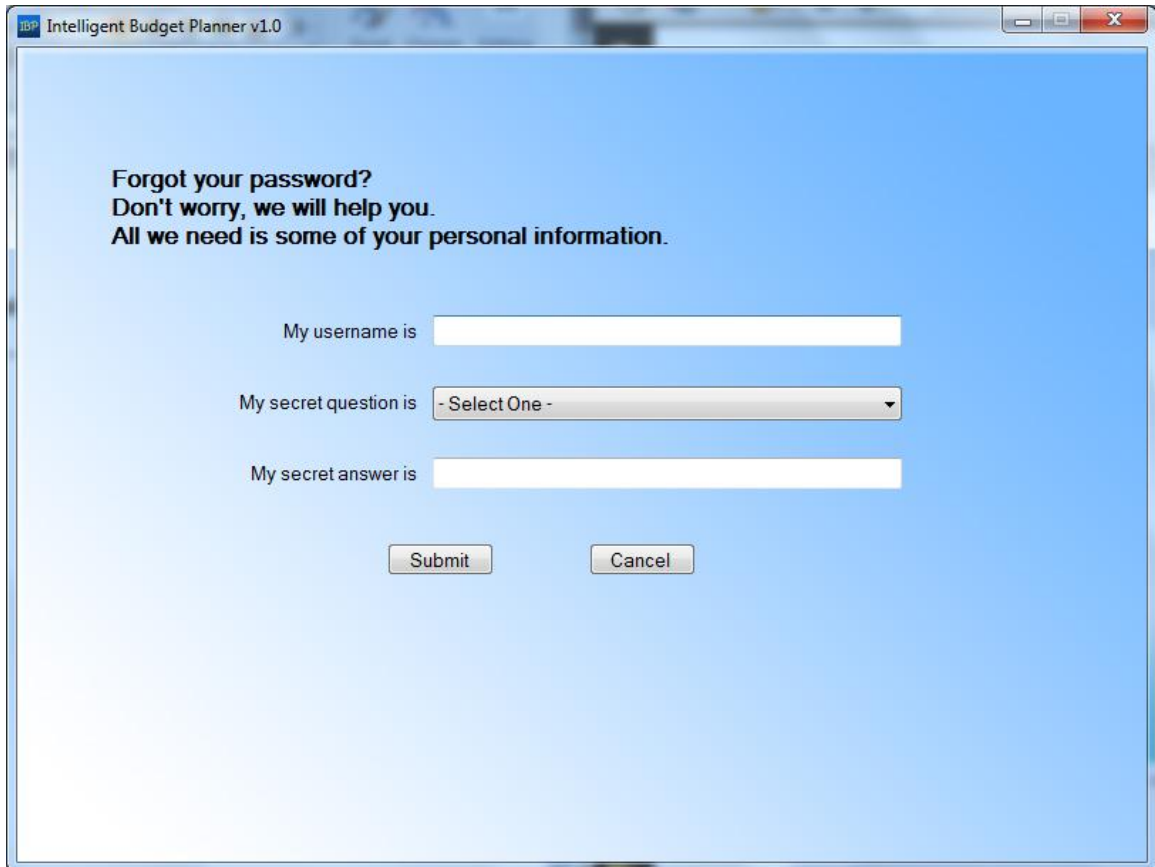
Click on this button to submit your registration.

Note: During submission, this system will check for all the essential fields (Mark with *).
If any of the essential field is blanked, a warning message will prompt out.

Cancel

Click on this button to cancel registration and back to main page.

2-3 Password Retrieval

My username is

Enter your username that you used to register with Intelligent Budget Planner.

My secret question is

Choose your secret question here.

My secret answer is

Enter your secret answer here.

Submit

Click on this button to submit the username, secret question and secret answer.

If the combination of data is matched with you had entered when you registered to Intelligent Budget Planner, your password will appear accordingly. (Intelligent Budget Planner reminds you: Once you had retrieved the password, please change the login password. Refer to following chapter about how to change login password.)

Cancel

Click on this button to cancel password retrieval and back to Main/Login Page.

<div align="right">

Chapter 3

</div>

<div align="right">

Login to this system

</div>

Contents:

3-1 Page Header

After you login to this system, every page of this system will have the same header (have different page title: Income, Expenses, Bank, Report and Account Maintenance).
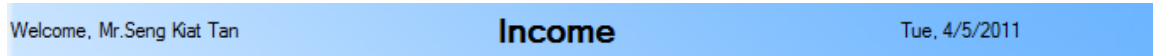
From the figure above, all headers will start with "Welcome" then follow by your last name and first name. On the right side is the today day and date.

3-2 Navigation Bar

In this system, there is a navigation bar on the left of every page as shown below.
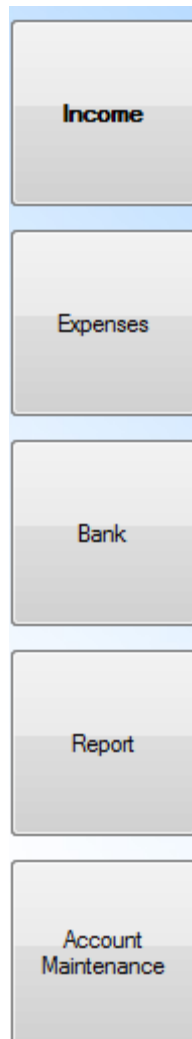
Income

Click on this button and this system will link to income page.

Expenses

Click on this button and this system will link to expenses page.

Bank

Click on this button and this system will link to bank page.

Report

Click on this button and this system will link to report page.

Account Maintenance

Click on this button and this system will link to account maintenance page.

Chapter 4

Account Maintenance

Contents:

4-1 Personal Details Setting

In Personal Details setting, you can change your particulars, example the password that use to login and etc. All the fields are same with the one when you register to this system (Refer Section 2-2 User's Registration for detailed information about each field).

Personal Information

Click on this radio button to link to Personal Information Maintenance Page.
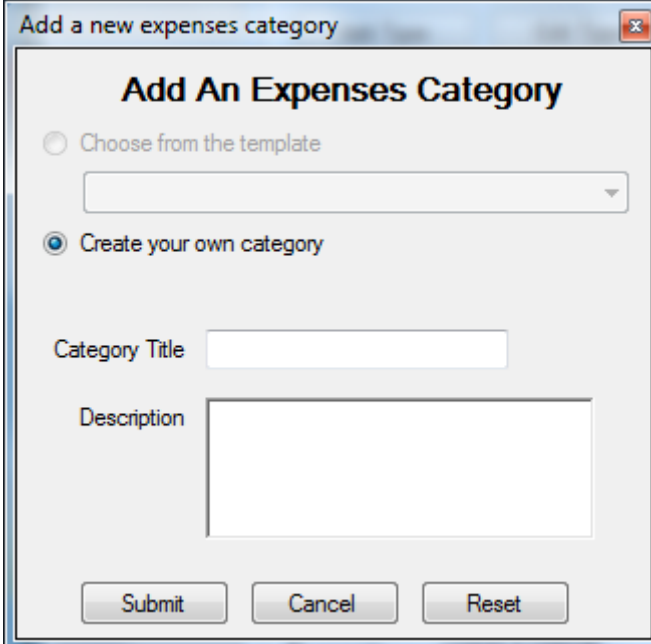
Income Maintenance

Click on this radio button to link to Income Maintenance Page.

Expenses Maintenance

Click on this radio button to link to Expenses Maintenance Page.

Save Change

Click on this button to update your profile.

Reset

Click on this button to reset the fields to the latest profile you updated.

4-2 Income Maintenance
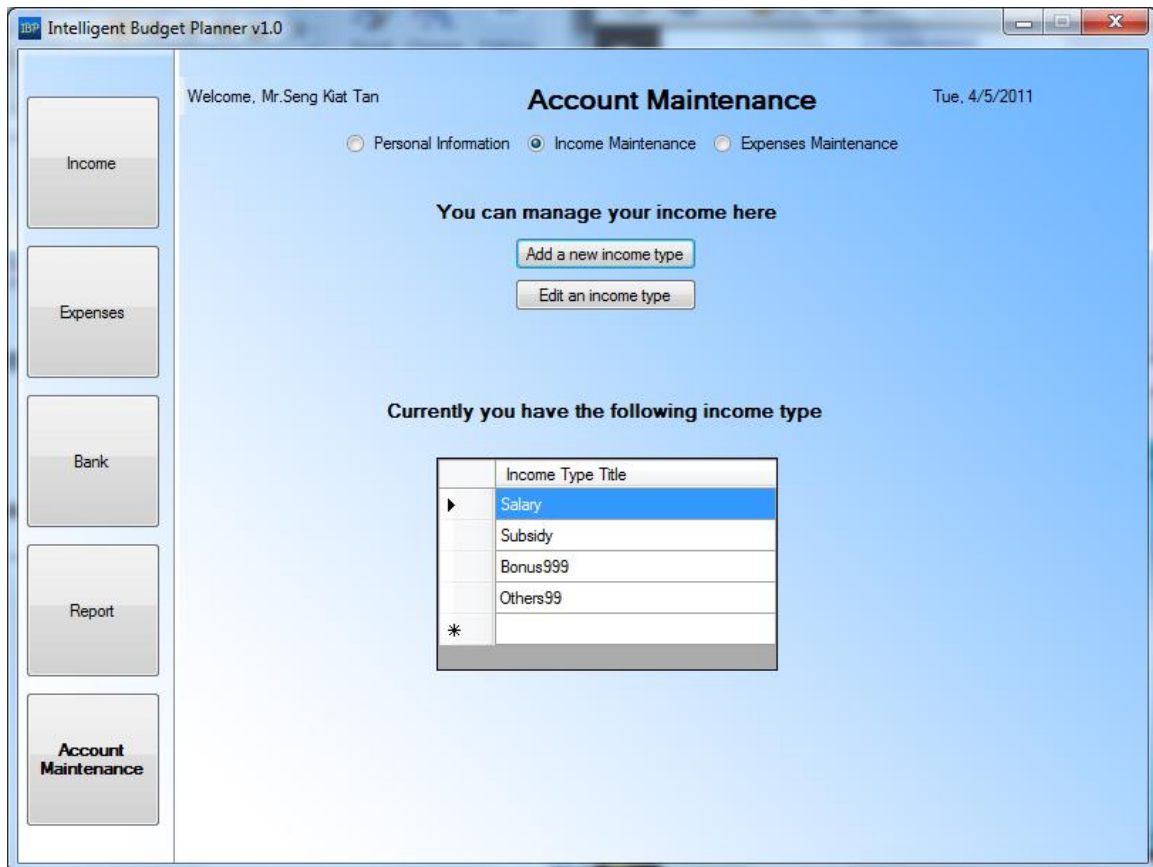
In Income Maintenance, you can update your income type.

Personal Information

Click on this radio button to link to Personal Information Maintenance Page.

Income Maintenance
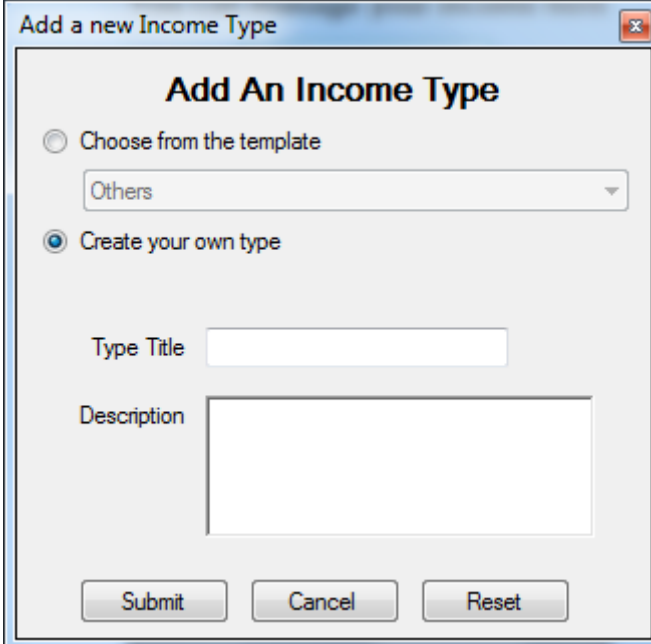
Click on this radio button to link to Income Maintenance Page.

Expenses Maintenance

Click on this radio button to link to Expenses Maintenance Page.

Add a new income type

Click on this button to add an income type. An add a new income type form will appear as shown below.

Choose from the template

Click on this radio button can allow you to choose the income type from the template.

Create your own type

Click on this radio button can allow you to create a new income type.

Type Title

Enter your income type title here.

Description

Enter your income type description here.

Submit

Click this button to insert your income type.

Note: During submission, this system will check for income type title field. If this field is blanked, a warning message will prompt out.
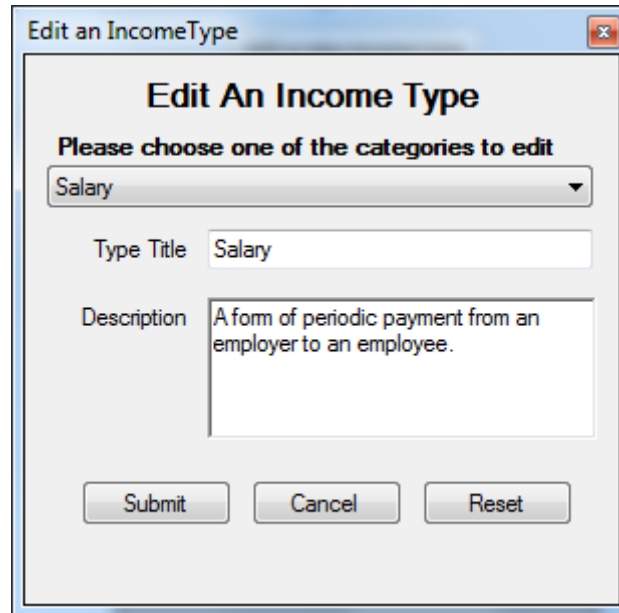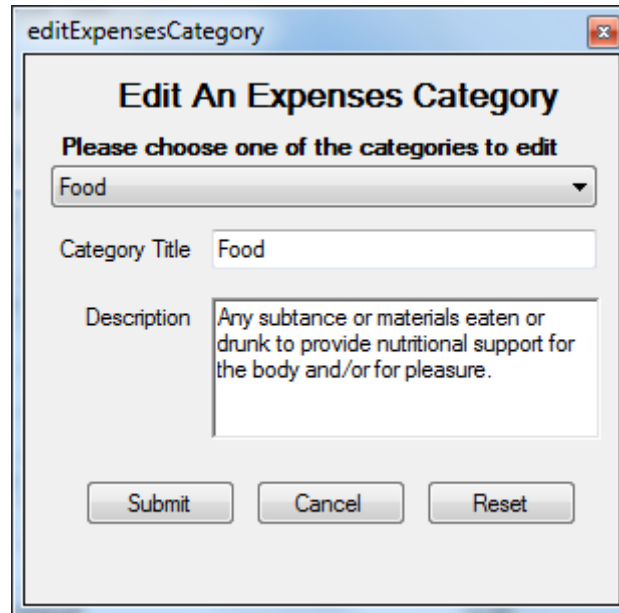
Cancel

Click on this button to cancel add income type and back to previous page.

Reset

Click on this button to empty the type title field and description field.

Edit an income type

Click on this button to edit an income type. An edit an income type form will appear as shown below (*Note: records shown are as example only*)

Please choose one of the categories to edit

Choose your income type to edit.

Type Title

Enter your new income type title.

Description

Enter your new income type description.

Submit

Click on this button to update your income type.

Note: During submission, this system will check for income type title field. If this field is blanked, a warning message will prompt out.
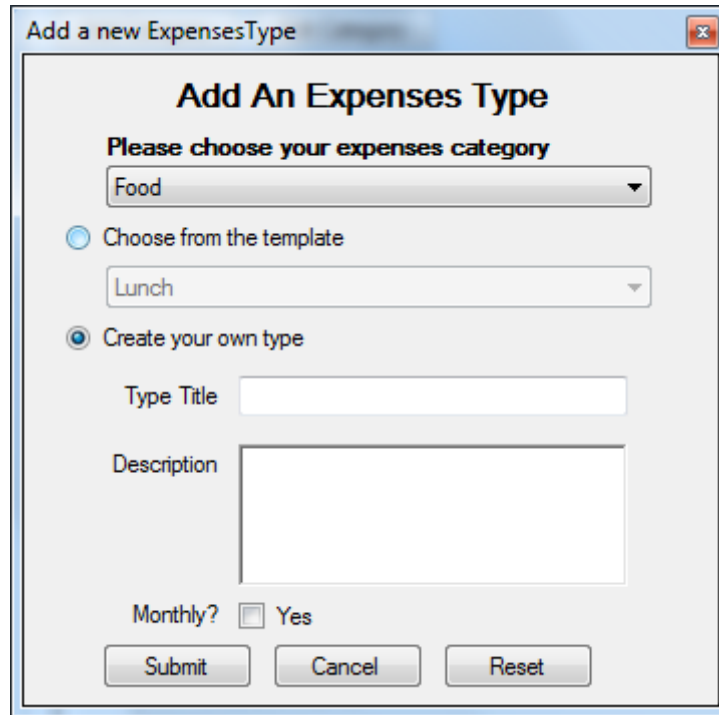
Cancel

Click on this button to cancel edit income type and back to previous page.

Reset

Click on this button to empty the type title field and description field.

4-3 Expenses Maintenance
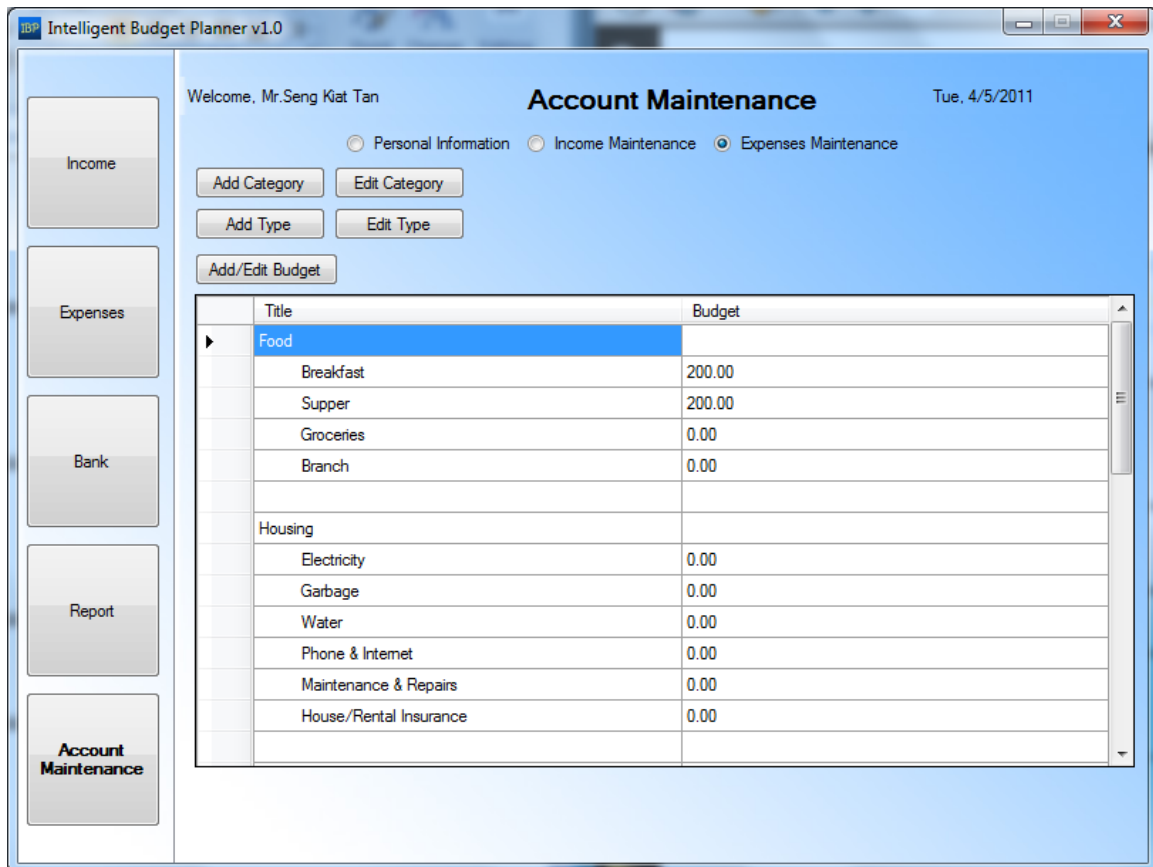
In Expenses Maintenance, you can update your expenses category and type.

Personal Information

Click on this radio button to link to Personal Information Maintenance Page.

Income Maintenance

Click on this radio button to link to Income Maintenance Page.

Expenses Maintenance

Click on this radio button to link to Expenses Maintenance Page.

Add Category

Click on this button to add an expenses category. An add a new expenses category form will appear as shown below.

    Choose from the template

        Click on this radio button can allow you to choose the expenses category from the template.

    Create your own category

        Click on this radio button can allow you to create a new expenses category.

Category Title

Enter your expenses category title here.

Description

Enter your expenses category description here.

Submit

Click this button to insert your expenses category.

Note: During submission, this system will check for expenses category title field. If this field is blanked, a warning message will prompt out.
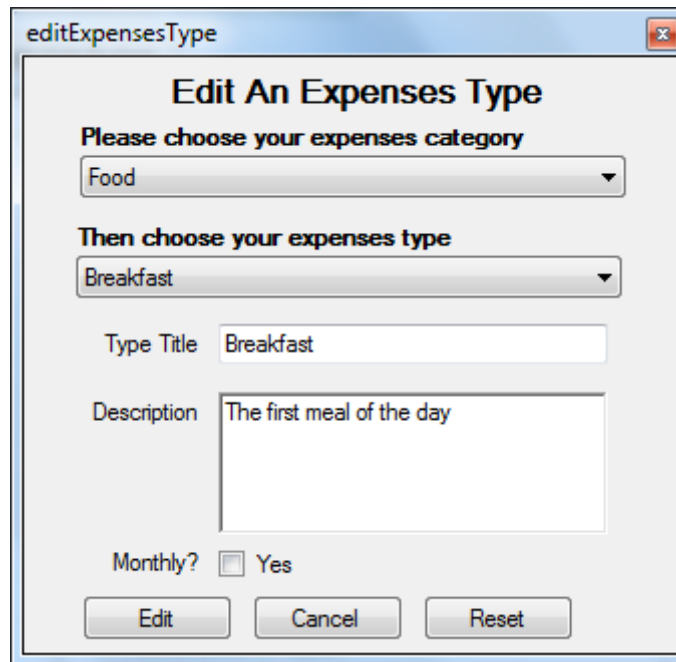
Cancel

Click on this button to cancel add expenses category and back to previous page.

Reset

Click on this button to empty the category title field and description field.

Edit Category

Click on this button to edit an expenses category. An edit an expenses category form will appear as shown below (*Note: records shown are as example only*)

Please choose one of the categories to edit

Choose your expenses category to edit.

Category Title

Enter your new expenses category title.

Description

Enter your new expenses category description.

Submit

Click on this button to update your expenses category.

Note: During submission, this system will check for expenses category title field. If this field is blanked, a warning message will prompt out.

Cancel

Click on this button to cancel edit expenses category and back to previous page.

Reset

Click on this button to empty the category title field and description field.

Add Type

Click on this button to add an expenses type. An add a new expenses type form will appear as shown below. (*Note: records shown are as example only*)

Please choose your expenses category

Choose one of the categories so that to create a new expenses type under that category.

Choose from the template

Click on this radio button can allow you to choose the expenses type from the template.

Create your own type

Click on this radio button can allow you to create a new expenses type.

Type Title

Enter your expenses type title here.

Description

Enter your expenses type description here.

Monthly?

Check if the expenses type is for monthly records.

Submit

Click this button to insert your expenses type.

Note: During submission, this system will check for expenses type title field. If this field is blanked, a warning message will prompt out.
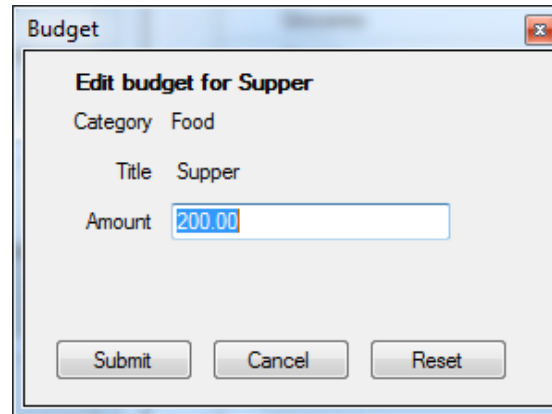
Cancel

Click on this button to cancel add expenses type and back to previous page.

Reset

Click on this button to empty the type title field, description field uncheck monthly field.

Edit Type

Click on this button to edit an expenses type. An edit an expenses type form will appear as shown below. (*Note: records shown are as example only*)

Please choose your expenses category

Choose your expenses category so that later can choose your expenses type that is under this category.

Then choose your expenses type

Choose your expenses type to be edited.

Type Title

Enter your new expenses type title.

Description

Enter your new expenses type description.

Monthly?

Check if the expenses type is for monthly records.

Submit

Click on this button to update your expenses type.

Note: During submission, this system will check for expenses type title field. If this field is blanked, a warning message will prompt out.

Cancel

Click on this button to cancel edit expenses type and back to previous page.

Reset

Click on this button to empty the type title field, description field uncheck monthly field.

Add/Edit Budget

Click on this button when you selected an expenses type. An Add/Edit budget form will appear as shown below. (*Note: records shown are as example only*)

Amount

Enter your budget amount.

Submit

Click on this button to update your budget.

Note: During submission, this system will check for amount field. If this field is blanked or not numeric format, a warning message will prompt out.

Cancel

Click on this button to cancel add/edit budget and back to previous page.

Reset

Click on this button to empty the amount field.

Chapter 5

Records

Contents:

5-1 Income Records

Add a new income transaction, Edit this income transaction

Click on this button will enable the top right form to create/edit your income transaction as shown below.

Date

Choose the date of income transaction.

Type

Choose the income type for this transaction.

Amount

Enter your income transaction amount.

Description

Enter your income transaction description.

Fixed?

Check if the income transaction is a fixed record. This system will generate a new record with the same information new monthly automatically.

From

Choose the source of the income transaction

Submit

Click on this button to create/update income records.

Note: During submission, this system will check for amount field. If this field is blanked, a warning message will prompt out.

Cancel

Click on this button to cancel add/edit income transaction and disable the form.

Reset

Click on this button to empty the amount field, description field and uncheck fixed field.

Delete this income transaction

Click on this button, a delete confirmation message will appear to ask you to confirm delete the selected income transaction.

Transfer money from bank

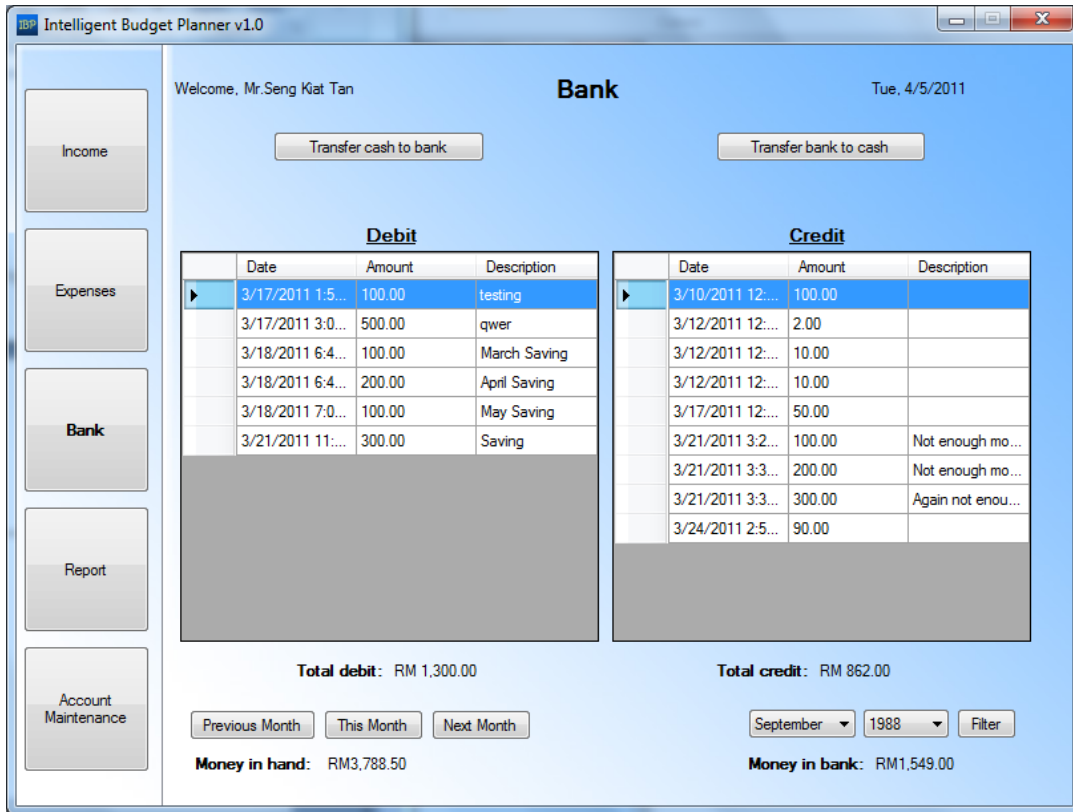Click on this button to allow you to transfer money from bank. Refer Section 5-3 Bank Records for more information.

Add a new income type, Edit an income type

Refer to Section 4-2 Income Maintenance for more information.

Previous Month, This Month, Next Month, Filter

Filter out income transactions to be shown with the selected month and year accordingly.

5-2 Expenses Records
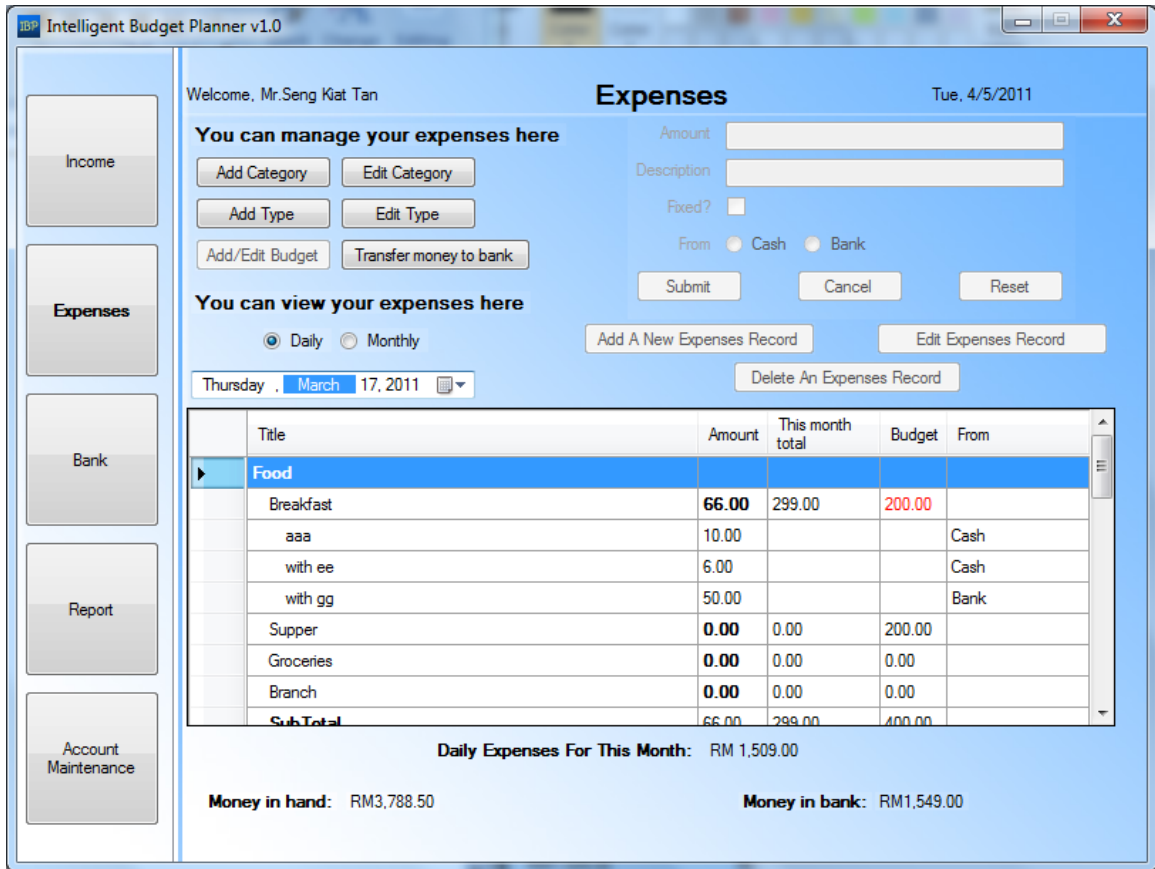
Add a new expenses record, Edit expenses record

Click on this button will enable the top right form to create/edit your expenses record as shown below.

Amount

Enter your expenses record amount.

Description

Enter your expenses record description.

Fixed?

Check if the expenses record is a fixed record. This system will generate a new record with the same information new monthly automatically.

From

Choose the source of the expenses record

Submit

Click on this button to create/update expenses records.

Note: During submission, this system will check for amount field. If this field is blanked, a warning message will prompt out.

Cancel

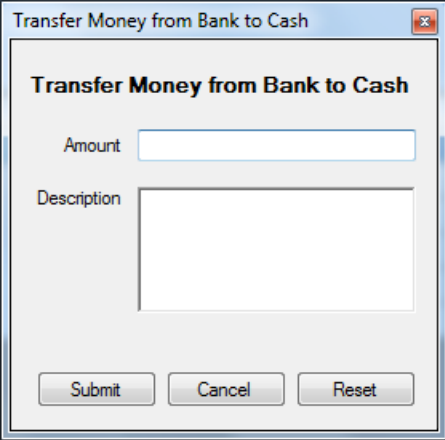Click on this button to cancel add/edit expenses record and disable the form.

Reset

Click on this button to empty the amount field, description field and uncheck fixed field.

Delete an expenses record

Click on this button, a delete confirmation message will appear to ask you to confirm delete the selected expenses record.

Transfer money to bank

Click on this button to allow you to transfer money to bank. Refer Section 5-3 Bank Records for more information.

Add Category, Edit Category, Add Type, Edit Type, Add/Edit Budget

Refer to Section 4-3 Expenses Maintenance for more information.

You can view your expenses here

Expenses Records will be filtered with daily or monthly records and the date you choose.

5-3 Bank Records

Transfer cash to bank

Click on this button to transfer your cash to bank. A transfer cash to bank form will appear as shown below.
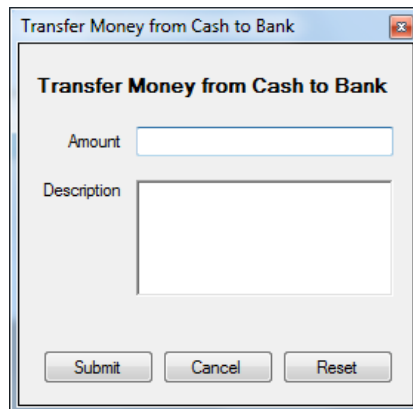
Amount

Enter your transaction amount.

Description

Enter your transaction description.

Submit

Click on this button to create a cash to bank transaction.

Note: During submission, this system will check for amount field. If this field is blanked, a warning message will prompt out.

Cancel

Click on this button to cancel a cash to bank transaction and back to previous page.

Reset

Click on this button to empty the amount field and description field.

Transfer bank to cash

Click on this button to transfer your bank to cash. A transfer bank to cash form will appear as shown below.

Amount

Enter your transaction amount.

Description

Enter your transaction description.

Submit

Click on this button to create a bank to cash transaction.

Note: During submission, this system will check for amount field. If this field is blanked, a warning message will prompt out.

Cancel

Click on this button to cancel a bank to cash transaction and back to previous page.

Reset

Click on this button to empty the amount field and description field.

Previous Month, This Month, Next Month, Filter

Filter out bank transactions to be shown with the selected month and year accordingly.

Chapter 6

Reports

Contents:

6-1 Generating Report

Record Report:

-   Income Record Report

Check this radio button if you want to generate income records report. Then select the
data that you want to filter.

-   **Expenses Record Report**

Check this radio button if you want to generate expenses records report. Then select
the data that you want to filter.

- **Budget with Expenses Report**

   Check this radio button if you want to generate budget with expenses report. Then select the data that you want to filter.

Maintenance Report:

- **Budget Report**

   Check this radio button if you want to generate budget report. Then select the data that you want to filter.

- **Expenses Type Report**

   Check this radio button if you want to generate expenses type report. Then select the data that you want to filter.

- **Expenses Category Report**

   Check this radio button if you want to generate expenses category report. Then select the data that you want to filter.

- **Income Type Report**

   Check this radio button if you want to generate income type report. Then select the data that you want to filter.

Generate Report

Click on this button to start generate the report.

6-2 Export and Print Report

Below is the sample report.

Export Report

Click on this button to export your generated report. You can save it in PDF files format.

Print Report

Click on this button to print your generated report.