**Chapter l**

**Introduction**

Every hour technology is improving that greatly affects our personal social and public life this is the outcome of the advances of communication and computer technology. Technology is widely used from our day to day activities. Both hardware and software are keep coming from day to day.

Understanding how the computer works and knowing how to use it is the way to take advantage on the available information. Hence organizations, institutions, and businesses need different information's systems. As the technology grows, people’s standard increases. In order to create and develop an information systems, a flowchart is needed to make a guide, flow and blueprint of the system. This will serve as the view of processes and flows of the system.

In developing a system the flowchart depicts the flow and process by dividing the process into events or activities and presenting its logical relationships between them. It shows where are the problem areas and opportunities on improving its processes by analyzing the decision points, rework loops and redundant steps.

Creating flowchart is not easy and very complex, users usually uses applications which are not intended for making flowcharts that makes it more complicated and consumes a lot of time. as time pass by, some users seeks for an application that makes the creating of flowchart will become faster and easy. Because of these demands we proponents came up wit developing a “flowchart application”. It is an application designed for making flowcharts that will lessen the time, effort, energy and provide efficiency. The application provides symbols and accurate results and in standardized format, templates that helps user to manipulate the application. It has a graphical user interface that is designed for a better understanding on how the application will work

**1.1 Project Context**

This study is needed for those students who are not familiar or has a problem on understanding flowcharts and diagrams. Users such as student are still using MS Word and Paint for creating a flowchart which is time consuming and hard to design because this application are not specifically designed to create flowcharts. In addition, this diagramming application is convenient because diagrams can be stored and retrieved easily. Moreover it will fit to the improvement of other flowchart/diagram systems that lacks of some functionality.

The SDLC model that will be used for this study is iterative model where begins by specifying and implementing just part of the software and continues through iterative development cycles which can be reviewed in order to identify further requirements.

This study will let the student make a diagram or flowchart provided by the application it includes micro, mini and macro that will be exported as an image or file format. Its limitation is that this will not provide a system backup in case of the application will unexpectedly closed.

**1.2 Problem Statement**

Generally, this study is to create a flowchart application for students.

Specifically, this study has the following sub problems:

1. Lack of Flow charting tools with Macro-Mini-Micro features.

2. Available tools are difficult to use because symbols are not categorized.

**1.3 Definition of Terms**

The proponents defined the following terms operationally based on their use in the study and the system.

**Flow chart**

A diagram consist of symbols that represents an algorithms, work flow or process and their order by connecting them with arrows. It illustrates a solution to the given problem.

**Executable**

A type of computer file that will run if open or installed into the computer, this means it executes codes and instructions contained in the file.

**Macro Level**

A macro level, view of the process may be enough for their purposes. Generally, A macro-level Flowchart has fewer than six steps.

**Mini Level**

It is used for a Flowchart that falls between the big picture of the macro level and the fine detail of the micro level. It focuses on only a part of the macro-level Flowchart.

**Micro Level**

The micro-level , or ground-level, view provides a very detailed picture of a specific portion of the process by documenting every action and decision. It is commonly used to chart how a particular task is performed.

**Process**

A continuous action, operation, or series of changes taking place in a definite manner.

**Chapter 2**

**2.1 Review of Related Literature**

**Importance of Flowcharts in Developing Information Systems**

Flowchart is a tool that is made for analyzing decision points, processes and spotting the opportunities for improving the systems. Its shows the flow of operation by presenting the logical relationship between them by dividing the processes into events or activities.

Flowchart are made of different symbols; decision process, connectors and comment symbols. Each are link by using flow lines, to indicate the flow of control through the program or system.

Overall, a system flowchart focuses on the configuration of a system, including the various processes, decision points within a system, flows of control, data stores and documents and is essential in the development of information systems as it helps analyze processes, programs and systems and depicts a logical flow of activities events and processes.

**Flowchart Tutorials - Flowchart Resource Center**

**The benefits of using flowcharts are that they**

Promote process understanding by explaining the steps pictorially. People may have differing ideas about how a process works. A flowchart can help you gain agreement about the sequence of steps. Flowcharts promote understanding in a way that written procedures cannot do. One good flowchart can replace pages of words.

Provide a tool for training employees. Because of the way they visually lay out the sequence of steps in a process, flowcharts can be very helpful in training employees to perform the process according to standardized procedures.

Identify problem areas and opportunities for process improvement. Once you break down the process steps and diagram them, problem areas become more visible. It is easy to spot opportunities for simplifying and refining your process by analyzing decision points, redundant steps, and rework loops.

Depict customer-supplier relationship, helping the process workers understand who their customers are, and how they may sometimes act as suppliers, and sometimes as customers in relation with other people.

The flowchart symbols that are commonly used in flowcharts have specific meanings and are connected by arrows indicating the flow from one step to another. *Oval*, An oval indicates both the starting point and the ending point of the process. *Box*, A box represents an individual step or activity in the process. *Diamond*, A diamond shows a decision point, such as yes/no or go/no-go. Each path emerging from the diamond must be labeled with one of the possible answers. *Circle*, A circle indicates that a particular step is connected within the page. A numerical value placed in the circle to indicate the sequence continuation. *Pentagon*, A pentagon indicates that a particular step of the process is connected to another page or part of the flowchart. A letter placed in the circle clarifies the continuation. *Flow line*, this indicates the direction flow of the process.

When you are developing a flowchart, consider how it will be used and the amount and kind of information needed by the people who will use it. This will help you determine the level of detail to include.

*Macro Level*. The top leadership may not need the amount of detail required by the workers in a process. A big picture, or macro-level view of the process may be enough for their purposes. Generally, a macro-level flowchart has fewer than six steps. Think of it as a view of the ground from an airplane flying 30,000 feet above sea level.

*Mini Level*. The term (mini or midi) is used for a flowchart that falls between the big picture of the macro level and the fine detail of the micro level. Typically, it focuses on only one part of the macro-level flowchart. Using the airplane analogy, you see the level of detail as if looking at the ground from 10,000 feet above sea level.

*Micro level*. People trying to improve the way a job is done need a detailed depiction of process steps. The micro-level, or ground level view provides a very detailed picture of a specific portion of the process by documenting every action and decision. It is extensively used to chart how a particular task is performed.

**Mistakes you would unintentionally make with flowcharts**

The use of appropriate symbols, each symbols has a meaning. Avoid flow direction that is inconsistent, the most widely accepted flow directions are top to bottom or left to right. Excessive color schemes, flowchart is designed to give solution to problem. Symbol sizes should be consistent, maintaining a flowchart that is well proportioned is vital when it comes to avoiding a visual mess, the height and width of symbols should be proportion to each other except the connectors. The need for consistent branch direction, flowchart should be logical in all aspects, TRUE conditions should flow out from the bottom while FALSE conditions should flow out from the right side. Flowchart symbols and spacing, to make flowchart more professional you should maintain even spacing around symbols. Remember to scale, it is better to have a flowchart span multiple pages the to be crammed into a small space, where all details are unreadable. Extended flowcharts, If your flowchart is connected to another flowchart, then instead of putting it in just one page, it is best that you connect it via a circular node to the flowchart on a different page. Define alternate paths clearly, In certain flowcharts, processes do tend to fork. For the sake of clarity, it is best that you specify whether one branch needs to be followed or all of them. Beware of loops, Processes may not run forever. However, make sure that you do document processes that may be too excessive that it affects the clarity of the flowchart. Be descriptive, It is suggested that you use a footnote, a call out or even a separate document to offer more detail for those process step descriptions that may need more detail. Use a flowchart key, One of the best practices of using flowcharts is to have a flowchart key describing the symbols that are used.Battling inaccuracy, When drawing flowcharts, remember that verifying the flowchart steps is critical to avoid any inaccuracies. Stick to one level of detail, It’s best that you stick to a certain level of detail, e.g. a high-level, mid-level (like the diagram above) or detailed flowchart. Don’t leave room for any uncertainty, Planning ahead would mean that you avoid any unwanted mistakes. So ensure that you ask questions like, “What happens next?”, “Is there a decision made now?”, and “Has the process description been complete?” (Rohitha 2011)

**2.2 Review of Related Systems**

**Draw.io**

Draw.io is a basic diagram application that utilizes a large amount of equally basic images to create your project developed by the folks at JGraph. With simple drag-n-drop techniques, this easy to use website provides a method for design that virtually anyone can use.

Upon visiting the website, there are no log in screens or registration account information to enter. You immediately can start creating a diagram for your specific project. There are no email newsletters to worry about, advertising information, or login details to remember.

Saving and loading diagrams created by Draw.io act as they would if you were using the program installed on your computer. These files are saved as .xml and can be used by various programs that can read such languages. The Diagrams can also be exported as .jpg, .png, .gif, .pdf, and .svg in order to be used on the Internet or otherwise distributed within email.

One of Draw.io's more appealing features is the sheer amount of basic vector graphics that are available to the user. Although these graphics don't have heavy detail in them, they are still effective in order to produce the intended result without having to spend money on an application. For those who need simple but functional diagram development, all of the major representations are available.

Connect to Google Drive in order to save your diagram in the cloud. Now, you can access your diagram from anywhere you have access to the Internet. However, this disables the ability to save to your computer locally unless you disconnect your Google Drive from Draw.io's interface.

Images can be imported to your diagram by using Google to search for the specifics. This gives you access to a wide selection of images based on Google's search results. These can add further professionalism and detail to the diagram whether it is for personal creation or for your client. Images can be resized, moved, and copied to fit your specific needs.(*http://blinklist.com/reviews/draw-io*)

**Dia Diagramming Software**

Dia is free and open source general-purpose diagramming software, developed originally by Alexander Larsson. Dia uses a controlled single document interface (SDI) similar to GIMP and Inkscape. Dia has a modular design with several shape packages available for different needs; flowchart, network diagrams, circuit diagrams, and more. It does not restrict symbols and connection from various categories from being placed together.

Dia has a special objects to help draw entity-relationship models (obsoleted tedia2sql or newer parsediasql can be used to create the SQL, DDL). Unified Modeling Language (UML) diagrams, network diagrams, and simple electrical circuits. It is also possible to add support for new shapes by writing simple XML files, using a subset of Scalable Vector Graphics (SVG) to draw the shape. (Wikipedia, n.d)

**Microsoft Visio**

Microsoft Visio Standard 2013 is designed for individuals who are looking for a powerful diagramming platform with a rich set of built-in stencils. It helps users to simplify complex information through simple, easy to understand diagrams. Visio Standard includes stencils for business, basic network diagrams, organizational charts, basic flowcharts, and general multipurpose diagrams. Take advantage of built-in templates, many with updated shapes. Visio Standard includes stencils for: General diagrams such as basic and block, business diagrams, such as audit, brainstorming, marketing, and organization charts, flowcharts, such as basic, cross-functional, and simple workflows, maps and floor plans, basic network shapes, schedule diagrams and timelines.

**Edraw**

Edraw provides excellent flowchart software that can be used not only for flowchart generation but also to create a multitude of business diagrams and technical drawings. With a great variety of diagramming, text and graphic tools, a solid set of organizational features.

Edraw tops the charts with its interface features and ease of use. The layout closely mimics that of Microsoft's Office suite, and this familiar layout, combined with clearly labeled buttons, makes the software simple to figure out. You can replace shapes without first deleting the existing object, add extra connection points as needed, and have automatically resized shapes to fit your text. In addition to standard character formatting options, like color, font style, size and style, all the standard paragraph formatting options are available as well. This software offers the uncommon feature of previewing formatting changes; you just hover your mouse over the effect you’re considering, and it will appear on your flowchart, disappearing when you move your mouse if you don’t first click to apply the effect. This flowchart software features a spell-checker.

The canvas automatically expands as your diagrams grow, and you can split it into multiple pages or add additional pages to your project. You can also create diagrams with multiple layers, as might be useful for technical drawings. If you are unsure what kind of chart you need, you can view examples and use premade templates.

**Lucidchart**

Lucidchart is a web-based diagramming tool that makes drawing diagrams fast and easy. Quickly draw flowcharts, org charts, wireframes, UML, mind maps and more! More than 3 million users have chosen Lucidchart. Work together with an unlimited number of others to create diagrams in real time, with changes synced instantaneously--great for team collaboration and working with clients. Outfit your company with Lucidchart for **a** fraction of the cost of alternatives like Microsoft Visio. (getapp, n.d)

**SUMMARY**

After analyzing the different concepts and systems, the proponents have identified features that can contribute in the development of the

|  |  |  |
| --- | --- | --- |
| **Related System** | **Features** | **Proposed System** |
| Dia Diagraming Software | · Drag and Drop  · Export to PNG  · Can add your own sets of custom shapes  · Drop down menu  · The toolbox features | ·Drag and drop symbols to the pane |
| Edraw’s Easy Flowchart Maker | ·XML file format  ·Connecting shapes with smart connection lines that maintains the flow and relationships easily.  ·Provide abundant arrows, line styles, gradient fills and textures for each object.  ·Rich pre-drawn Templates | ·Templates  ·Some flowchart symbols  ·Connection Lines/links |
| Microsoft Visio | · Print function  · Flowchart symbols | ·Print function  · Some Flowchart symbols |
| Draw.io | · Flowcharts  · Process diagrams  · Organizational Charts  · UML  · Entity Relationship Diagram and Networking Diagram | · Flowcharts  · UML |
| Lucidchart | · Input Visio  · Drag and drop  · Export PDF and image  · Cross platform compatibility | · Export image |

**Chapter III**

**Methodology**

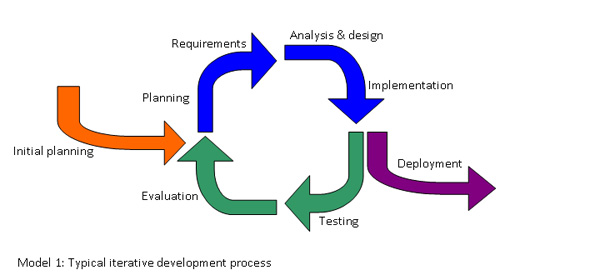
The purpose of this chapter is to explain the methods and procedures to be followed in making the flowchart application. The review of the research approach and the system development that will be using for system development to carry out the study. This includes the system requirements specification, system analysis and design in establishing the application.

**3.1 Research Approach**

The proponents will use a qualitative research which is the observation method and document analysis in order to gather necessary data that will be included to counter check if there will be problems that will arise to improve the flowchart application. The proponents and observers will participate as the subject of the study. Due to the fact that the application is generic, the proponents will also study some documents and other existing related application for the enhancement of the study.

**3.2 System Development Methodology**

The proponents have studied and decided to use the Iterative model for the system development. The development starts with defining the requirements needed for designing and analyzing the flowchart application. Consequently the implementation and testing for evaluation which can be reviewed in order to identify the further requirements.Each subsequent release of the module adds function to the previous release. The process continues till the complete system is ready as per the requirement. This process is then repeated, producing a new version of software through successive cycles.



**The Four phases of iterative Model**

Requirements phase, in which the the required symbols for macro mini and micro for the flowchart application are defined and analyzed . However some functionalities or enhancements may eventually should be met in requirement phase that produces complete and final specification of requirements.

Design phase, in which the meet requirements is designed. This may be a new design, or an extension of an earlier design.

Implementation and Test phase, when the software is coded, integrated and tested.

A Review phase, in which the software is evaluated, the current requirements are reviewed, and changes and additions to requirements proposed.

**3.3 System Requirement Specification**

**Functional Requirements**

The flowchart application is an application that is designed to create a flowchart specialized in macro-mini-micro format. It ease the process of creating flowchart.

The application lets user to create a flowchart in a short duration of time and produce and accurate output. This application will have the following functionality:

**Flowcharting:**

* Drag and drop symbols
* Open or import raw file
* Save in .vbs/raster image format
* Provide macro-mini-micro template

**Input Requirements**

* Symbols
* Text
* Links

These are the needed input requirement in order for the user to generate an output which is the flowchart in macro-mini-micro format. Users should drag it to the working panel.

**Output Requirements**

**Save**

The output can be saved in PNG/JPG Format.

**Raw File**

Raw file can be saved in .vbs format and users can import it in further modifications.

**Software Requirements**

**Client Side**

**●**  Windows Version 7 or higher

* Framework: .NET framework (version 3.5 or higher)

**Recommended Hardware**

* Processor: 1.8 Ghz Processor or Higher (Dual Core Preferred)
* Memory: Atleast 512MB ram Available
* Hard Disk: 60 GB Hard Drive (or higher)

**3.4 System Analysis**

Analysis involves studying the application and seeking how it will benefit to the users. The proponents found out that some users such as student are still using MS Word and Paint for creating a flowchart, and the existing flowchart application that has a Macro-Mini-Micro flowchart is not an executable file. After gathering of data the proponents came up with the detailed specification of what the application will accomplish based on the user's requirements.

**Process analysis**

The application can be access by opening the executable application that is installed to the PC’s. The application can be directly use by the user because it does not require authentication. Each functions provided by the application can be accessed by the user.

**3.5 Design**

**Flow Chart**

A flow chart is a graphical or symbolic representation of a process. Each step in the process is represented by a different symbol and contains a short description of the process step. The flow chart symbols are linked together with arrows showing the process flow direction.

