

CERTIFICATION OF APPROVAL

Screen Shot Tool

by

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Approved by,



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TRONOH, PERAK

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CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



MOHD SHAFIK NAZMI BIN NAZAR

ABSTRACT

The purpose of this report is to study on how to implement a screen shot tool which helps in education purposes. This software will be called as Screen Shot Tool. The objective of this software or tool is to improve the effectiveness in education. One of the purposes of this tool is to provide effective visual aid in giving tutorial on how to use new software by capturing print screen and saving it to an image file. Besides that this tool also can be use for capturing data on the screen which needs to be done faster than using conventional way of capturing screen shot by pressing print screen button on the keyboard and paste it to software that can handle image file before saving it. This is why this tool has bigger advantage, this tool has the ability to perform more than one screen shot at any specified time and saving it automatically to image file without requiring user to do it manually like conventional way. The scope of study for this project is to study how exactly the print screen function in Windows environment. Furthermore, the study also will focus on the flaws and issues in completing the whole project. With the new system user will experience easier way in completing their task which need print screen to be performed. The architecture and development of this tool will be further discussed throughout this paper. It is hoped that this tool will helps a lot for whatever application that needed the function especially in education purposes.

ACKNOWLEDGEMENT

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Last but not least, to all the people that I know that have affected either directly or indirectly with this project, thank you for your cooperation and commitment throughout the project development. Thank you for all the experiences, knowledge and ideas that are shared during the development of this project.

CHAPTER 1

INTRODUCTION

1.1 Background

In today's world, almost everything is done electronically or computerized from buying things to managing company. Therefore, systematic and interactive learning environment has been the issues being discussed from time to time that focuses on how they could learn and gather information faster, effective and more reliable. As the result, Screen Shot Tool has become the right solution to advance the learning environment and experience in order to achieve requirement such as reliability, interactivity and efficiency of new learning process.

This project is intended to create new experience of learning to every category of user, whether they are from different level of education or age. In order to achieve it, this tool is designed to be easy to understand and use. The output of this tool is also one of the best ways to deliver education as it provides visual aid for anything that the user trying to learn about (especially in providing tutorial on how to use certain software). Other than for education purpose, this tool also helps in capturing data in current screen for other purposes easier and faster.

Fundamentally, the Screen Shot Tool being implemented is to allow user to capture every single step that is currently occurring in the computer. This tool is actually an improvement to an existing tool which only offers single screen shot capturing at any time. One of the purposes of the existing tool is to provide visual aid for better explanation on certain activity on computer. This tool offers a better way in capturing screen shot. In Screen Shot Tool, user can choose two functionality which is capturing screen shot to a predetermined time (user can define how many screen shot will be performed in specified time, for an example 1 screen shot for every 1 second) where the tool will automatically perform the screen shot based on the input user give and the

other choice is the tool will perform one screen shot every time the user press the hotkey. The output of this program which is the sequence of screen shot that been saved to jpeg format will be stored in specified folder that will be chosen by the user.

1.2 Problem Statement

Capturing screen shots takes time to be done

Using the standard operating system function of print screen takes time and also extra effort to accomplish. This is because when a user press a print screen button on the keyboard, the screen shot that been captured is not actually saved yet. The operating system such as Windows and Macintosh will save the duplicate of current screen (known as screen shot) and store it in clipboard. Clipboard is a hidden area where the operating system will store things that been copied into. This is only temporary and only can hold a single item at any one time. If a user presses the print screen button on the keyboard, the screen shot will be stored in the clipboard, and if the user presses again, the latest screen shot will replace the older one. After the user has pressed the print screen button, he or she will have to paste it to any program that can handle image file such as "Paint" and "Microsoft Words" by pressing alt+v key at the same time. Then the user will have to save it, and then only the screen shot capturing process is done. So the user will have to do it one at a time if he or she needs to capture several screen shot repeating the previous step.

Limited functionality on existing screen shot capturing tool

Currently, there are a lot of software being developed to ease the process of print screen but still there is limitation in the software or tool. Usually the existing tool only support single screen shot at a time which is when a user run the software or tool, it will automatically save the screen shot into an image file but if the user run again the tool it will replace the image file of screen shot that been saved earlier. Although it is still better than using standard operating system print screen function where user have to do several more step to actually save the screen shot, the functionality of the existing tool is limited. Existing tool are not able to capture more than one screen shot and save it to different file name which means without replacing any previous saved screen shot at any specified time and also automatically perform print screen automatically in specified time interval. The example of such tools which is a freeware that can be found on the net is Gadwin Print Screen from www.gadwin.com as shown at Figure 1. One of the most

important feature on this freeware is it can save screenshots in .jpeg format automatically and directly save it to any desired folder unlike the conventional way by pressing print screen button on keyboard and the operating system will place the captured image to be stored first in the clipboard and user will have to paste it to any program that can handle image files such as 'Paint' and Microsoft Word.

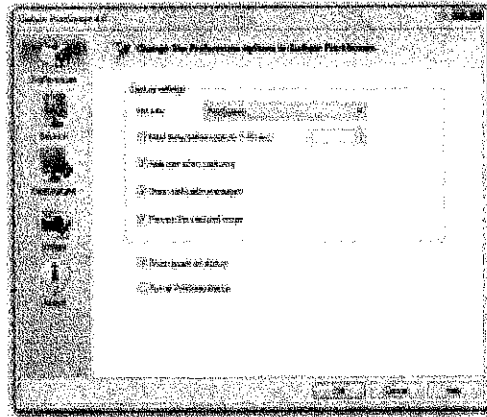


Figure 1

A new way to provide tutorial on how to use a software

A tool is needed in order to provide better tutorial on how to use any software. In order to ease the understanding of any such tutorial, providing screen shots of step by step way of using any software is a good way to go. It is easier to provide tutorial by capturing screen shots of step by step needed to be done and compile it to one folder and just pass the folder to persons that need that tutorial so he or she can take a look to the screen shots.

Ease the process of data collection

As research has been carried out it is found out that there is certain case where there is no other way to collect data on something except to capture the screen shot. Electrical Engineering student of University Teknologi Petronas facing the problem where in one of their subject which is Power Electronics need a tool to ease the screen capturing process. This is because they will have to perform some experiment on computer and they will have to copy the output data including some graph which is there is no other

ways to collect the data accept by capturing the screen shot. They will have to perform the experiment several times and collect the output data so using operating system standard print screen function they will have to take extra time to complete it. The copy of screen shot that needed to be done is shown on Figure 2

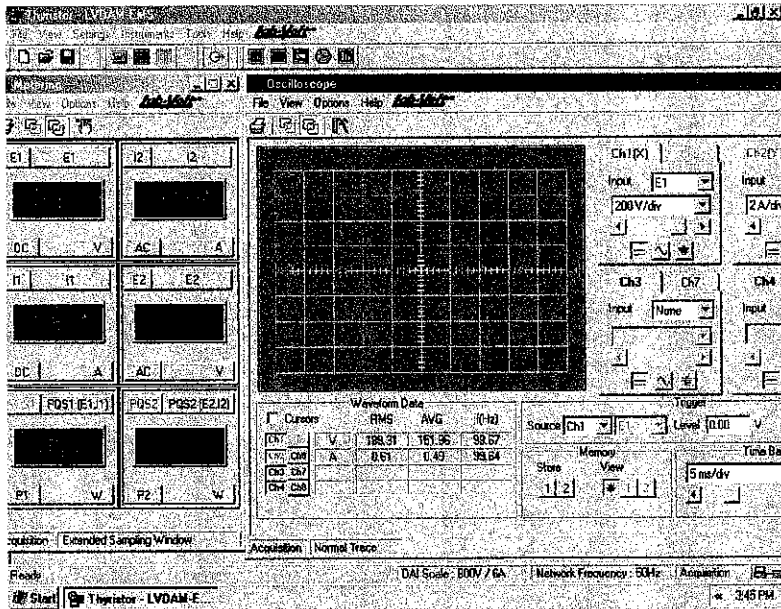


Figure 2

1.3 Objectives and Scope of Study

1.3.1 Objectives

To improve the way tutorial been given by providing a tool that can ease screen shot capturing

One of the goals of this implementation is to create something that can provide help or tutorial on how to use certain software. The output of this implementation helps a lot of people to expose themselves to IT emphasizing on how to use any software as it provides helps in order to guide people clearly by using actual visual step by step guidance effectively (step by step tutorial on how to use a computer or a software or anything that related to computer).

To ease data capturing on the screen

With easy and automatic function that can be done faster, this tool will helps a lot the user who needs to perform a lot of screen shot capturing in order to collect data that they need.

1.3.2 Scope of Study

Visual Basic code manipulation

Be able to perform screen shot and also perform image compression using Visual Basic programming language. Study on Windows API that can be used to complete the project

Image format

Study on details about image format, how it is built, the image quality for each format and the efficiency in term of size of each.

Image compression

Understanding how image compression algorithm is done in order to save space without compromising quality of the output because this tool will have to deal with a lot of image file so image size is an important issue.

CHAPTER 2

LITERATURE REVIEW AND/OR THEORY

2.1 Understanding Microsoft Visual Basic.net

This programming language which is VB.NET is a high level language, where a compiler creates an executable (.EXE) file and we run the EXE file. Generally, when writing any program, if they perform any input or output, it will require the use of services found in library code. A large library, called the .NET Framework Class Library, comes with .NET and can be used in developing any program.

The EXE file that is created does not contain executable code, but rather Intermediate Language or IL. In Windows environment, this IL code is packaged up in a standard portable executable (PE) file format so the familiar EXE extension will be seen. When we run the EXE, a special runtime environment (the Common Language Runtime or CLR) is launched and the IL instructions are interpreted each time it is executed, the CLR comes with a just-in-time (JIT) compiler that translates the IL to native machine code the first time it is encountered.

2.2 How print screen works in windows environment

When Windows is running, pressing Print Screen creates an image of the entire screen and puts it into the clipboard. The Windows clipboard is a hidden area where something you have just copied is stored.) This image can be pasted into all kinds of documents - into a WordPad document, for example. The clipboard can hold only one thing at a time. Before using the print screen function again, whatever that has been stored in the clipboard has to be pasted or else it will be replaced with the new one.

2.3 Image format

As the software that will be implemented is related closely to image processing, the student should have better understanding on the image format itself. The image format that will be discussed is BMP and JPEG format as the output for screen shot will be produced in BMP format and it have to be converted to JPEG format in order to make the program perform better.

2.3.1 BMP

BMP or bitmap image format is basically a format that created for Windows operating system. In the other word, Microsoft is the one who invented this format. Bitmap image is actually a simple kind of image format which is the image is built from simple series of colored dots. BMP images can range from black and white (1 bit per pixel) up to 24 bit color (16.7 million colors). Below is the example on how a bitmap image created.

```
0000000
0011100
0111110
0110110
0110110
0110110
0110110
0111110
0011100
0000000
```

Figure 2.1

The pixels that represent black, will be denoted as zero. Those that represent white, is denoted as one. The more bits per pixel, the more detail an image will become. Bitmaps are good images but somehow it's not great. Compared to other format bitmap creates images that are a little heavy on the bytes which means that bitmap images are a little big in term of it size.

2.3.2 JPEG

JPEG stands for Joint Photographic Expert Group and is actually a compression algorithm that developed by a group of photographic expert. The most interesting part of this kind of format is that its compression factor stores the image on the hard drive in less bytes than the image is when it actually displays. So it means that the quality of jpeg images is good and the size of each one of it is small compared to bitmap format. Basically the compression algorithm will look out for groups of pixels that all appeared to be close in color and just grouped them all together as one. So this is how the compression algorithm makes the bytes that have to be stored smaller.

2.4 Image Compression

Image compression is one of most crucial part of this program as Screen Shot Tool will have to handle a number of images. To make the program perform better, the size of images that it produce should be small in term of size and at the same time still hold good quality images. The best image format that will be use is JPEG format (Joint Photographic Experts Group). Once screen shot function is working, the output will be in BMP (bitmap) format. This format is good in term of quality but the size is quite large. So an image compression algorithm is needed to be put in the program. The algorithm will have to determine the image dimension and pixel depth of the image and later it will have to look for any group of pixels that are close in color and just group them all together and stored as one (basic principal of jpeg compression algorithm). The quality of the image will be a bit low but it is not really visible to human eye. So, this compression algorithm is perfect for this software as the quality of images that it produce is good and the size is reasonable to store in large quantity and also JPEG format main purpose is to store photorealistic graphic image with a large number of colors.

2.5 Screen Shot

In Windows environment screen shot is perform in a way that a duplicate of current screen is copied and stored to a clipboard which is a hidden area where things that being copied stored to. So the student will have to look for the algorithm to duplicate the action of performing screen shot on this program. The algorithm also should be able to perform print screen several times and the images that been capture have to be stored.

CHAPTER 3

PROJECT METHODOLOGY

3.1 System Development Lifecycle (SDLC)

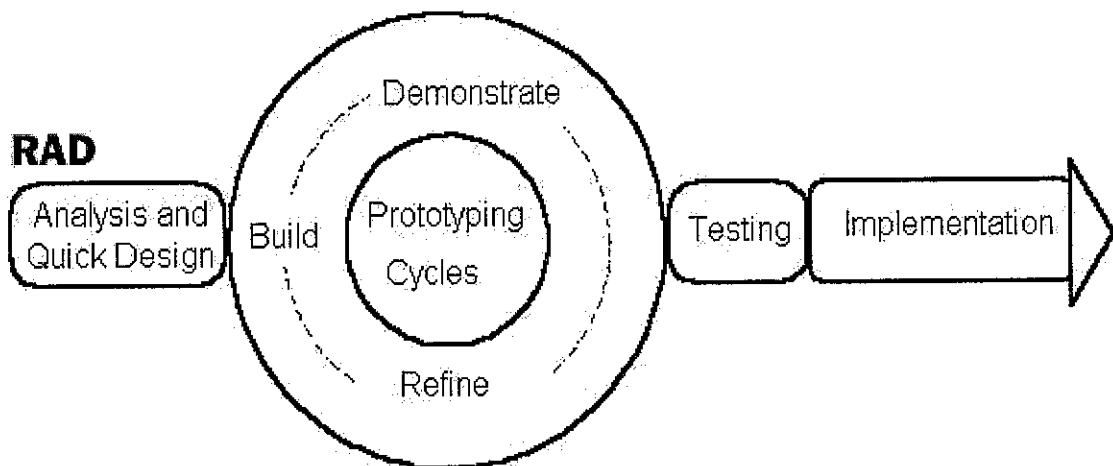


Figure 3.1

Rapid Application Development

This is a programming system that enables programmers to quickly build working programs. RAD systems have tended to emphasize reducing development time. Besides, the concept of iteration in RAD allows for corrective actions and encourages refinements. The reason behind this is that, RAD methodology being used in this project because this method suitable for compressing the analysis, design, build, and test phases into a series of short, iterative development cycles. In traditional waterfall approach, users are consulted only during the initial analysis phase but RAD compress analysis, design, build and test phases, incorporating the feedbacks and user input during the four phases. In this chapter, the author going to discuss on what are the procedure and processes involved during the development of Screen Shot Tool. Below, the author will be discussing on how the project progress in various phases that each of it have its own roles in shaping the project itself. By applying this methodology, the author believes that

this project will be progressing continuously and there will be no long delays until it can be completed right on the scheduled time.

Analysis and Quick Design

The phase where analysis to find out the functional and non-functional requirement will be carried out. At this phase also a quick design will be performed which is the basic function of the product are already in place.

During this phase, researches been carried out in order to understand more how actually standard print screen function on Windows operating system works and also to look for any ideas that can be used or manipulated in order to write the working Visual Basic code for this project. Analysis on existing software that provide print screen function also be carried out to study how it works and also to improve it.

During this phase also, basic function for capturing screen shot is developed but as it is only the basic code is being applied, only a single screen shot can be done at one time.

Prototyping Cycles

During prototyping cycle, the prototype of the product is ready. At this phase the existing prototype will be demonstrated to ensure the effectiveness of the product. Every single detail will be put into account as later in the phase, any error or any problem will be fixed and refine.

The complete required function is already in place and during this phase, some of the functionality is being refined which is one more function is added to the program which is “Hotkey Activated” function. Based from earlier plan the only function that will be provided is “Automatic Timer” where the screen shot capturing will be performed based on the predetermined frequency but with added function, this tool is also capable of doing print screen only when hotkey pressed.

During this phase also, some error are detected which is the tool is unable to save the screen shot to different file name, which means every time the screen shot is performed, it will replace the older one. After detailed checking on the codes, it is found out that there is redundant function of code is being written so the file saving function having conflict as the result writing the file name into different one failed.

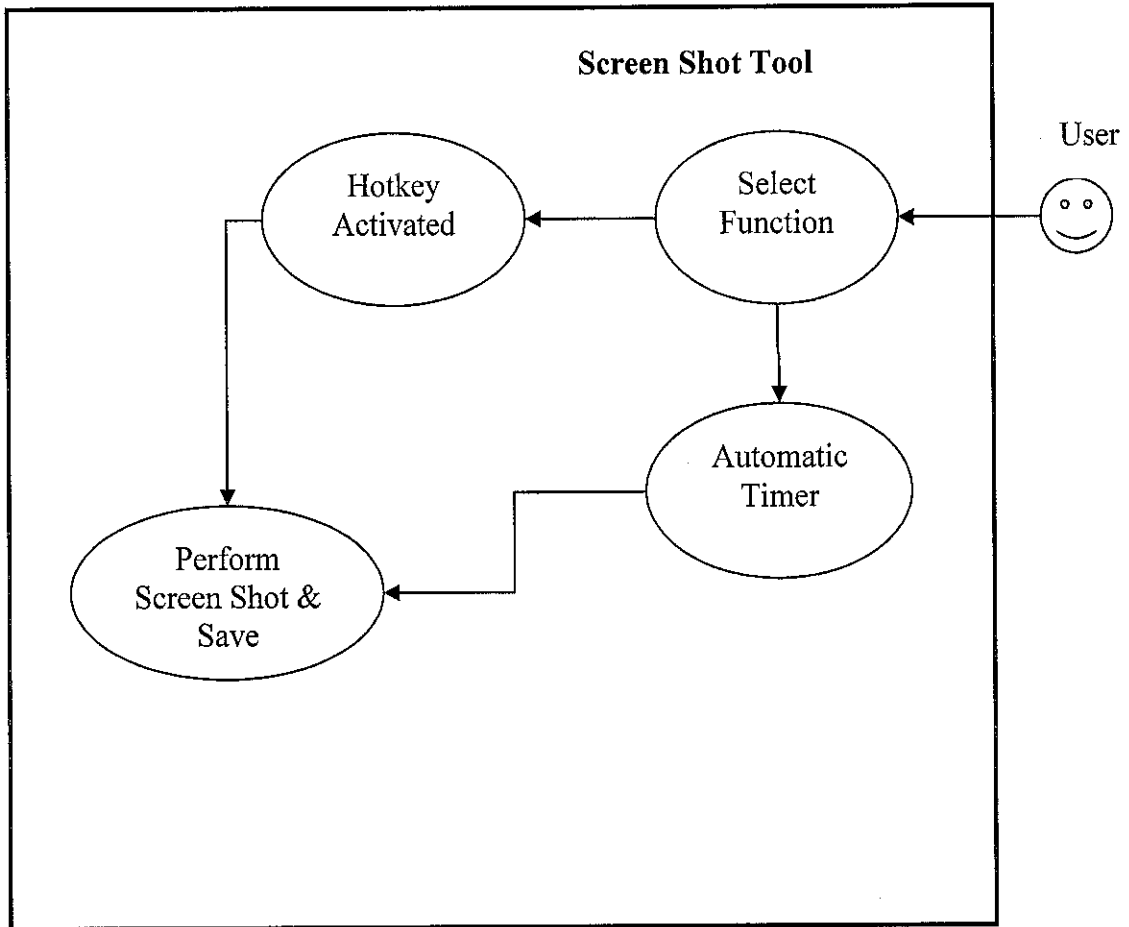
Testing

In order to make sure that the program work as planned without any error, testing will have to be performed. The program full capabilities will be tested to look out for any malfunctioning component.

The Screen Shot Tool is being tested for many times to look for any errors or bugs. The testing part also involving the user to try to crash the program such as key in invalid character or closing the tool by force to see whether it crashes or not.

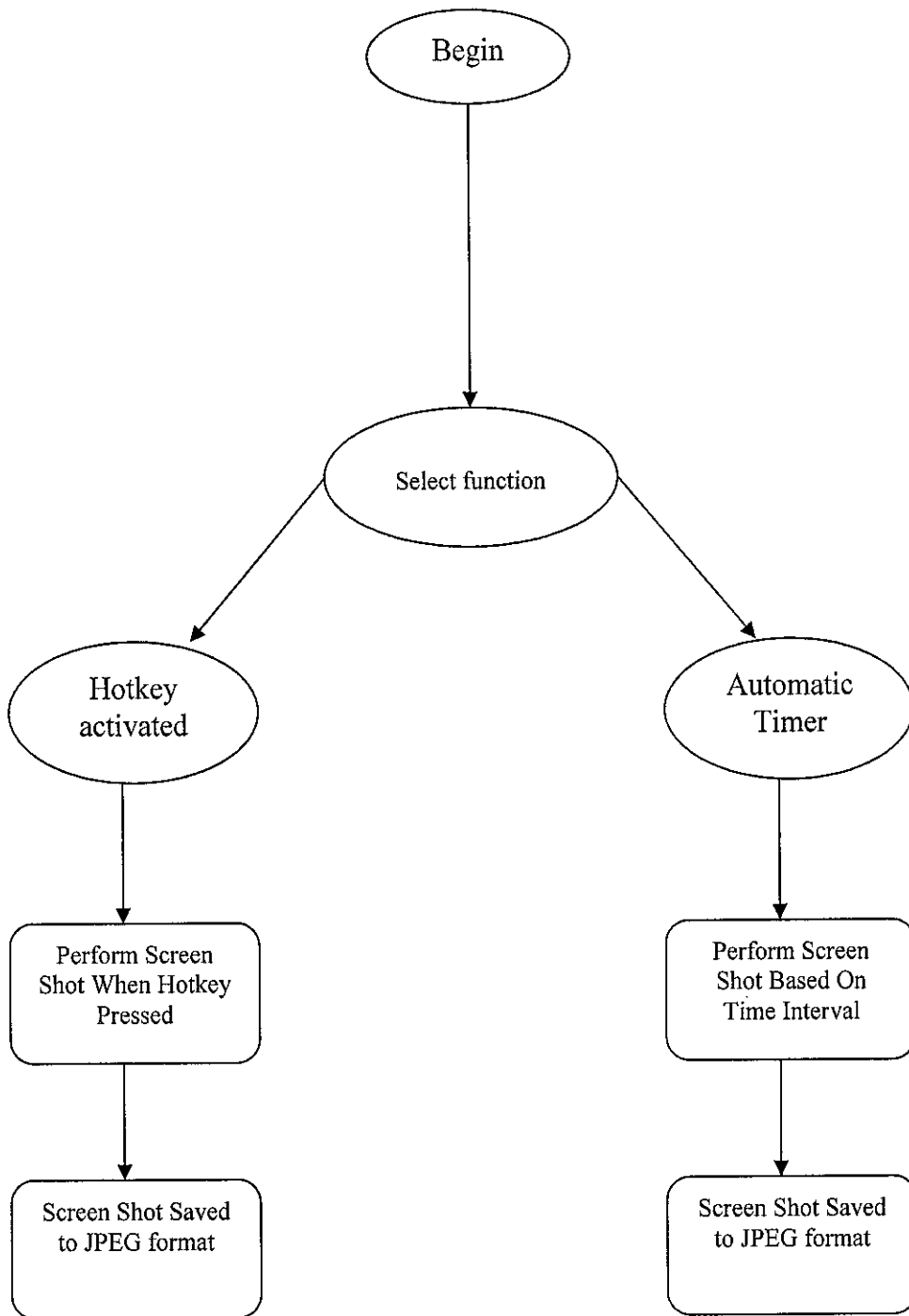
Implementation

After the prototype is tested, later the implementation of the product is performed, meaning to say, all the behaviors or functions involved must be included in the project.



Use Case Diagram

Based on the above use case diagram, user will have to choose between two function which is perform screen shot using automatic timer or using hotkey activated. Once the user choose one of the function, the Screen Shot Tool will perform screen shot based on the function that the user chose.



Flow Chart

3.2 Development Tools

Development Hardware:

- AMD Athlon XP 2800 1.83 GHz
- 512GB DDR Ram
- 80 GB Hard disk
- Network Interface Card

Development Software:

- Visual Studio.net 2005
- Adobe Photoshop CS2

File Edit View Insert Format Tools Object Collaborate Window Help

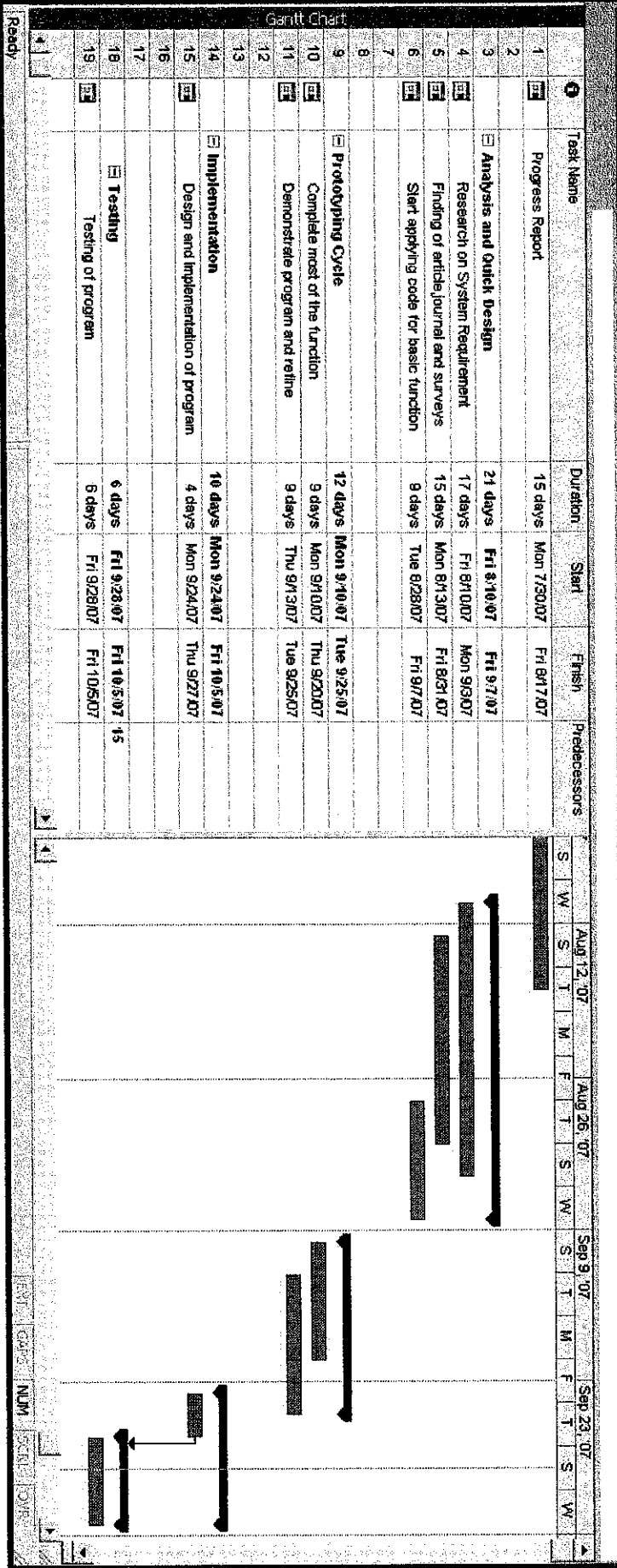
Resources Track Report

No Group

Show

8

Type a question for help



CHAPTER 4

RESULT & DISCUSSION

4.1 Research on screen shot function

Based on the research that has been performed, the student has found out some codes that can be manipulated in order to complete the project.

Captures a screen shot code

Protected Sub CaptureScreen()

Dim hsdc, hmdc As Integer

Dim hbmp, hbmpold As Integer

Dim r As Integer

hsdc = CreateDC("DISPLAY", "", "", "")

hmdc = CreateCompatibleDC(hsdc)

fw = GetDeviceCaps(hsdc, 8)

fh = GetDeviceCaps(hsdc, 10)

hbmp = CreateCompatibleBitmap(hsdc, fw, fh)

hbmpold = SelectObject(hmdc, hbmp)

r = BitBlt(hmdc, 0, 0, fw, fh, hsdc, 0, 0, 13369376)

hbmp = SelectObject(hmdc, hbmpold)

r = DeleteDC(hsdc)

r = DeleteDC(hmdc)

Background = Image.FromHbitmap(New IntPtr(hbmp))

DeleteObject(hbmp)

Several logic manipulations in the code are needed in order to make the program capable to perform several print screens per second. The outcome of this print screen function will be in BMP format. This format however is large in size. In order to counter the drawback of this format, the output will have to be converted to JPEG format.

Saving screen shot to jpeg image file

```
Private Sub Timer1_Tick(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles Timer1.Tick
```

```
    CaptureScreen()
```

```
    PictureBox1.Image = Background
```

```
    Save()
```

```
End Sub
```

```
Public Sub Save()
```

```
    Dim d As Integer = lblHold.Text
```

```
    d = d + 1
```

```
    lblHold.Text = d
```

```
    PictureBox1.Image.Save("Capture " & d & ".jpeg")
```

```
End Sub
```

Because of the program needed a function where the screen shot will be performed in predetermined time, a special function called from Visual Studio.net will have to be used which is called Timer function. Using this Timer function, the Screen Shot Tool will be able to work on predetermined time interval.

4.2 Research on image compression

In general, to convert from one image format to another, the steps are:

- determine the image dimensions and pixel depth
- allocate buffer space for the image
- load the image
- if the destination format does not support the image pixel depth
 - allocate space for an image of the correct pixel depth
 - convert the image to the correct pixel depth
- save the image
- free the image buffer

Below is the basic code that is possible to be used and need to adjust to suit the tool:

```
If (vbitcount = 24) Then ' If we loaded a 24-bit image, convert to 8-bit palette
color
    rcode = allocimage(tmp2image, bdat.biWidth, bdat.biHeight, 8)
    If (rcode = NO_ERROR) Then
        colors = 256
        reduction_mode = CR_TSDDIFF ' For the best image quality
        rcode = convertrgbtoplex(colors, tmpimage, tmp2image, reduction_mode)
        freeimage tmpimage ' Replace 24-bit image with 8-bit version of image
        copyimgdes tmp2image, tmpimage
    End If
End If
```

4.3 Screen Shot Tool functionality

This tool will have two ways to use that can be chose by the user. First using automatic timer and the second one is by pressing hotkey.

4.3.1 Automatic timer

Using this function of screen shot capturing using Screen Shot Tool, user are able to set the frequency of screen shot that been capture over certain time (e.g. one screen shot per second). After the frequency of screen shot capturing being set, the program will automatically perform it accordingly and save the series of screen shot to jpeg image format.

4.3.2 Hotkey activated

The way that this function work is, screen shot will be performed every time the user press the hotkey which is alt+c pressed at the same time. This is for user that only wants to capture specific frame of screen. Every time the user pressed the hotkey, the tool will automatically save the screen shot to jpeg image file.

4.3.3 Directory of saved screen shots

Screen shot tool will prompt the user to set the directory or to which folder that the user wanted to save the screen shot that been captured.

CHAPTER 5

CONCLUSION & RECOMMENDATION

5.1 Conclusion

Nowadays, most of things are computerized so providing guide in helping or providing tutorial on how to use certain software will become more effective if there is a way to do it easily and systematically. The Screen Shot Tool is the best tool that can be used in order to make the whole process a lot easier.

The idea of this project is to provide a tool which helps for education purposes especially on providing tutorial to people who is new to certain software and this tool is actually fulfilled those objective as the way it worked which is every important step is recorded for later viewing (tutorial). The process of data acquisition by doing screen shot will be a lot easier and faster compared to using conventional way of standard operating system print screen function.

With all the resources available, the help of the supervisor and the right approach and methods that are going to be used, this project should achieve all the project objectives and feasible within the time frame given. It is hoped that later in the future this tool will be improved in term of functionality.

5.2 Recommendation

As the Screen Shot Tool that is implemented by the author still have room for improvement, author would like to recommend some features to enhance the system functionality and capability. If the features that will be recommended is successfully implemented in the future, the tool can become even more beneficial in supporting educational process or anything that applicable.

- **Convert series of images to video file**

This is a good function to be applied where the series of captured screen shot is compiled together to form a video file. This will help in reducing the virtual space consumption where everything is compressed and also it will become easier for the user as there will be a single file that been store so it is more systematic.

REFERENCES

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Performing Screen Shot using VB.net

www.alvbcode.com

Image Compression/Conversion

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Image Format

http://www.htmlgoodies.com/tutorials/web_graphics/

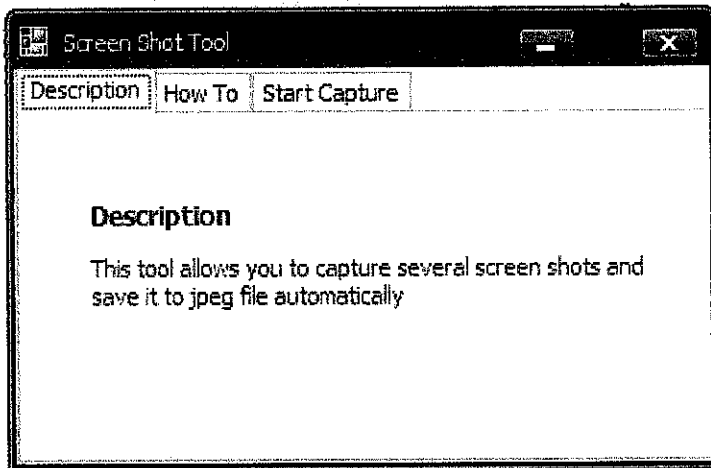
Gadwin Print Screen

www.gadwin.com/printscreens/

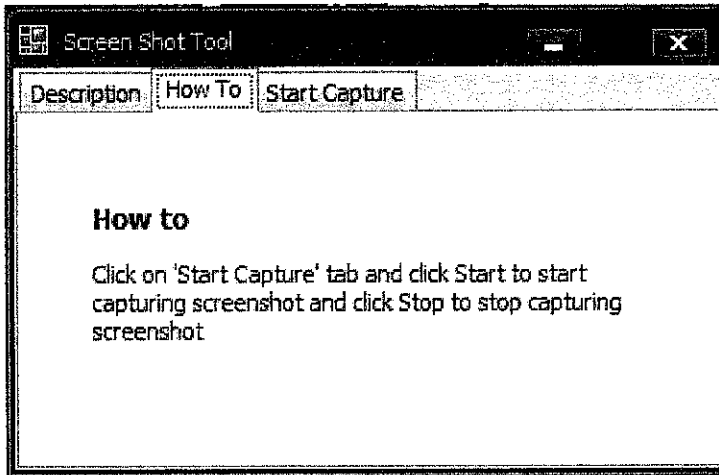
APPENDICES

APPENDIX I

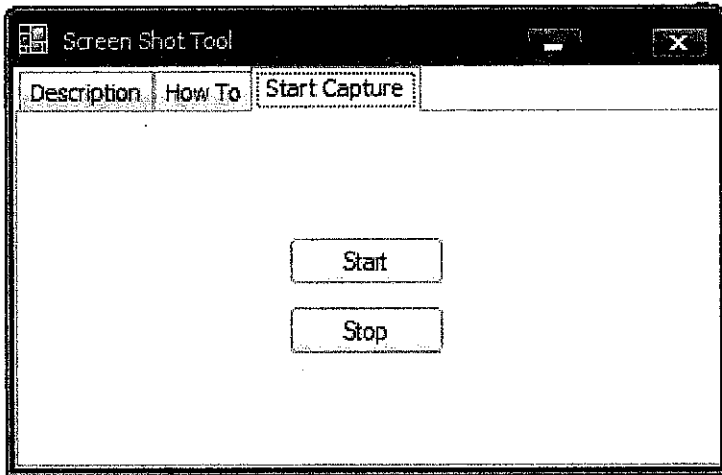
Start page



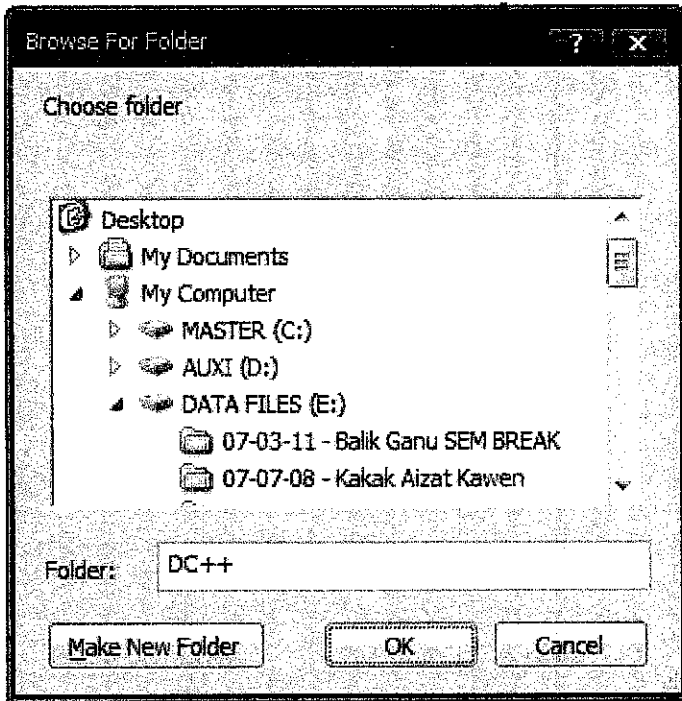
How to page



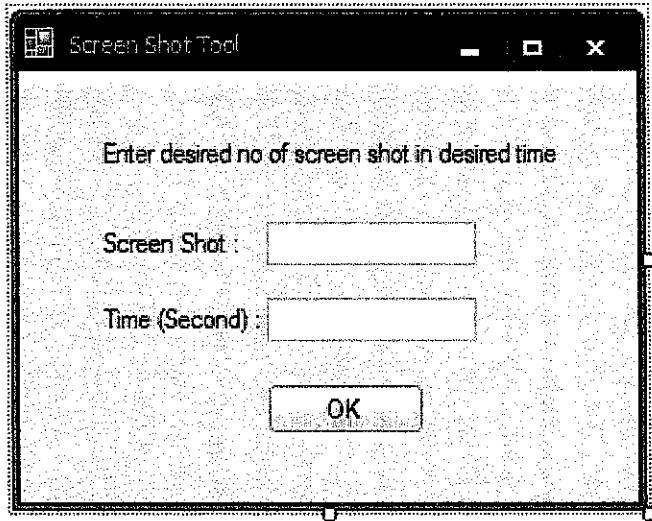
Start capture page



Directory setting



Set time and no of screen shot



Screen Shot Tool

Enter desired no of screen shot in desired time

Screen Shot :

Time (Second) :

OK

Saved screen shots

