



**A REPORT ON
PRACTICAL ASSIGNMENT OF
COMPUTER GRAPHICS**

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Introduction

Background

“Nepali Photoshop” is an animation or photo editing program created with the help of C language coded in Code blocks. This program is used to edit any photo using pixel to pixel editing methodology. The major objects in this animation are: a photo (to edit), scale, replace, color, polish, add text, add object. This photo editing depicts the interaction between these functions. The demonstration of the photo editing can be observed while giving inputs to the related functions. Using different function we can edit our photo accordingly. These are the major highlight of this project (Nepali Photoshop).

C Language

C is a procedural and most popular programming language. It was developed by Dennis Ritchie in the year 1972. It was mainly developed as a system programming language to write an operating system. The main features of C language include low-level access to memory, a simple set of keywords, and clean style, these features make C language suitable for system programming like an operating system or compiler design and development.

Statements of Problems

This report discusses the Computer Graphics project “Nepali Photoshop”. It also deals with the different functions used in the program to make the program execute successfully. It attempts to highlight different user define functions like polishimage(), ptriangle(), psquare(), ellipse(), pcircle(), addobj(), xyplusminus(), circledraw(), objpie(), objline(), objtriangle(), objellipse(), bydefaultglasses(), objglasses(), addtext(), Ending(), setfillstyle(), setfillst(), is being used. This report tries to showcase the mathematics regarding the tools applied on image and also has the source code of the project. This report lists the limitations in the project. One of the limitations of this project is that the edited part can’t be undoing.

Objectives of the Study

The main objectives of the study are as follows:

1. To understand and learn how to use tools related to computer graphics and to implement them to create projects.

2. To learn the graphics tools provided by c graphics library and understanding how to

Use them and process them in Code::Blocks IDE.

LITERATURE REVIEW

History of Photoshop

Adobe Photoshop is a raster graphics editor developed and published by Adobe Inc. for Windows and macOS. It was originally created in 1988 by Thomas and John Knoll. Since then, the software has become the industry standard not only in raster graphics editing, but in digital art as a whole. The software's name has thus become a generic trademark, leading to its usage as a verb (e.g. "to photoshop an image", "photoshopping", and "photoshop contest") although Adobe discourages such use. Photoshop can edit and compose raster images in multiple layers and supports masks, alpha compositing and several color models including RGB, CMYK, CIELAB, spot color, and duotone. Photoshop uses its own PSD and PSB file formats to support these features. In addition to raster graphics, Photoshop has limited abilities to edit or render text and vector graphics (especially through clipping path for the latter), as well as 3D graphics and video. Its feature set can be expanded by plug-ins; programs developed and distributed independently of Photoshop that run inside it and offer new or enhanced features.

REVIEW OF THE TOOLS USED

PROGRAMMING LANGUAGE USED

Programming language used for this project is C++ programming language. Functional approach of programming is used. As it is a visual project, graphics.h library is used for creating the graphics and visuals. And Code::Blocks ide is used as a building platform. Following are the details of the tools, libraries used throughout the making of the project.

1. Code:Blocks IDE

Code::Blocks is a free C, C++ and Fortran IDE. It is built around plugin framework through which Code::Blocks can be extended with plugins. Extra functionality can be added by installing/coding a plugin.

2. Graphics.h header file

The graphics.h header file provides access to a simple graphics library that makes it possible to draw lines, rectangles, ovals, arcs, polygons, images, and strings on a graphical window. Some of the function

Header files Description

A header file is a file with extension .h which contains C function declarations and macro definitions to be shared between several source files. There are two types of header files: the files that the programmer writes and the files that come with our compiler.

We request to use a header file in our program by including it with the C preprocessing directive `#include`, like we have seen inclusion of `stdio.h` header file, which comes along with our compiler.

`#include<stdio.h>`

Header file `stdio.h` is the header file for standard input and output. This is useful for getting the input from the user and output result text to the monitor. Without this header file, one cannot display the results to the users on the screen or cannot input the values through the keyboard. The `stdio.h` header defines three variable types, several macros, and various functions for performing input and output.

The three variable types defined by `stdio.h` are: `size_t`, `FILE` and `fpos_t`.

Some macros defined in the header file `stdio.h` are: `NULL`, `BUFSIZ`, `EOF`, etc.

Some functions defined in the header file `stdio.h` are: `int fclose`, `void clearer`, `int feof`, etc.

`#include<conio.h>`

The `conio.h` header file used in C programming language contains functions for console input/output.

There are five different inbuilt C functions declared in header file `conio.h`.

They are: `clrscr()`, `getch()`, `getche()`, `textcolor()` and `textbackground()`.

#include<graphics.h>

The graphics.h header file provides access to a simple graphics library that makes it possible to draw lines, rectangles, ovals, arcs, polygons, images, and strings on a graphical window.

#include<stdlib.h>

The **stdlib.h** header defines four variable types, several macros, and various functions for performing general functions.

#include<dos.h>

Header file dos.h header file of C language contains functions for handling interrupts, producing sound, date and time functions etc. It is Borland specific and works in Turbo C compiler.

Library Variables

Following are the variable types defined in the header stdlib.h –

Sr.No.	Variable & Description
1	size_t This is the unsigned integral type and is the result of the sizeof keyword.
2	wchar_t This is an integer type of the size of a wide character constant.
3	div_t This is the structure returned by the div function.
4	ldiv_t This is the structure returned by the ldiv function.

Library Macros

Following are the macros defined in the header `stdlib.h` –

Sr.No.	Macro & Description
1	NULL This macro is the value of a null pointer constant.
2	EXIT_FAILURE This is the value for the exit function to return in case of failure.
3	EXIT_SUCCESS This is the value for the exit function to return in case of success.
4	RAND_MAX This macro is the maximum value returned by the rand function.
5	MB_CUR_MAX This macro is the maximum number of bytes in a multi-byte character set which cannot be larger than <code>MB_LEN_MAX</code> .

Functions Description

#define

#define is a C preprocessor directive used to define macros.

A preprocessor directive is a program statement which is invoked before the program compilation takes place. Actually, any line followed by a # character is a preprocessor. This includes the include directive as well. The preprocessor directives are used to provide general instruction or required data which is used inside a program.

A macro is a block of code which has been given a name. Any occurrence of that name is replaced by the value of the macro. Say, I defined macro named AMOUNT whose value is 200. Now every time the word AMOUNT is used in the program it is replaced by the number 200 before compilation. In contrast to variables, where data is actually stored inside of them, macros act rather like alias names.

Syntax of #define directive is as follows:

```
#define MACRONAME value
```

OR

```
#define MACRONAME (expression)
```

Line Function

Line function is used to draw a line from a point(x1,y1) to point(x2,y2) i.e. (x1,y1) and (x2,y2) are end points of the line.

Syntax: void line(int x1, int y1, int x2, int y2);

Setcolor Function

In Graphics, each color is assigned a number. Total number of colors available is 16. Number of available colors depends on current graphics mode and driver. For example, setcolor(RED) or setcolor(4) changes the current drawing color to RED. The default drawing color is WHITE. The Colors table is given below:

COLORS	INT VALUES
BLACK	0
BLUE	1
GREEN	2
CYAN	3
RED	4
MAGNETA	5
BROWN	6
LIGHTGRAY	7
DARKGRAY	8
LIGHTBLUE	9
LIGHTGREEN	10
LIGHTCYAN	11
LIGHTRED	12
LIGHTMAGNETA	13
YELLOW	14
WHITE	15

setfillstyleFunction

- - setfillstyle() function contains two arguments pattern and color. Various fill patterns are already enumerated in graphics.h header file as given below:

```
enum fill_styles  
  
{  
  
EMPTY_FILL,  
  
SOLID_FILL,  
  
LINE_FILL,  
  
LTSLASH_FILL,  
  
SLASH_FILL,  
  
BKSLASH_FILL,  
  
LTBKSLASH_FILL,  
  
HATCH_FILL,  
  
XHATCH_FILL,  
  
INTERLEAVE_FILL,  
  
WIDE_DOT_FILL,  
  
CLOSE_DOT_FILL,  
  
USER_FILL  
  
};
```

rand Function

rand() function is used in C to generate random numbers. If we generate a sequence of random number with rand() function, it will create the same sequence again and again every time program runs. Say if we are generating 5 random numbers in C with the help of rand() in a loop, then every time we compile and run the program our output must be the same sequence of numbers.

Syntax:

int rand(void):

returns a pseudo-random number in the range of 0 to RAND_MAX.

RAND_MAX: is a constant whose default value may vary between implementations but it is granted to be at least 32767.

Main Functions:

Function used	Description
Line(int x1,int y1,int x2,int y2)	Creates a line from point (x1,y1) to (x2,y2)
Rectangle(int Xleft,int Yleft,int Xright,int Yright)).	Creates a rectangle with top left corner (Xleft,Yleft) and bottom right corner (Xright,Yright)
Cleardevice()	The header file graphics.h contains cleardevice() function which clears the screen in graphics mode and sets the current position to (0,0). Clearing the screen consists of filling the screen with current background color
Setfillstyle(int pattern, int color)	It is used for setting the current fill pattern and color for floodfill(). Pattern value ranges from 0 to 12 varying from solid fill, line fill etc. Color
Floodfill(int x,int y, int bordercolor)	It flood fills from point (x,y) in the pattern and color specified by setfillstyle().

Some other functions of other header files used in the projects are:

1.Delay() function

It is used to suspend execution of a program for a particular time.

Syntax: Delay(unsigned int)

unsigned int is the number of milliseconds. The function is included under dos.h header file.

This is function is used to delay the program in order for the visuals to work and see as an animation.

2. Sprintf() function

Sprintf() is used for storing the output in character buffer.

Syntax: sprintf(char* ch,const char* string,. . .)

Example:

Char ch[50];

Int a=5,b=10,c;

C = a+b;

Sprintf(ch,"Sum of Ch will contain: "sum of 5 and 10 is 15");

Sprintf() is used in order to display the numbers in the visuals as outtextxy() takes fixed string.And numbers stored in variables directly can't be displayed through outtextxy().As outtextxy(char*) takes input parameter as character pointer, first the number stored in variables are stored in the character pointer through sprintf() and displayed by outtextxy() by displaying the same character pointer.

Research Methodology

Idea of Process:

Following were the approaches made while building this project.

For editing photo I think each functionality on program can be done using a block of code (i.e function)

Among all function I decided to make some functionality like brush, changing background paint on image, adding object help section etc.

Displaying image in one panel and displaying control console input panel in another side panel means displaying image panel and input panel and side by side together

it makes easier to give input in one panel called input panel and can see effect in another panel called displaying image panel

Home page interface for Inputs:

User should give some input to make modification in image so, homepage interface is there to make User experience better

Results and Discussion

Overview

Source Code

Source Code is really long You can visit my Github repo for more

<https://github.com/Nabiin/Nepaliphotoshop.git>

Implementation and Final Output

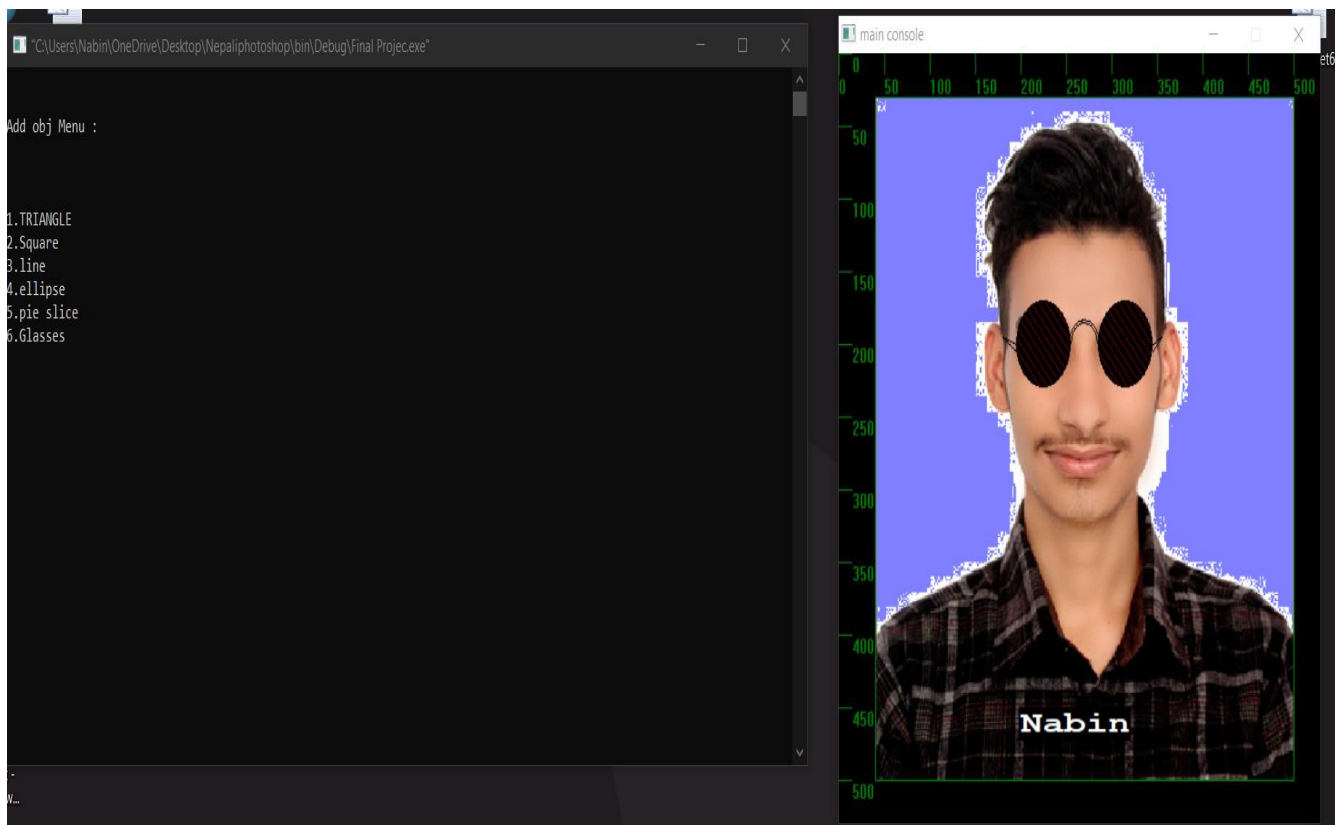


Fig: Image and Instruction Panel side by side

Conclusion and Recommendation

Conclusion

This project is an image manipulation created with the help of C language coded in Dev. C++. This project report also deals with the images and different functions to manipulate the image or edit the image. Out of many features available this project uses some popular and commonly used features and functions like line, circle, set fill etc.

In a nutshell, this project is a simple execution of different functions, loops, and variable and rendering images, with that rendered images we can create different lines, circles and different objects from different functions in an image.

Limitation of the study

- It falls short in setting the resolution and making an app full-screen i.e. making its window take up the entire screen.
- Once we edit something in image then we can't undo the change.
- It have to set image location in code to display in console, we can't choose image in console.

Future Enhancements

In future, we can use OpenGL and GLUT on Code Blocks platform and use sphere, cylinder and quadrilaterals to make our environment more realistic i.e. With the help of various OpenGL functions, we can also create a motion of the umbrella in a circular way using the hemisphere function and ground using rectangle and rain in the feet of the man and so on.

OpenGL by itself is not familiar with the concept of a camera, but we can also try to simulate one by moving all objects in the scene in the prefer direction, giving the illusion that we are moving by changing the vertex and co-ordinates as seen from the camera's prospective in real time.

Flexibility in the input for the user can be improved by giving the user to input more amounts of data.