Delhi Technological University

Computer Graphics Project Report

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Project Title - OS++

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INTRODUCTION

Computers have become a powerful tool for the rapid and economical production of pictures. Computer Graphics remains one the most exciting and rapidly growing fields. Old Chinese saying" One picture is worth a thousand words" can be modified in this computer era into "One picture is worth many kilobytes of data".

It is natural to expect that graphical communication will often be more convenient when computers are utilized for this purpose. Many people for different domains of applications use interactive graphics. From the survey it is evident that in future, engineers, designers etc. will be using computer graphics quite extensively. There is virtually no area in which graphical displays cannot be used to some advantage, and so it is not surprising to find the use of computer graphics so widespread. Today, we find Computer Graphics used routinely in such diverse areas such as science, engineering, medicine, business, industry, government, art, entertainment, advertising, education, training, etc.

So for understanding the depth of this subject and for gaining sound knowledge in this field we had an attempt at the first step on this current field. We tried to make a graphically designated virtual operating system **OS++**. The Graphic operating system is made with the application of Graphics codes. It is completely designed in **C++ programming language** & using the various in-built functions of **graphic.h header file**.

FEATURES & SCOPES

In this project we applied the Computer Graphics subject and made the virtual operating system in which we had tried to include all the basic features that a standard operating system like Windows, Linux, Mac has such as :

- Login & Password
- Desktop
- Calculator
- Settings
  - Change Password
  - Remove Password
  - Cancel
- Tic Tac Toe
- Screen Saver
  - Moving Ball
  - Circles
  - Stars
- Logout
- Restart
- Shut Down

METHODOLOGY

This project was done with the help of C-Programming Language. Different methods are performed in order to make it more applied and efficient. C Graphics programming is very easy and interesting. We used graphics programming for developing our projects, for designing, ani-mation etc. It's not like traditional C programming in which you have to apply complex logic in your program and then you end up with a lot of errors and warnings in your program. In C graphics programming you have to use standard library functions (need not worry if you don't know functions) to get your task done. Just you pass arguments to the functions and it's done. Many graphic functions are coded on its header file <graphics.h>

Tools & Technologies Used

❖ **Integrated Development Environment : Turbo C++**

Screenshot of the Turbo C++ IDE

Turbo C++ is a C++ compiler and integrated development environment originally from Borland for Microsoft Windows operating System. It is used to create the C/C++ source file, compile it, link it and then execute it.

Advantages of Turbo C++:

- In Turbo C++, graphics are installed by default.
- In Turbo C++, previous program data is saved as garbage and next time appears on the output screen. So clrscr() function is required to clear previous output

❖ Header Files & Library : graphics.h

This interface 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.

Common Terminologies used in a graphics program:

- void **initgraph**(int *graphicsDriver, int *graphicsMode, char *driverDirectoryPath) : It initializes the graphics system by loading the passed graphics driver then changing the system into graphics mode. It also resets or initializes all graphics settings like color, palette, current position etc, to their default values.
- **graphicsDriver** : It is a pointer to an integer specifying the graphics driver to be used. It tells the compiler what graphics driver to use or to automatically detect the drive. In all our programs we will use the DETECT macro of graphics.h library that instructs the compiler for auto detection of graphics driver.
- **graphicsMode :** It is a pointer to an integer that specifies the graphics mode to be used. If *gdriver is set to DETECT, then initgraph sets *gmode to the highest resolution available for the detected driver.
- **driverDirectoryPath :** It specifies the directory path where graphics driver files (BGI files) are located. If the directory path is not provided, then it will search for driver files in the current working directory directory.

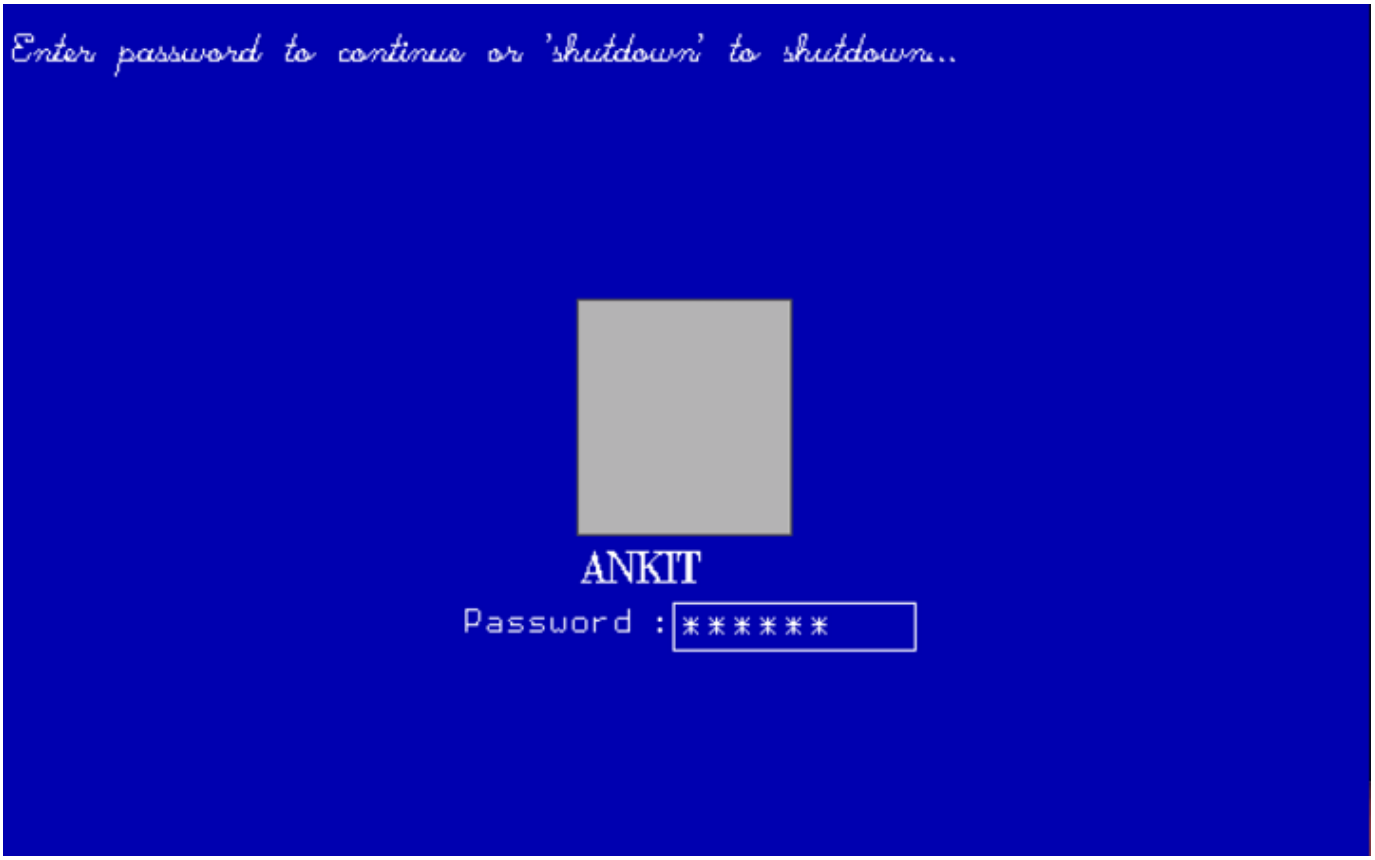
❖ Programming language : C++

C++ is a general-purpose programming language created by Bjarne Stroustrup as an extension of the C programming language. Advantages of C++:

- C++ gives programmers a high level of control over system resources and memory.
- C++ is an object-oriented programming language and includes concepts like classes, inheritance, polymorphism, data abstraction, and encapsulation which allow code reusability and makes programs very maintainable.
- The wide range of applications – From GUI applications to 3D graphics for games to real-time mathematical simulations, C++ is everywhere.

ScreenShots with Explanation

Login & Password



This is the login screen where the user has to enter the correct password to continue OR “shutdown” to shutdown. Warning: 5 wrong attempts will cause the system to shut down automatically.

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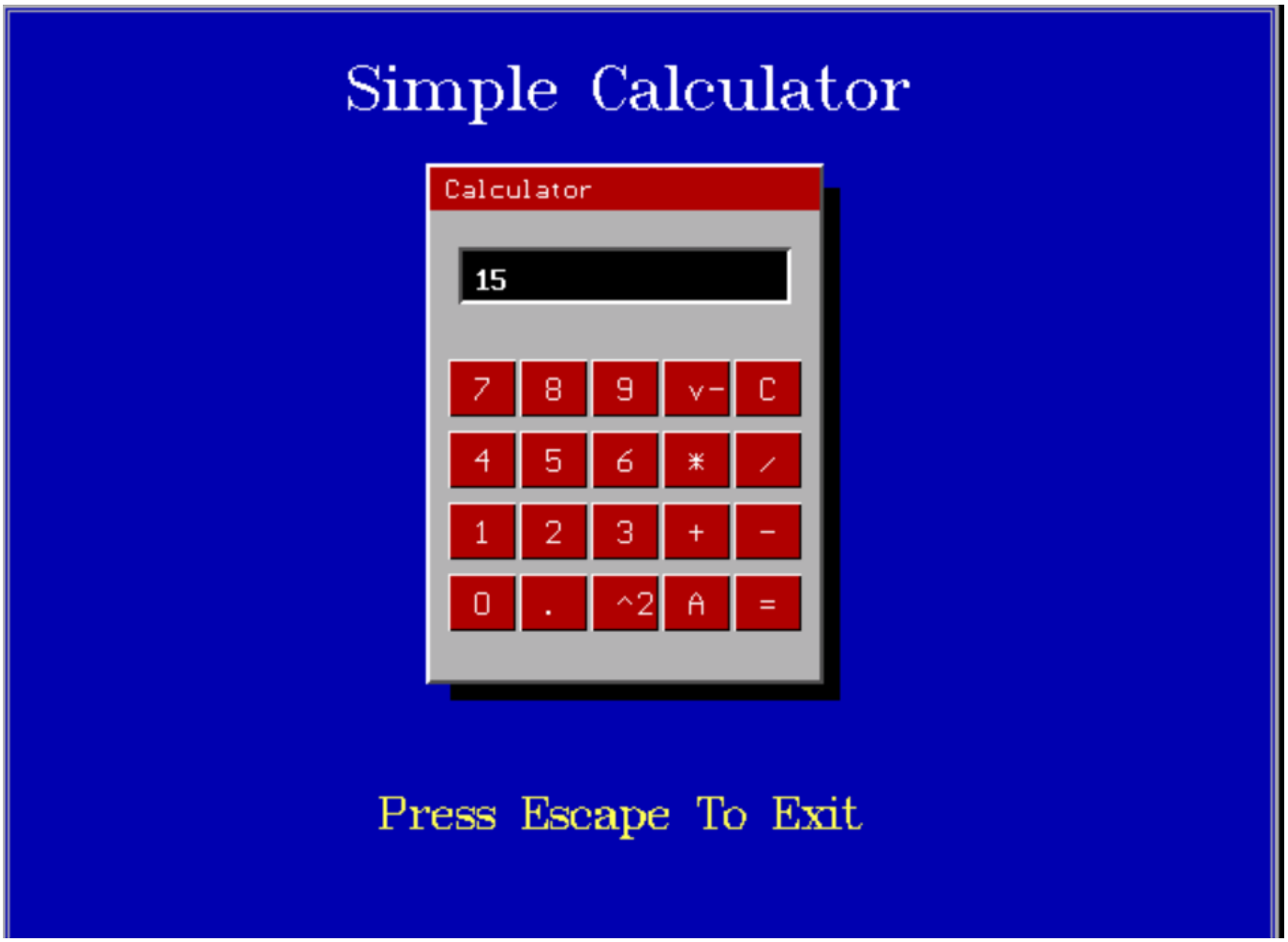
Calculator

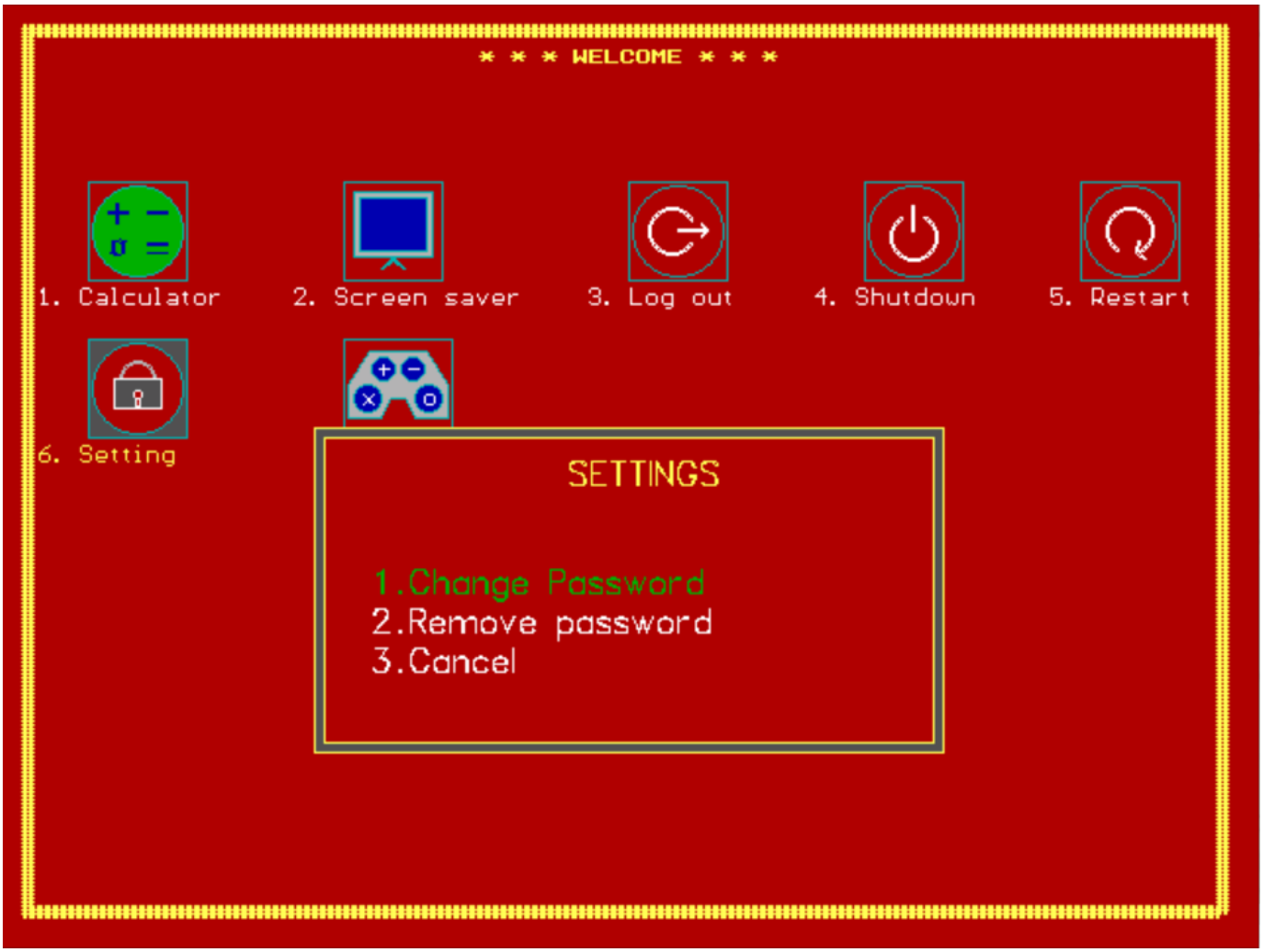


A simple calculator which can perform fundamental mathematical operations Addition, Subtraction, Multiplication and Division and two additional functions square and square root. It can work with decimal values also.

Desktop

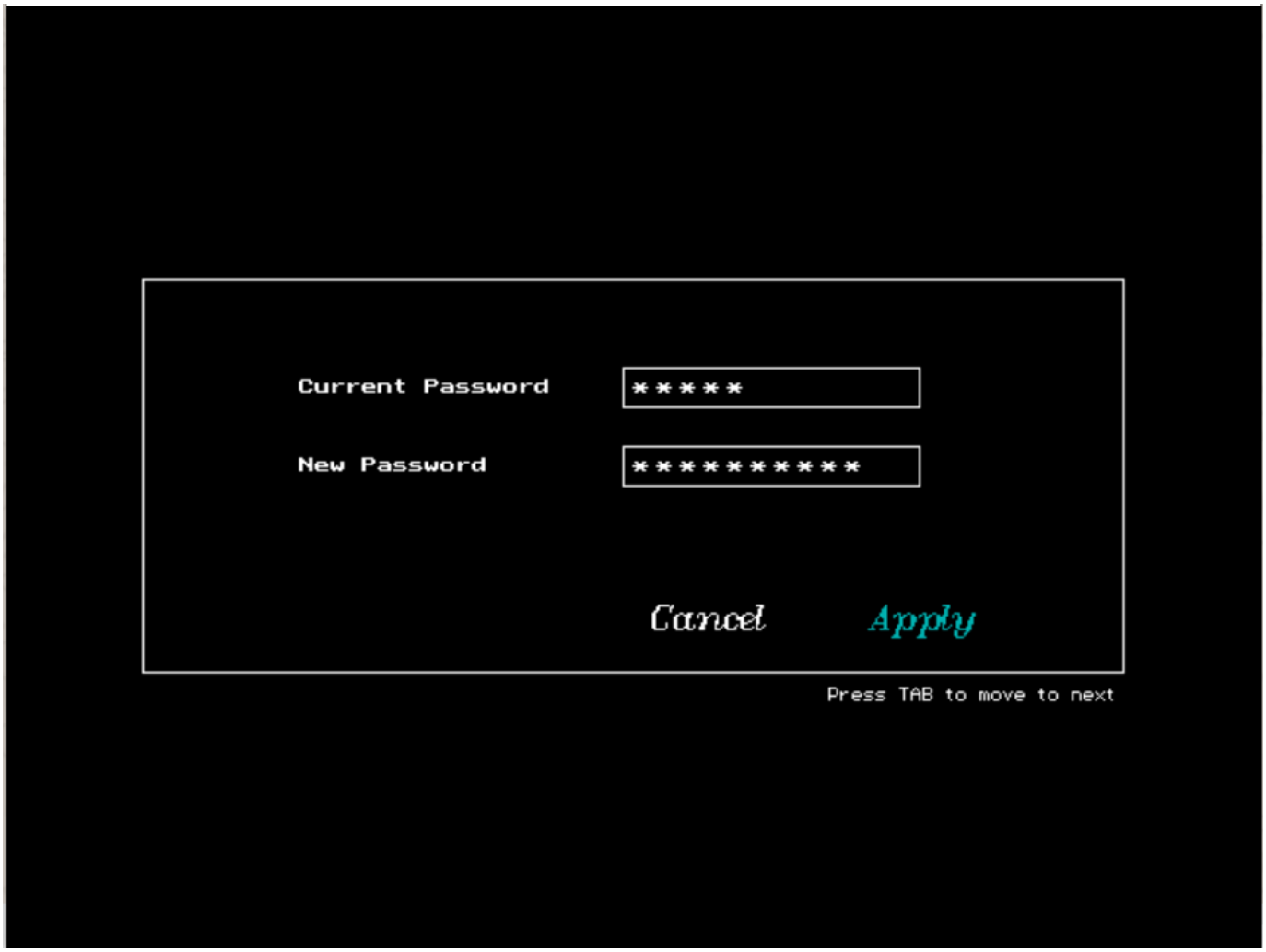
As soon the user enters the correct password he is redirected to the desktop / home screen. Where he can see the 7 icons and switch between them using the arrow keys. The icon where the user is currently present is highlighted.

Settings



In the setting, the user is provided with 3 options viz. Change Password, Remove Password, Cancel and depending upon the choice the user is redirected to that section.

Change Password

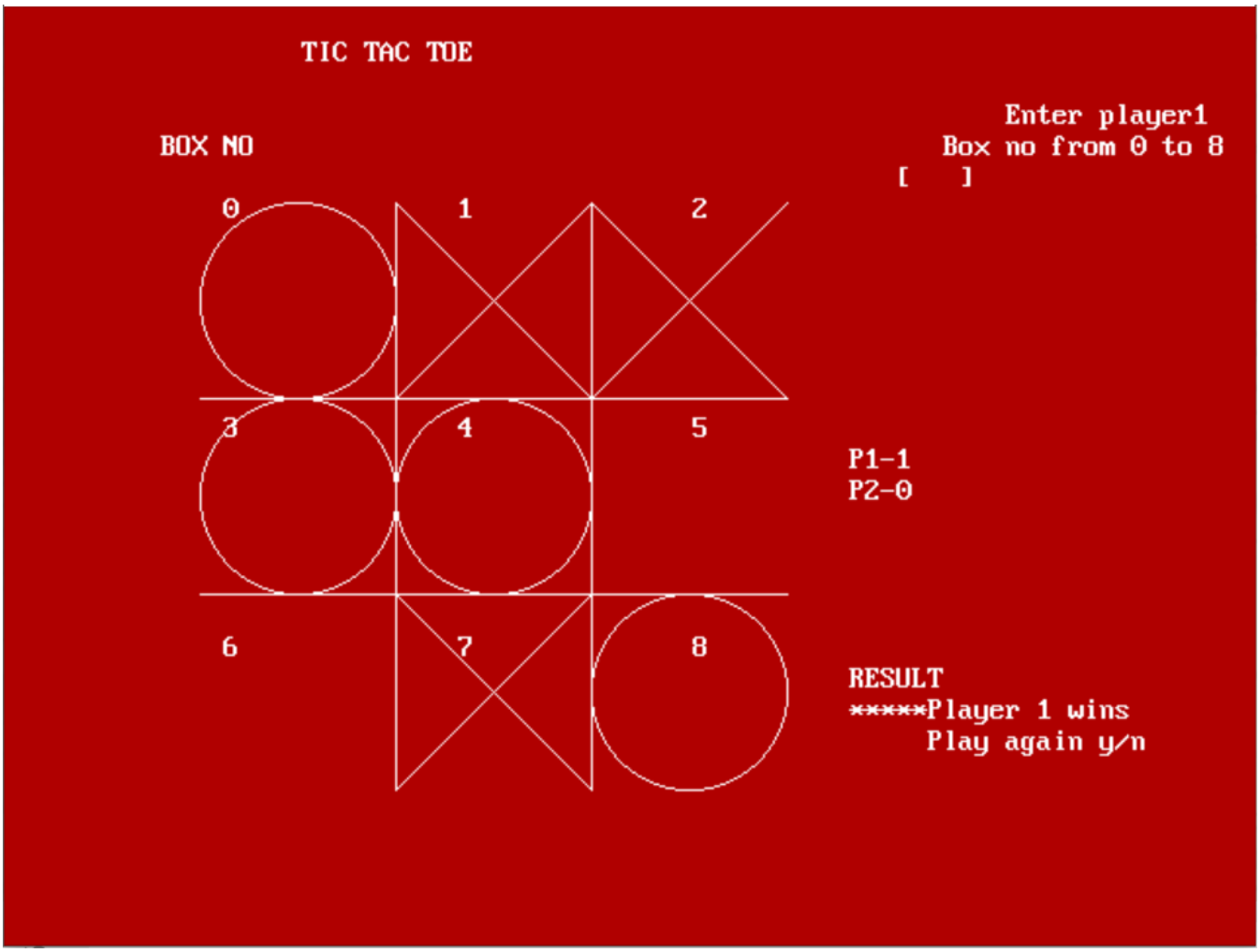


If the user selects the change password option under Settings tab he is redirected to this screen where he can change password by providing the correct current password. Users can switch between the various options on this page using TAB key.

Remove Password

If the user selects the remove password option under Settings tab he is redirected to this screen where he can remove password by providing the correct current password. Users can switch between the various options on this page using TAB key.

Tic Tac Toe

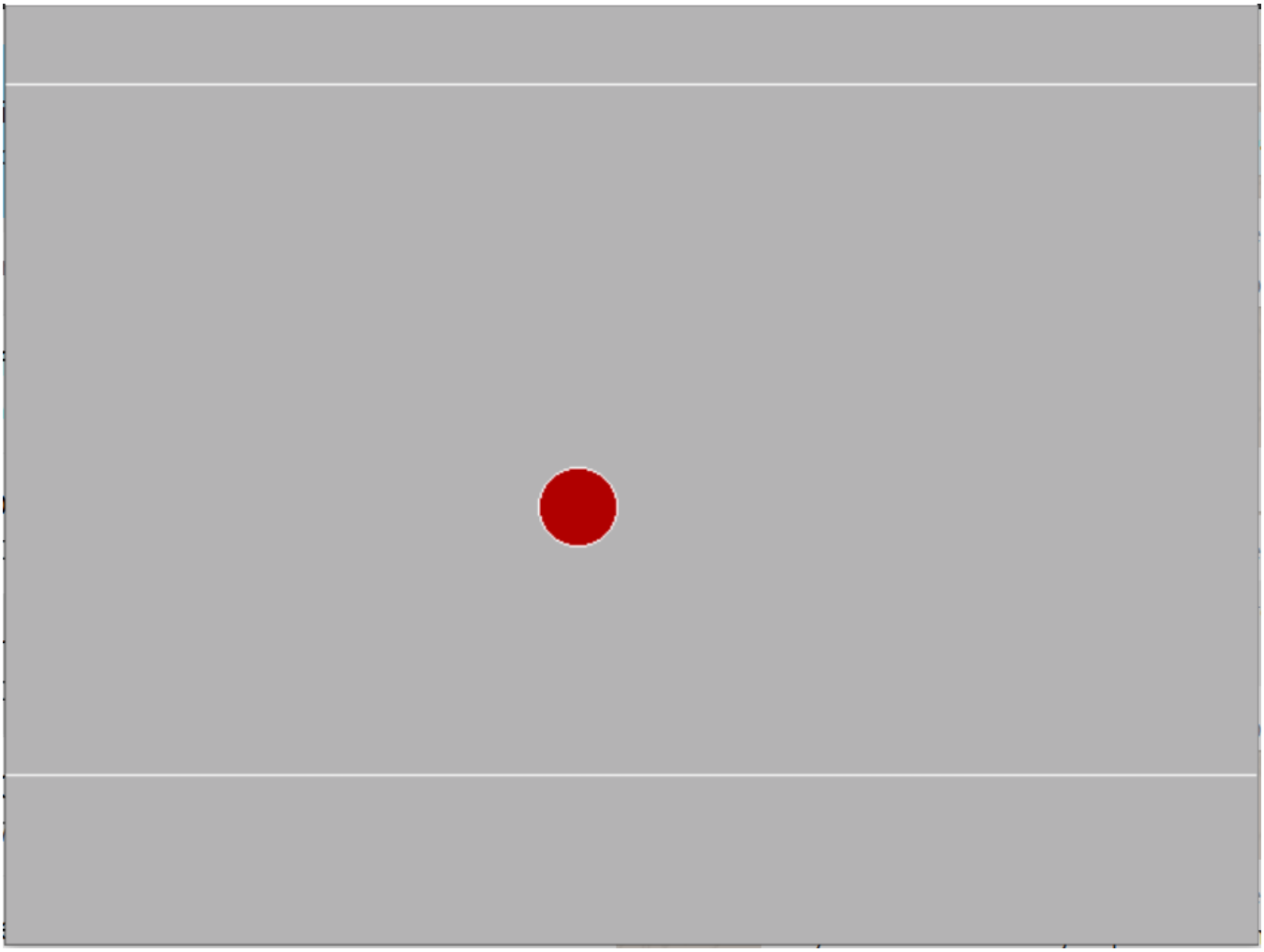


A multiplayer game tic tac toe where 2 players can play against each other in rounds and a result is displayed at the end showing cumulative score of both players.

ScreenSaver

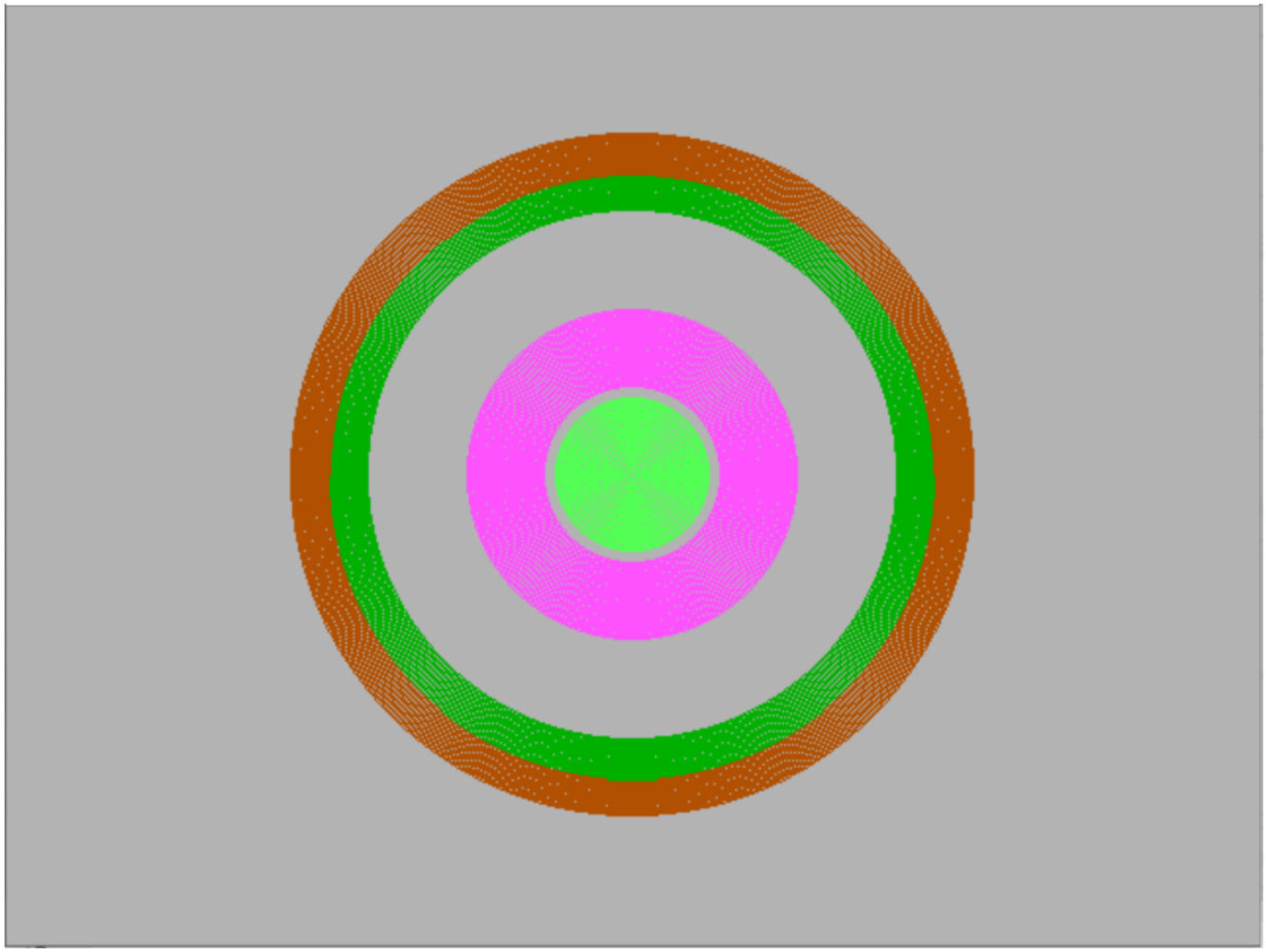
In this page the user is provided with various options to choose from the list of screensavers. Users can Preview them or Apply them by clicking “Enter” on the respective button. Being Screensaver if the user left the system inactive for 1 MINUTE the selected screen saver will start

Moving Ball



This is the screenshot of the moving ball screensaver where the ball bounces back from the wall at the instant it hits it at the same angle.

Circles



This is the screenshot of the concentric circles screensaver where concentric circles are displayed using the circle() function starting from the centre towards the boundary in an infinite loop with different colours.

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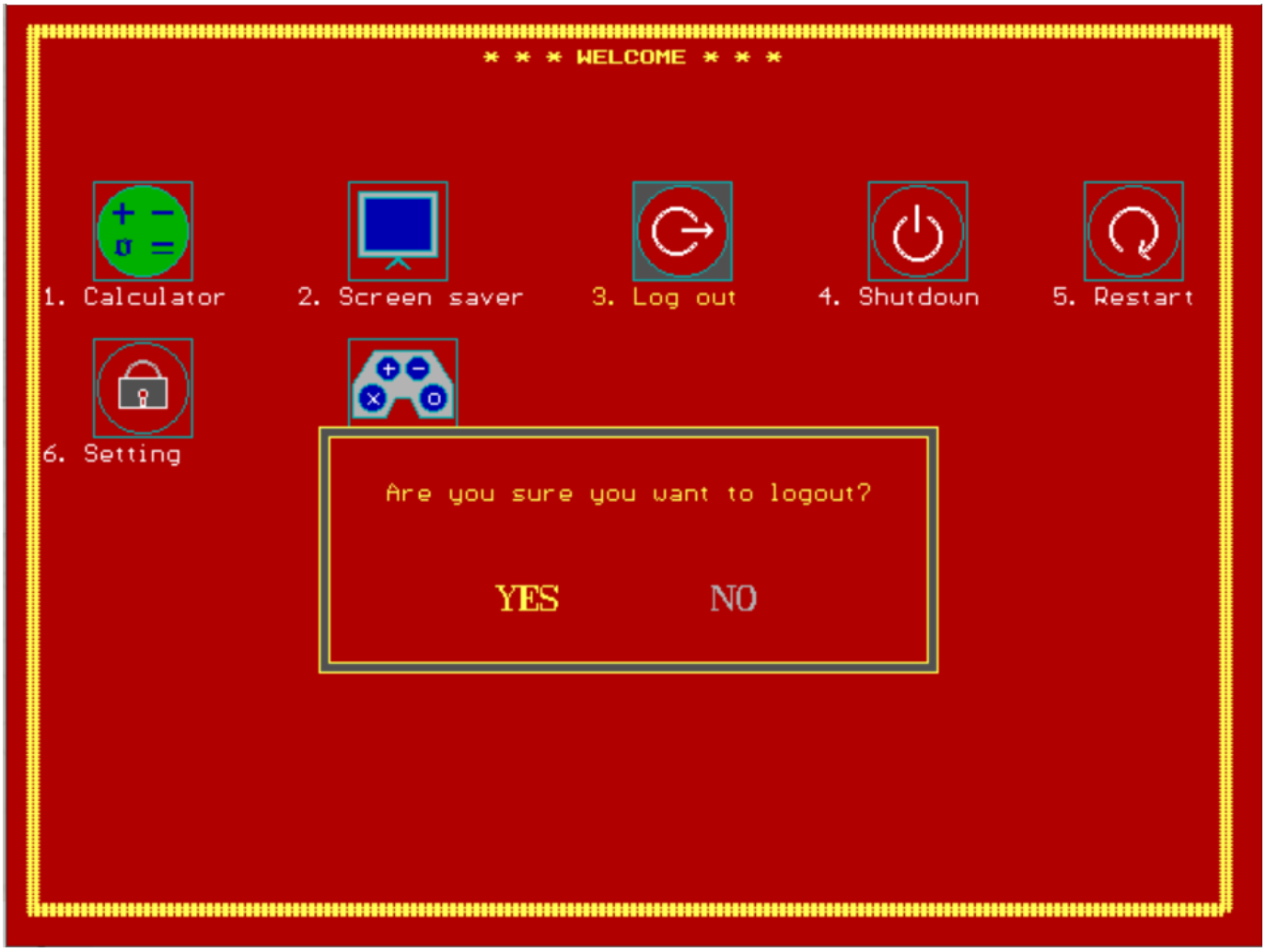
Stars

This is the screenshot of the stars screensaver where small dots are displayed randomly all over the screen using the putpixel() function which gives an illusion of stars moving randomly in the galaxy.

Logout



This is the login confirmation page where the user has two options “YES” or “NO”. Incase of “NO” the user remains on the desktop. Otherwise he is logged out of the system that is the to the starting password screen.

If the user presses “YES” then this page is displayed and the user is redirected to the initial password screen.

Restart

This is the restart confirmation page where the user has two options “YES” or “NO”. Incase of “NO” the user remains on the desktop. Otherwise the system restarts that is first logout followed by shutdown and the user is redirected to the initial password screen

Shutdown

This is the shutdown confirmation page where the user has two options “YES” or “NO”. Incase of “NO” the user remains on the desktop. Otherwise the user is redirected to the below page.

If the user presses “YES” then this page is displayed and the program terminates

SOURCE CODE

The implementation code for this project is too large to be pasted on this report so we have uploaded our code in github repository . You can see it and download it so that you can run the code on your pc. The link for the github repository is given below. So check it out to get the clear idea about the project and its working.

Link : https://github.com/ankitkumar892001/C-plus-plus-OS

LITERATURE REVIEW

[1] https://www.geeksforgeeks.org/computer-graphics-2/

[2] https://web.stanford.edu/class/archive/cs/cs106b/cs106b.1126/materials/cppdoc/graphics.html

As discussed earlier, this project is completely designed in C++ Programming language with graphics.h library included. So we have studied the graphics.h library and its pre built functions which are required in designing and animation. We took the reference of graphic.h library documentation. Graphics.h library 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. We have also used some concepts of classes ,objects in c++ programming and some concepts of file handling.

[3] https://www.w3schools.com/cpp/cpp_classes.asp

C++ is an object-oriented programming language. Everything in C++ is associated with classes and objects, along with its attributes and methods. For example: in real life, a car is an object. The car has attributes, such as weight and color, and methods, such as drive and brake. Attributes and methods are basically variables and functions that belong to the class. These are often referred to as "class members". A class is a user-defined data type that we can use in our program, and it works as an object constructor, or a "blueprint" for creating objects.

[4] https://www.geeksforgeeks.org/file-handling-c-classes/

In C++, files are mainly dealt by using three classes fstream, ifstream, ofstream available in fstream header file.

ofstream: Stream class to write on files

ifstream: Stream class to read from files

fstream: Stream class to both read and write from/to files.

[5] https://c.happycodings.com/games-and-graphics/

[6] https://www.programmingsimplified.com/c/graphics.h