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A MINI PROJECT ON A GAME "FLYING CROC"

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Submitted to:

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electronics and

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<u>Acknowledgement</u>

The task given to us was to develop a project using c programming. The core idea of the project is to make us capable to generate programs that could have realistic implementation on daily life.

We would like to express our sincere gratitude to the department of computer and electronics for providing us such a wonderful platform to develop our programming skills. We are thankful to our teacher Ms. Pratibha Paiju who gave us the opportunity to make this project .

This project would not have completed with a single hand. There is a considerable assistance from various personnel. Our seniors helped us lot during the development of concept of our program. They provided us with much needed tools and guidelines to help us develop our project. Also there was lot of help from our friends .

We express our hearfelt gratitude and regards for everyone for everyone who helped us during project development phase. Any suggestion and help would be highly appreciated.

Team members

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Introduction

C is a general purpose programming language developed by Denis Ritchie. C programming language provides immense potential for development of different purpose applications. This programming language lets users use different header files for various tasks. We used the SDL library (header file) to make a game application using various syntaxes under this header file. There are specific and simple control structures that helps to define various logics in the game and reduce the code volume.

In our project we decided to create a game using C programming language. We have created a game with graphical interface. The game interface consists of a menu that when selected takes users to different aspect of program. The game uses SDL(Simple Direct Media Layer) library to incorporate various logic and develop the game interface. SDL library has various commands and codes along with various attributes which makes manipulation of the graphical components very easy. Various commands in this library are defined under "sdl.h" header file. In this file functions and logic of various syntaxes are defined. The processor compiles the codes and gives output based on definitions set in this header file.

Basic game components:

1. **Setting the screen**: The game is basically in a window in which various alterations and coding is done to give desired output. The game background consists of various layers that are logically set to give the desired effects. The screen actually acts like a grid of coordinates where within various mathematical computations can be made and the effects to be displayed in the game can be synchronized. While using SDL the approach is to create multiple layers on the window to produce the effects in the game.

2. **Surface blitting**: As the basic idea is to create various layers and produce a screen to set these layers in various order based on different events, this function in SDL helps to put one surface over other. Its attributes helps to precisely define how and when to put different images in the screen.

3. **Collision detection**: The concept of collision detection is mainly used in game development. Using this concept effect of restricting user's movement to a specified area is possible. Also various logics can be put into game using this concept. In our game collision detection function is created and then logic like eating fruit and decreasing lives is created.

4. **Random value generation**: It is one of the most significant concept in our game. We used this function to create obstacles and place target fruits.

5. **Fps(frame per second) regulation**: The computer's ability to compute a code and execute them is tremendously fast. So in our game we needed to slow down activities to enable user's participation. It helps user to plan the move and play the game. In its absence the game would have been very fast and not so user friendly.

6. **Scrollable background**: This is another effect we used to create an endless background to give the player the effect of ever moving forward.

7. **Rectangle structure**: This is one of the key component of SDL library. Rectangle is actually a structure that helps to define the dimension and position of different components in the game. We can define logics and coordinate images and layers movement using this structure.

8. **Animation**: Animation is actually the movement of synchronized images in fast moving order to replicate different motions. In game development, animation is major component to giving it realistic feel.

9. **Text and audio**- SDL library enables us to incorporate sound and text I our game layers to make it more descriptive and informative. It also increases interaction. Mixer.dll and ttf.dll are necessary to add these features in the game.

10. **Events**: in general each and every input given via a mouse or keyboard is and event. There are specific codes for specific events. For example- if user presses the up key in keyboard then there is special coding for this particular event. It is very powerful tool in game development.

Game description

The game we have created is flying croc (flappy croc). The game has a graphical user interface which is created usind SDL library. The game consists of 2 major parts:

1. **Menu** – The game starts with a menu that prompts user to enter the choices displayed in the screen via a mouse click. The options provided are:
   - Start – This option takes the user to the game mode. The user can play the game after having selected this option. To exit from the game the user can press cross "×" in the window.
   - Exit- This option takes the user out of the game. User can press this option or the cross"×" option to exit from the game.
   - Credits- This option displays the name of the project members of the game.
2. **The game**- The game is basically a drone of the flappy bird. The game starts with a image that needs to get across obstacles set also eat various fruits in the in the way. The user will have 3 lives during the game. The game starts with a easier level and the difficulty goes on increasing with the time. The game adopts the basic concept of gravity.

   - **Controls**: The basic controls in the game are keyboard based. To initiate the game the user needs to hit the spacebar. Then the user has to press to scroll up and the down key sets the image downward. If no key is pressed the image is automatically set to go downwards.
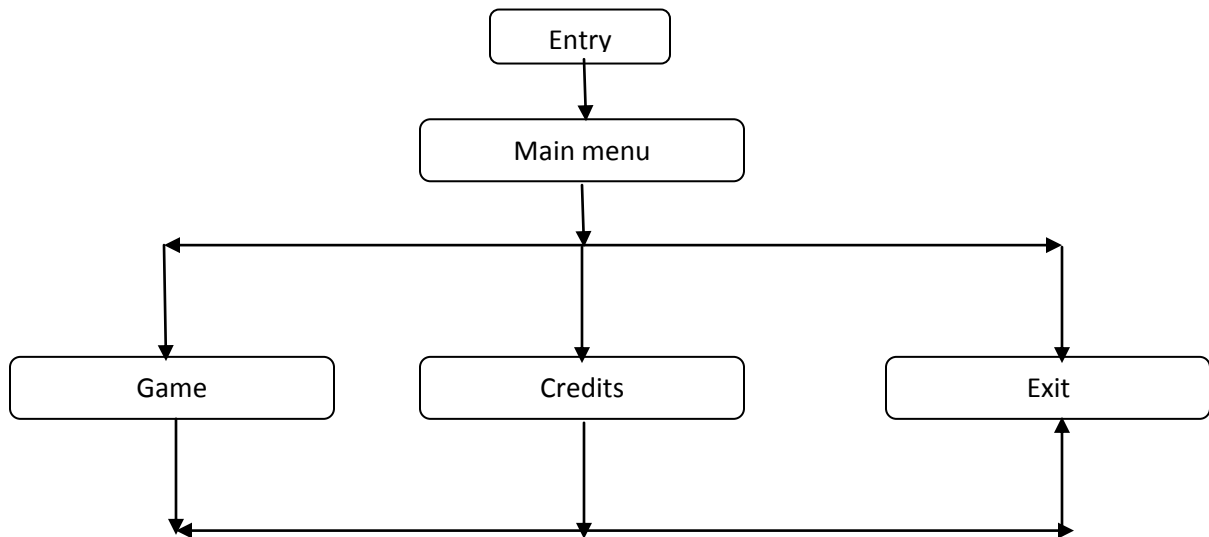
System block diagram:

```
                        ┌─────────┐
                        │  Entry  │
                        └────┬────┘
                             ↓
                      ┌────────────┐
                      │ Main menu  │
                      └─────┬──────┘
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   ┌─────────────────────────┼──────────────────────────┐
   ↓                         ↓                           ↓
┌────────┐            ┌────────────┐              ┌──────────┐
│  Game  │            │  Credits   │              │   Exit   │
└───┬────┘            └─────┬──────┘              └────┬─────┘
    ↓                       ↓                          │
    └───────────────────────┴──────────────────────────┘
```

Fig. system description

```
                      ╭─────────╮
                      │  Entry  │
                      ╰────┬────╯
                           ↓
                   ┌────────────┐
   ┌───────────────│ Main menu  │
   │               └────────────┘
   │
   │   ┌────────┐        ┌──────────────────────────────────────────────┐
   ├──→│  game  │───────→│ Takes the user to the game mode. User can play game. │
   │   └────────┘        └──────────────────────────────────────────────┘
   │   ┌────────┐        ┌──────────────────────────────────────────────┐
   ├──→│ credits│───────→│ Displays the name of the team members.       │
   │   └────────┘        └──────────────────────────────────────────────┘
   │   ┌────────┐        ┌──────────────────────────────────────────────┐
   └──→│  exit  │───────→│ Takes the use out of the game.               │
       └────────┘        └──────────────────────────────────────────────┘
```
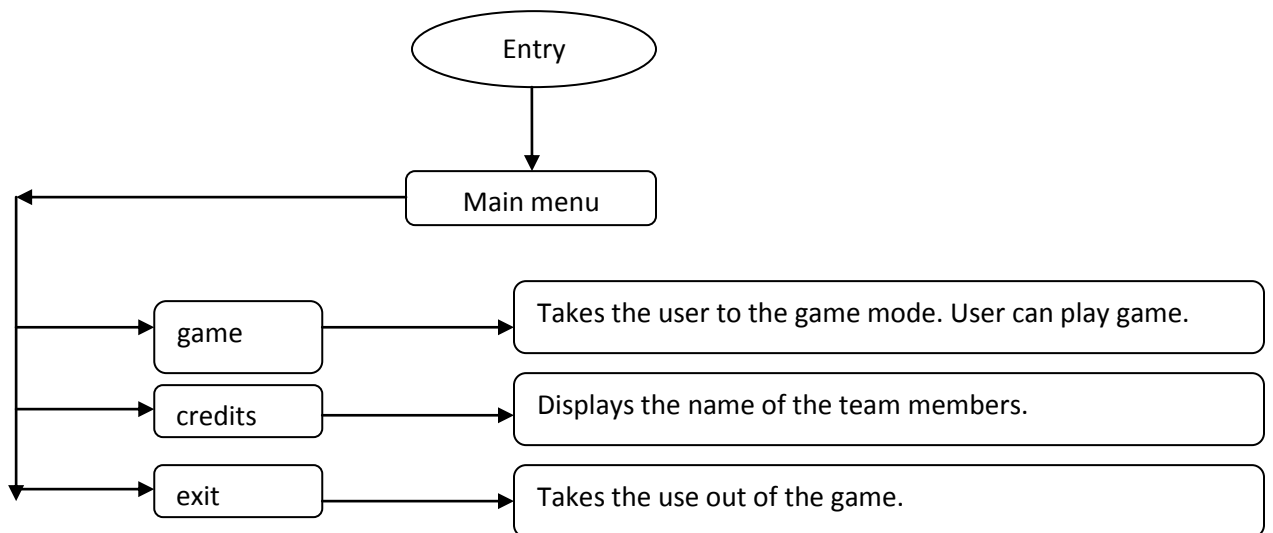
Fig. description of the game options

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Existing systems:

Games based on this concept are readily available in the major operating system platform like android, windows mobile, apple (now removed). These games are simple yet effective in drawing attention of the players. Flappy bird is somewhat similar to our project game. These games use much enriched and dedicated libraries for their coding due to which they have less bugs and better graphics handling quality.

Project limitations:

- The game will not track and save the progress of the game players. The game does not use file handling concepts. The scores and achievements cannot be retrieved later.

- The game does not support multiplayer. The game also does not use artificial intelligence or other self decision structures. All the possible outcomes are fed in the game code.

- The game cannot run until the header files are included in the compiler's library. So the program is not portable enough. The game only operates in the system with a compiler in which all the header files are present and the settings are optimized properly. This is the major setback in our game project.

- The game still has some bugs. The game is still a prototype and has lot of sector for improvement.

Methodology

- SDL library files and their tutorials were collect from various sources like internet and seniors.
- Books were used as guidelines.
- Working in group of 3, the project workload was divided among 3 of us.

Project scope:

- The game is solely for entertainment purpose. It might help players to enhance their response time.
- It will help us to develop idea of incorporating graphics library and various control structures of C programming.
- The game will give idea about graphics and memory management idea to the programmer.

__Conclusion and suggestions__

In this project, we fully used the SDL (Simple Direct Media Layer) graphics library. The game is solely based on the programming skill development of us. We tried our best to develop a interesting and eye catching game.

The game would have been much better if the time was sufficient and the resources were provided in time. We were unable to find the necessary tutorials for game in c programming due to which our time for project was shortened. Also the load shedding was problem during some periods in the game development phase.

The project all in all was very effective in giving us concept about C programming language and coding in C. The game is still a prototype and contains some latent errors which we were unable to identify causing the application to crash sometimes. Suggestions regarding this aspect would be highly appreciated. Also we would we happy to get any recommendations regarding enhancing the game's appeal.