Course Project Documentation

CS101 Project

GROUP CODE : 456

Sports Heads Football

Anshuman Acharya: 140010012

Arnav Deshmukh: 140110042

Ashish Kumar Gupta: 140010019

Kshitiz Agarwal: 14D110012

Table Of Contents

Introduction

The aim of the project was to make a game in C++, using the SDL graphics library. The game is the popular online flash game, Sports Heads Football along with a few additional features.
The link to the online game is :
http://www.twoplayergames.org/play/651-Sports_Heads_Football_2.html

SOFTWARE REQUIREMENTS

1) An IDE compiler preferably Codeblocks and a windows OS (The instructional video to install SDL graphic library is given for Codeblocks) to run and compile the code in C++.

2) SDL graphics library i.e. the header files of SDL and SDL_image are included in the code.

The youtube link to the video showing how to install SDL and SDL_image for Codeblocks is: https://youtu.be/_dNQ-IK7ll0

Also the instructions for installing it on other platforms is: http://lazyfoo.net/tutorials/SDL/01_hello_SDL/index.php

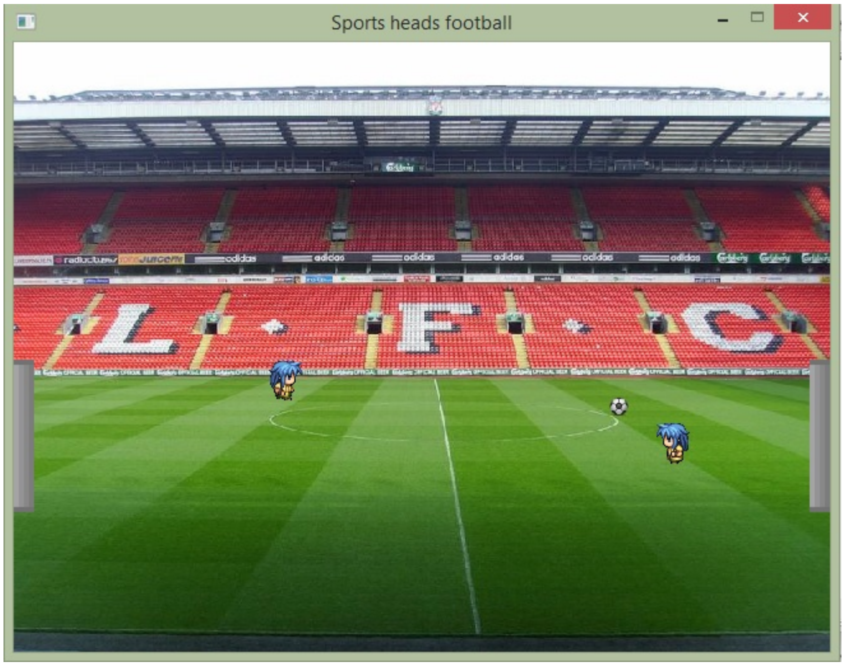
Problem Statement & Implementation

The aim was to make basic version of the game using the SDL graphics library.

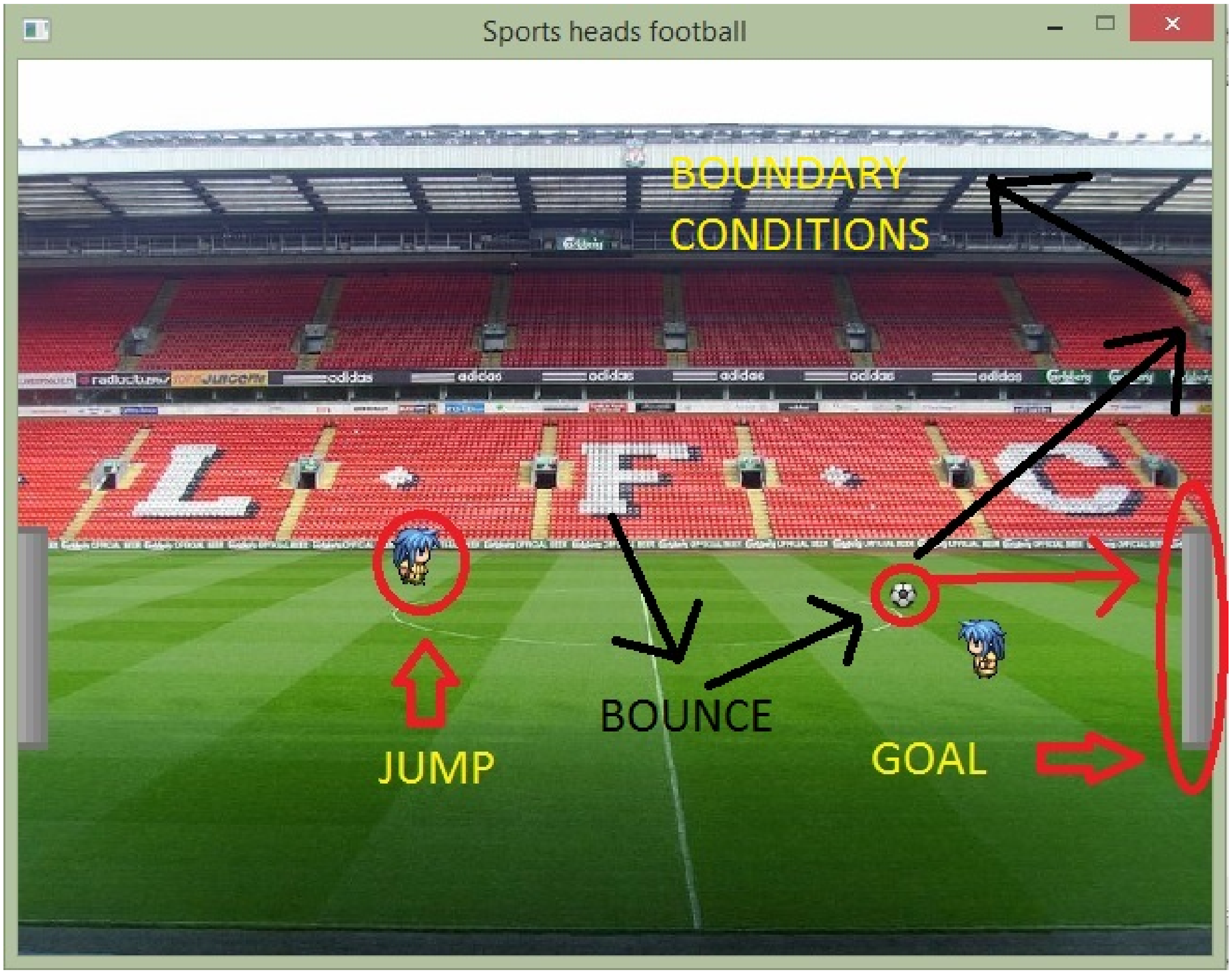
There were 2 main objects which needed to be created and whose functions needed to be implemented:

A)The 2 player sprites

B)The ball.



The aim of each player is to make the ball go into the opponents goal by heading the ball. Whichever player succeeds in scoring more goals, wins!!!.



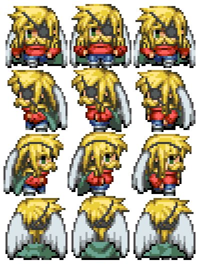
PLAYER:

1) First of all we needed to load and render the sprites, which was done by using functions in the SDL Library.

2) The movement of players was done by defining the x and y coordinates of the sprites and updating them in each loop of the

game by giving them a certain move speed. The direction is given using the keyboard keys input which is implemented by functions in SDL which detect the input key.

3) During the movement of players, animation is also done using a queue of images which are cropped and rendered from a single image given below:



Courtesy for image of sprites: Famitsu sprite creator
https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CB4QFjAA&url=http%3A%2F%2Fwww.famitsu.com%2Ffreegame%2Ftool%2Fchibi%2Findex1.html&ei=p1cyVbnvO8u5uASlr4Eg&usg=AFQjCNGriywt1vmN1i_UK-ZCVnjAng1XUQ&sig2=EEDDIMvmV6lnZb-7OrP5aQ
After every ¼th second, depending on the key being pressed, the image is cropped and rendered on the screen on the given x and y coordinates.

4) Jumping and gravity were also implemented by using equations in physics appropriately on the variables for position of x, y coordinates, movespeed and upspeed.

BALL:

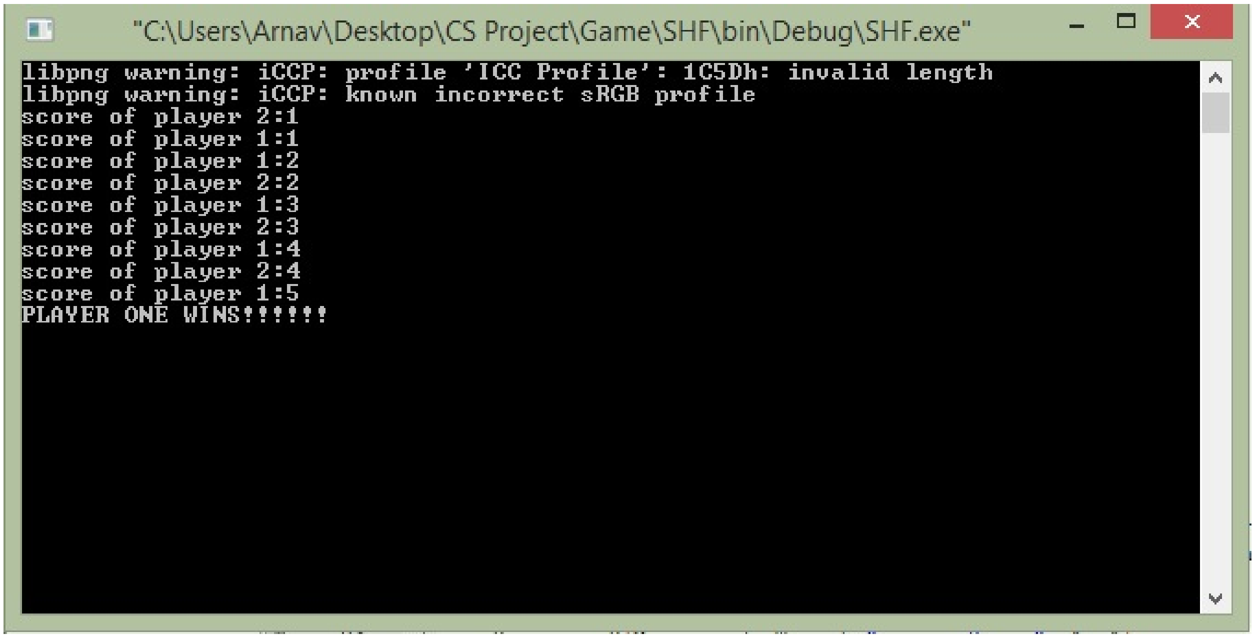
1) Again the image needed to be loaded and rendered.

2) A speed in x direction and a speed in y direction were defined and position of x and y coordinates were defined and changed accordingly to implement the following features: a) Bouncing on ground.
b) Gravity simulation.
c) Boundary conditions so that ball doesn’t escape the window.

d) Goal is detected when it enters the goal and updating score.
e) Collision with player.

SCORE KEEPING:

The score keeping was done on the terminal.



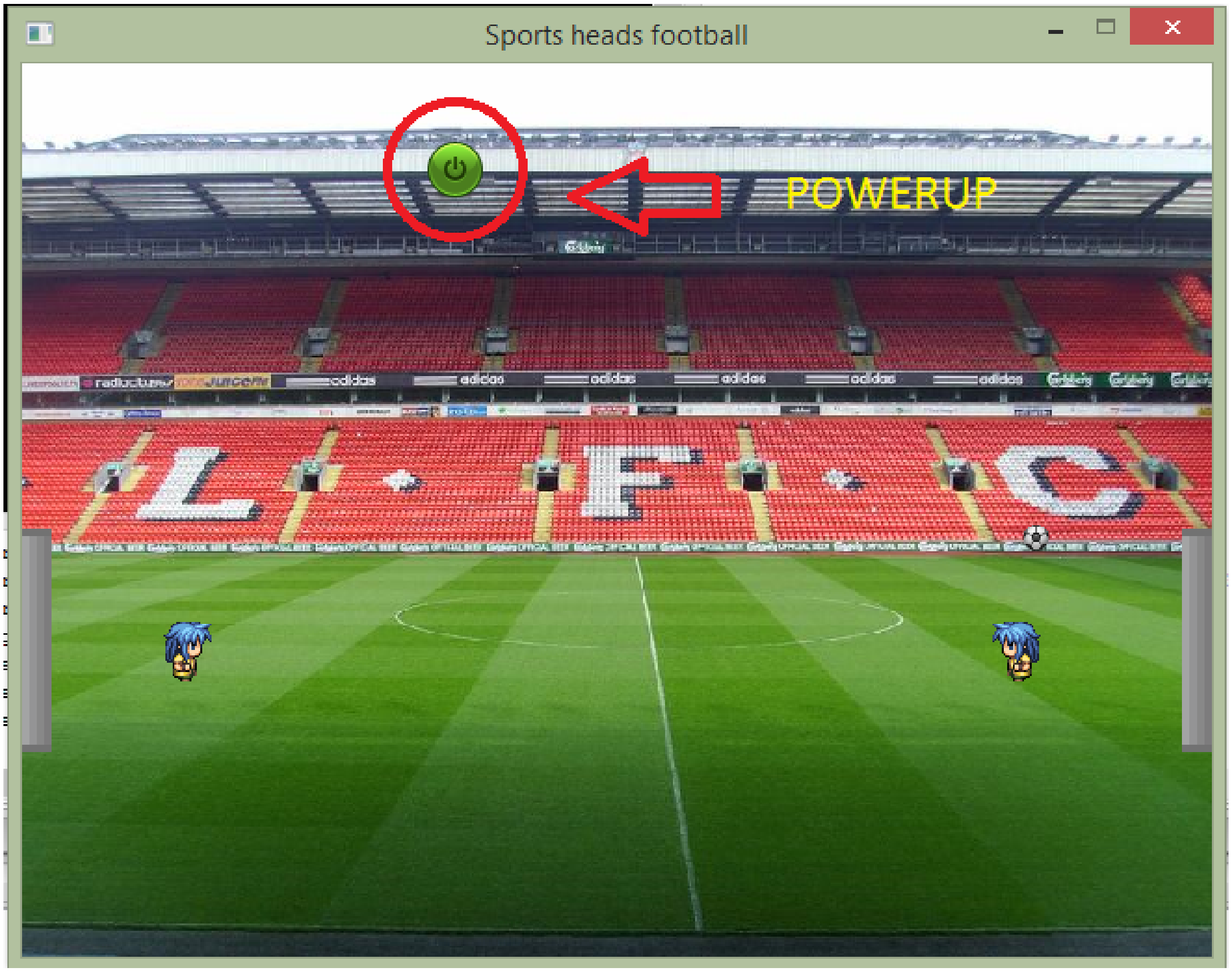
"C:\Users\Arnav\Desktop\CS Project\Game\SHF\bin\Debug\SHF.exe"

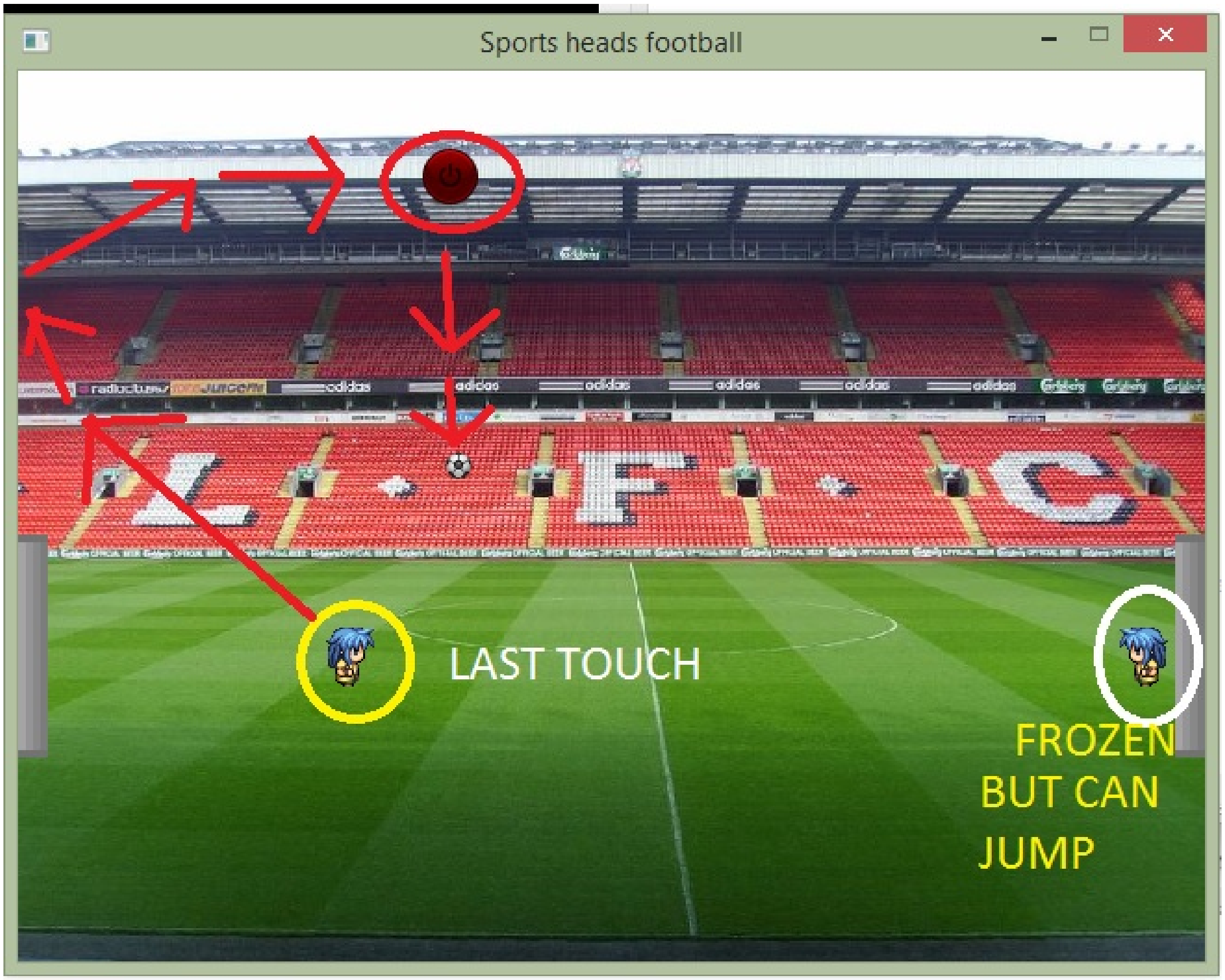
```
libpng warning: iCCP: profile 'ICC Profile': 1C5Dh: invalid length
libpng warning: iCCP: known incorrect sRGB profile
score of player 2:1
score of player 1:1
score of player 1:2
score of player 2:2
score of player 1:3
score of player 2:3
score of player 1:4
score of player 2:4
score of player 1:5
PLAYER ONE WINS!!!!!!
```

If someone wants to continue the project, they can also add the score keeping on the main SDL window!

ADDITIONAL FEATURES:

Power ups:



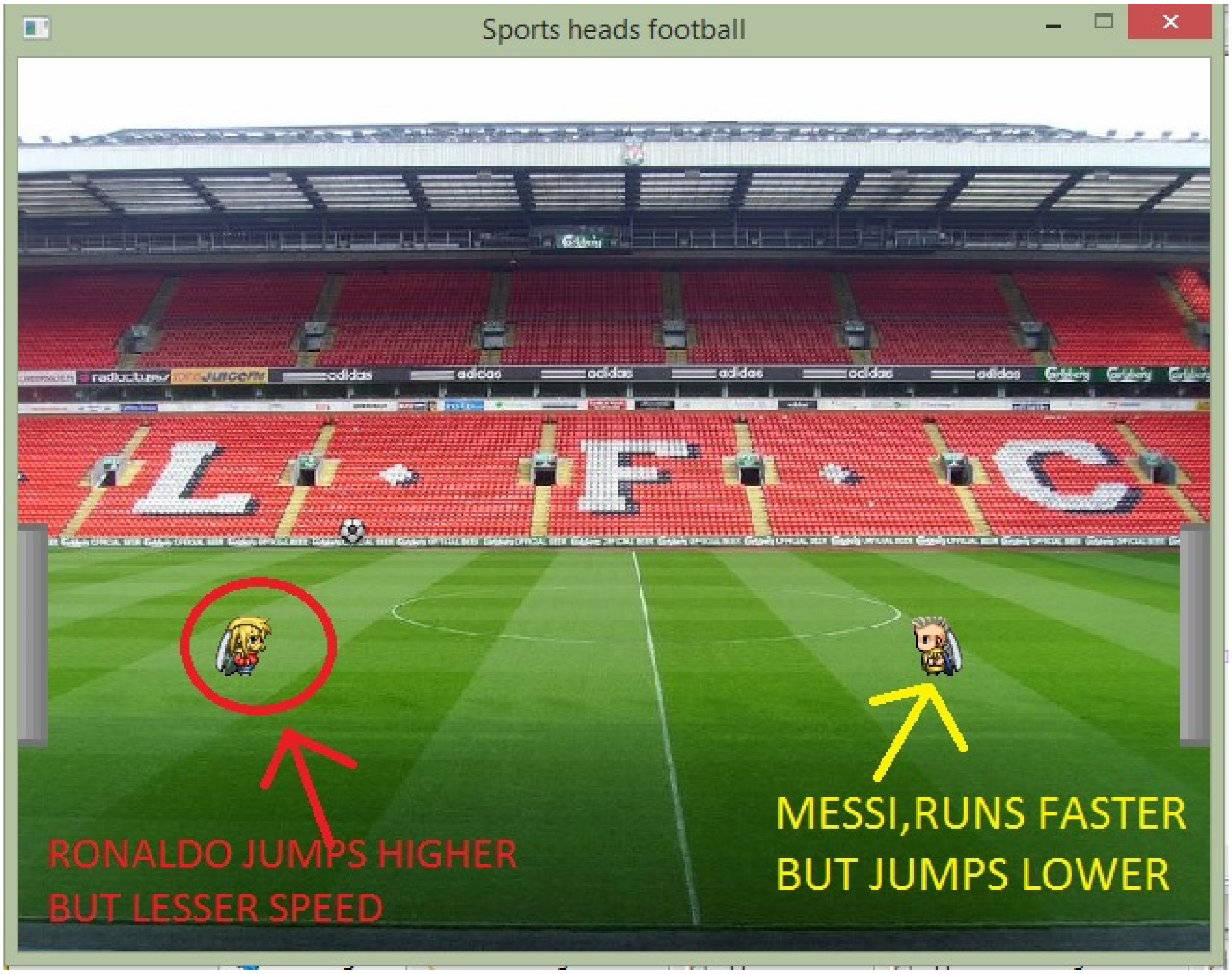


So, if the player collides with the ball and the ball goes and hits the power up, the other player is frozen for a period of time, thus giving the player an advantage.

We had to define a last touch function which detects which player had the last touch, we did this by flagging the player.

The power up appears at random places, we have used the randomize function.

PLAYERS WITH DIFFERENT ABILITIES:



We also gave the users options to choose different players having their own advantages and disadvantages as shown in the image above.

CHALLENGES FACED & BUGS

1) Learning and implementing the graphics library SDL :- We learnt how to use the library from online resources which gave tutorials on how to use SDL.

Courtesy : http://lazyfoo.net/tutorials/SDL/index.php Lazyfoo SDL Tutorial and coding made easy, SDL tutorials https://www.youtube.com/watch?v=DgpcRIK2uug&list=PLHJE4y54mpC5_eEz9gCqIkNpU-n_2eyNt

2) Unpredictable behaviour :- There was unpredictable behaviour of rendering of objects if we took input on terminal E.g. We couldn't exactly figure out the problem so we stopped using terminal for input and just used the keyboard inputs using the SDL's functions.

3) Collision Detection :- There was multiple collision detection and the ball was vibrating due to this each time collision happened with a MOVING player. We introduced a time factor to wait after a collision is detected to solve the multiple collision problem.

CHANGES MADE IN PLAN

We had first decided to make the project in simple cpp and init canvas and we made a prototype in it but saw that it was running too poor.

So we decided to switch to a better graphics library, SDL which also uses a function which uses GPU to do its processing and rendering.

Future Work and Instructions to Continue Project

1) Animations: We could add trails to player and ball.

2) Single Player Option: We could add a single player option for the user to play with computer operated player.

3) Sound: Adding sounds like crowd cheering on scoring a goal.

4) Tournament Mode: In a single player mode, a tournament can be made with increasing difficulty levels.

5) Power ups: More power ups and power downs can be added.

6) More players with even more different abilities can be added.

7) The physics of the game can be improved by adding drag and friction. Also the collision can be made more realistic by adding force applied by players.

8) Kicking can also be implemented.

REFERENCES

1) SDL installation guide:
http://lazyfoo.net/tutorials/SDL/01_hello_SDL/index.php

2) SDL Tutorials: Lazyfoo tutorials:
http://lazyfoo.net/tutorials/SDL/index.php,

SDL Made easy tutorials:
https://www.youtube.com/watch?v=DgpcRIK2uug&list=PLHJE4y54mpC5_eEz9gCqIkNpU-n_2eyNt

3) Famitsu Sprite Creator(Used to make the sprites of Players):
https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CB4QFjAA&url=http%3A%2F%2Fwww.famitsu.com%2Ffreegame%2Ftool%2Fchibi%2Findex1.html&ei=p1cyVbnvO8u5uASIr4Eg&usg=AFQjCNGriywt1vmN1i_UK-ZCVnjAng1XUQ&sig2=EEDDIMvmV6lnZb-7OrP5aQ

4) To understand the functions of SDL : wiki.libsdl.org