TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

PULCHOWK CAMPUS

PROJECT REPORT

ON

Foo2y

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Acknowledgement

The sensation and final upshot of this project required a lot of guidance and assistance from many people and we are exceptionally honored to have got this all along the completion of our project. All that we have done is only due to such supervision and assistance so we would like to express our sincere and earnest gratitude to all individuals who granted their helping hands to accomplish our project timely and efficiently.

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Objectives

The main objectives to be met in this project can be summarized as follows:

1. To become familiar with the basic concepts of Object Oriented Programming in C++,
2. To learn Graphics Programming using the SFML library,
3. To learn the basics of Game Development and Game Physics,
4. To Create an Interactive User Interface,.

Introduction

Foo2y is a 2D football game which resembles the one we used to play during our childhood when mobile phones were barely available and smartphones didn't exist.Football is a game played between two teams of 11 players each.On **Foo2y** the user will be able to control one of the player. The game will be available on single player and multi player mode. On single player mode the user will be playing with computer while on multiplayer mode the player will be playing with another player. On both modes all other players will be controlled by the algorithm.

Application:

This game is entertaining to play(at least we think so). Also afew games can be derived from our game, using the type of movement our game elements implement. One example being obstacle-avoiding game where the user's character moves around to avoid obstacles. Networking concepts can be used to make this game even more enjoyable than it is by introducing multi-computer multiplayer feature.

Literature Survey:

Since this project is based on the application of Object Oriented Programming concept, different books were suggested to refer by the teachers for the OOP concept. The books like "The secrets of object oriented programming" were referred OOP as reference for the development of program that assisted us to clear the concepts regarding the language and make our program development easier. For implementing the graphics in our project, we have use SFML and for this, different e-books were referred and different video tutorials from YouTube were viewed.

SFML is a free and open-source software provided under the terms of the zlib/png license. It handles creating and input to windows. It can be downloaded easily through and has a complete documentation available on its website(sfml-dev.org), which was the most important reference to sfml, for this project. To link SFML to our IDEs we had to watch a few tutorials from YouTube.

Existing System:

We derived the concept for this game from several existing, excellent football games like FIFA, PES, etc. We don't stand on our project being unique because football is so popular a game that there are several hundreds of implementations of it,, but we didn't try to reference to any other similar games, for our code.

Methodology:

This project is based on C++ programming language utilizing SFML graphics library, and “Object Oriented Programming” concept. Different classes were created with suitable access specifiers(as much private members as possible) and data hiding was given a priority. The concept of code reusability, data abstraction were implemented in the project.

We used GitHub features for sharing of codes among our team members.

We created an object for each of the elements of our game and then worked on their interaction with each other, which is the default approach to problem solving in an OOP. The interaction between objects is the 95% of our project as this game has rather simple graphics elements.

The multifile feature is a must for better readibility and easy maintainence of a large program. So, we have created different files for each of the objects and game

modes and a single main file to use them all. This helps make our main.cpp file seem like an abstract for our whole code.

The player's movement can be controlled with four keys(representing up, down, left and right) and the inertia enables the user to make the player move in several directions other than(left, right, up and down). The inertia has been implemented by making the velocity of the player decrease continuously, rather than abruptly, when the user releases the movement key.

The player can move(with or without the ball), and pass and shoot the ball whilst it's in his/her possession. The different ball-player interactions are used, depending on the which of the predefined conditions is being fulfilled.

Implementation:

Block Diagram:

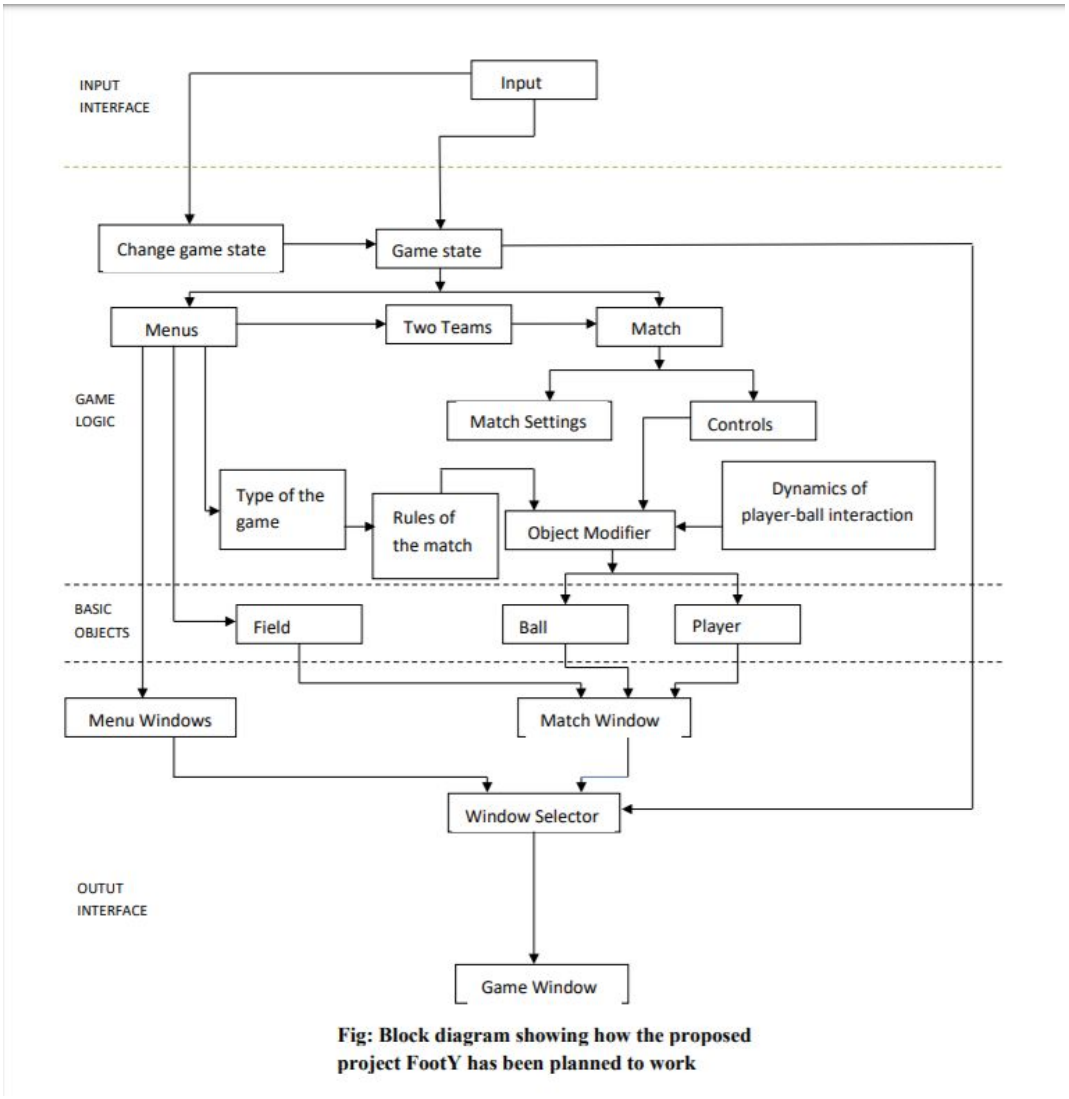

Fig: Block diagram showing how the proposed project FootY has been planned to work

Results:

The project was completed, the objectives of the project were achieved and the game was designed and completed as per the requirement. The complete game was designed with the necessary features.

We managed to designa defensive AI by fixing formations of the players and applying a “Zonal Marking” system

The attacking part was handled by making the CPU teammates make calculated runs to recieve passes

We failed to implement a on player only mode

Discussion:

With the completion of the project, the objectives of the project were achieved and the game was designed and completed as per the requirement. The complete game was designed with the necessary features.

The main objective for the development of this game was fulfilled, but still some features in this game could not be completed which might be due to the time constraint, and also, this is the learning phase due to which much time was spent on learning the subject matter as the topic was completely unknown before the starting of project.

From this project, we can take positives as we achieved the cooperation between the team members, learnt to work in a team, backing up each other in need and also the challenges to develop the software by developing this small gaming program.

Problems Faced and Solutions:

The first problem we faced was to properly link SFML library to our IDE. Then we had to think of logics for player-ball interactions and the game AI. Other features were not so challenging and were just a matter of time.

Linking was done successfully after thoroughly rewatching the previous tutorials and some new ones to find where we might have made some errors. The logics part was solved with some thinking, derivations from real world games and some trial and error.

Limitations and Future Enhancements:

Many features had to be left out so that we could complete the game on time.. The following features can be added to our project:

The game can be extended for multiple players to play in LAN and network peer discovery could also be added.

Several modes of play like practice, tournament, match modes could be added.

Predefined teams and also a bit of commentary can be added.

The graphics quality could be improved by making the game 3d with cylindrical players and spherical balls.

The game AI can of course be improved to the quality of already available, excellent games.

Conclusion and Recommendations:

This project was unquestionably a good way of learning and implementing the way for programming practice. This project leads us to the winding up on the programming practice that for developing software a good judgment and proper analysis of the topic is required at first rather than the coding. The coding is not the initial step for emergent of any program, rather a good planning on the basic framework and making decision on the way of implementing the program is the most. After the coding of the program the system may not be as per our requirement but debugging, if any error, and testing and execution of the program are furthermore required. After the completion of the system, its management takes, is another most required obsession that is to be handled with great care. Also on using the graphics we might have to load different images for different purpose so proper discussion and proper decision is required as per the situation emerges.

Thus, after the completion of our project, we can conclude proper judgment and implementation of the problems or topic leads to the good programming practice which might lead to have desired output.

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