



TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Pulchowk Campus

Project Report On
“Pac man”

Submitted by:

Amrit Prasad Phuyal (PUL074BEX004)

Ashlesh Pandey (PUL074BEX007)

Sunney Sharma (PUL074BEX449)

Submitted to:

Mr. Daya Sagar Baral

(Lecturer, Department of Electronics and Computer Engineering, Pulchowk Campus, IOE)

Acknowledgement:

We are glad to take this opportunity to express our sincere gratitude to our teacher Mr. Daya Sagar Baral (Assistant professor, Department of Electronics and Communication Engineering, Pulchowk Campus, Institute of Engineering) for his guidance, support and valuable suggestion throughout the days. We feel overwhelmed to be able to take this wonderful chance to build the "*Pacman*" game which enabled us to learn the concept of Object-Oriented programming to develop a useful software and game.

We owe our deep sense of gratitude to the Department of Electronics and Computer Engineering, Pulchowk Campus for providing such a marvelous opportunity to students like us.

Lastly, we would like to take this opportunity to acknowledge the contributions of all those who have published their reports and articles in related field on various media for the benefit of students like us. And we would also like to thank our families, friends and teachers who helped and guided us to pursue the vast field of Object-Oriented Programming.

Amrit Prasad Phuyal (PUL074BEX004)

Ashlesh Pandey (PUL074BEX007)

Sunney Sharma (PUL074BEX049)

Abstract:

Arcade game were quite popular in the past. The games played in the arcade-gaming machines are still quite popular among the arcade enthusiasts. The games however are not easily available and are supposed to be hard to realize on different platforms.

We tried to portray the game as much as possible written C++. The game Pac-man is a well-designed arcade game where the main character, a Pac-man is chased around a map by the ghosts. The original game consists of many power ups, pellets and cherries that award different points to the player.

Our game doesn't cover all the aspects that were available in the original series. However, we tried to make the game as fun as possible by adding super-pellets and chasing mechanisms.

In short, our game provides the option to play an interactive game made with the use C++ and OpenGL.

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1. Objectives:

We know computer games are the enormous virtual environments that we can explore, conquer, build and destroy. Our main motto is to provide the gaming environment to the player and full Entertainment as described above through our game.

2. Introduction:

Pac-man originally developed by Toru Iwatati and first released in Japan as Puck Man in May 1980 is an arcade game that has been a regular to many arcade gamers. It is one of the most challenging arcade games to fully complete. The player represents a character in the game that must run around a maze while being chased by four colored enemies each resembling different nature. The player collects points by collecting the dots scattered all around a maze while being chased by four colored enemies each resembling different nature. The player collects points by collecting the dots scattered all around the maze along with other point rewarding items like cherries. Near the corners of the maze are four flashing power pellets that provide Pac-man with the temporarily ability to eat the ghosts and earn bonus points. The enemies turn deep blue, reverse direction and usually move more slowly. When an enemy is eaten, its eyes remain and return to the center box more where the ghost is regenerated in its normal color.

3. Application:

Playing games has been a part of keen interest to the humans from the very the very past. Like this concept our game can be used as source of entertainment, relaxation of mind and to reduce stress as well. We can also do the work that can't be done in our real world through the virtual environment created by our code.

4. Literature Survey:

We found the code of the other games that were coded using OpenGL library like tetris (xhacker, 2014), chess (xenaheart, 2015). We study these codes thoroughly and got the following conclusions:

- Using OpenGL library, we can create various graphics related structure.
- Different functions defined in the OpenGL can be used to give different colors and textures to the ghost and Pacman.
- Glut (Toolkit of OpenGL library) can be used to create window, translate and rotate the matrix of the object, to track the position of mouse, to show the render screen etc.

Example:

- To create the window

Function used: `glutCreateWindow ("window name")`

- To define the position of window

Function used: `glutInitWindowposition (int x, int y)`

X and Y are the co-ordinates of top left part of window in pixel.

- define the size of window

Function used: `glutInitWindowSize (int x, int y)`

x and y are the width and height of the window.

Likewise, many user-defined functions are used to manipulate the game flow. The works are commented in the source code. In this way we gather most of our knowledge from the previously made similar projects and got familiar with Open Gl library and its toolkit.

5. Methodology:

5.1 Research and study

The initial stages of our project included the research and study phase, where we studied about the development of game using C++ and OpenGL library. We also guide our way through any possible obstacles with the internet or the valuable suggestions from our teachers.

We are still learning the vast field of object-oriented programming and are looking forward to broadening our horizon with this project on hand.

5.2 Problem Analysis

The next step that we worked on is problem analysis. We brought up questions related to our field of project, found a common and optimal solution and included that to solve the problem

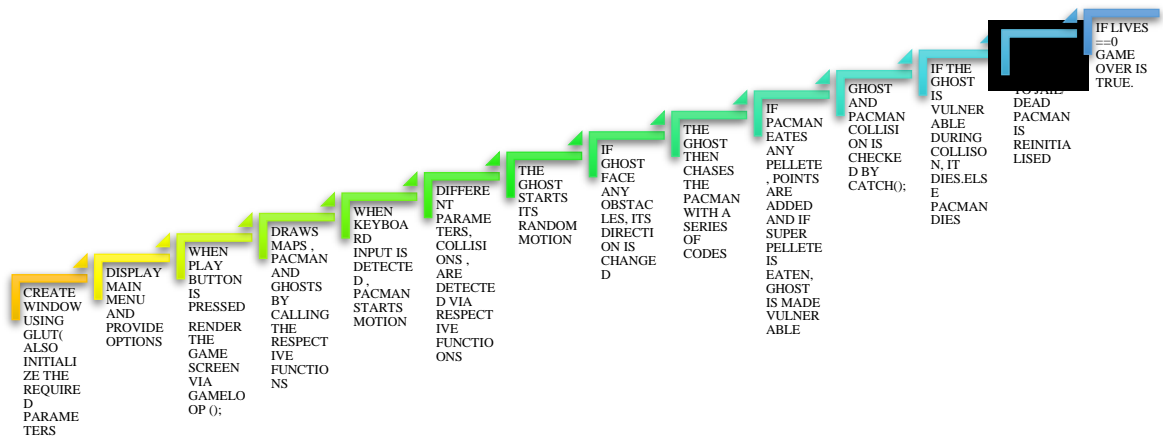
5.3 Data Collection

We collected data that matched the criteria of our field and we tried our best to create a game with least possible errors. Case study helped us to make a clear picture of the challenges that lie ahead.

5.4 Implementation:

We Implemented the codes for the game as similar to the following flowchart:

5.5 Block Diagram:



6. Existing System:

The original game has seen many spin offs. Likewise, many developers have added their unique ideas to even change the game play. Some systems include the use of different Powerups to level the game.

6.1 Similarities to the system

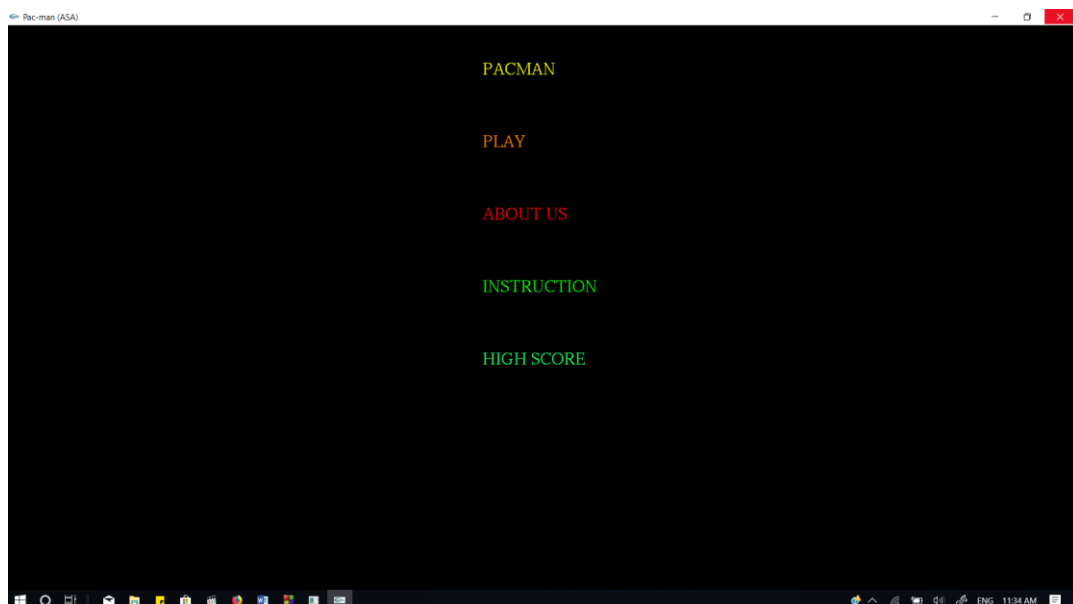
- Based on the original Pac-man arcade game
- Coded on C++ language

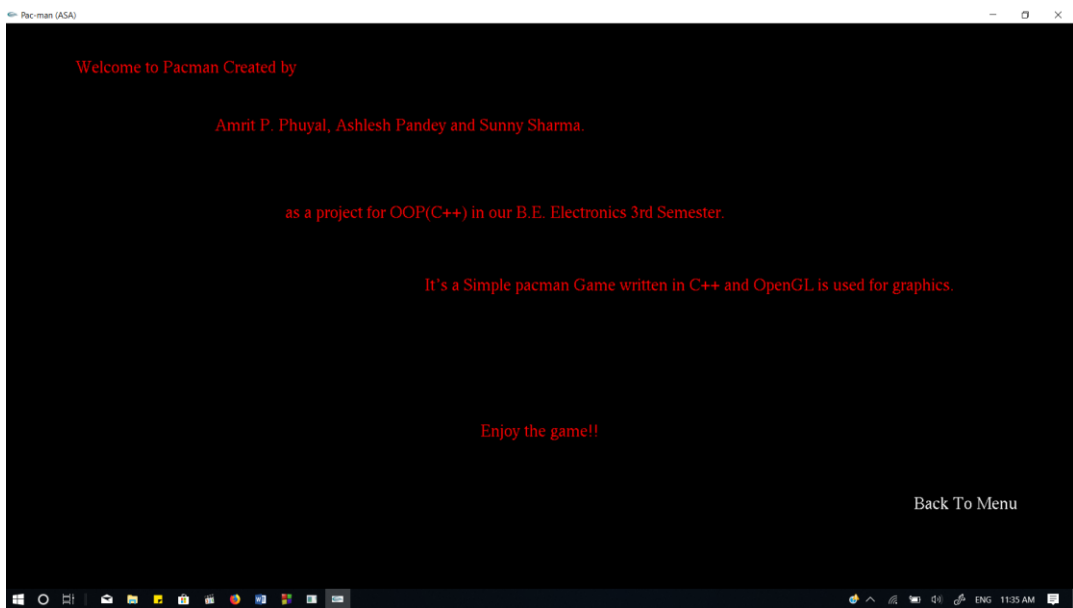
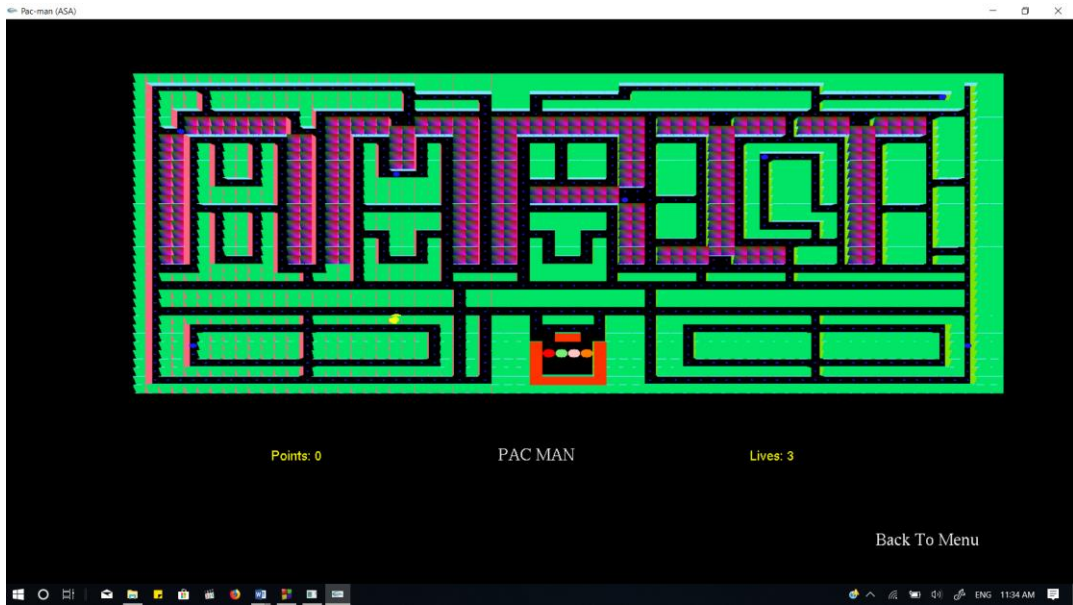
6.2 Dissimilarities to the system

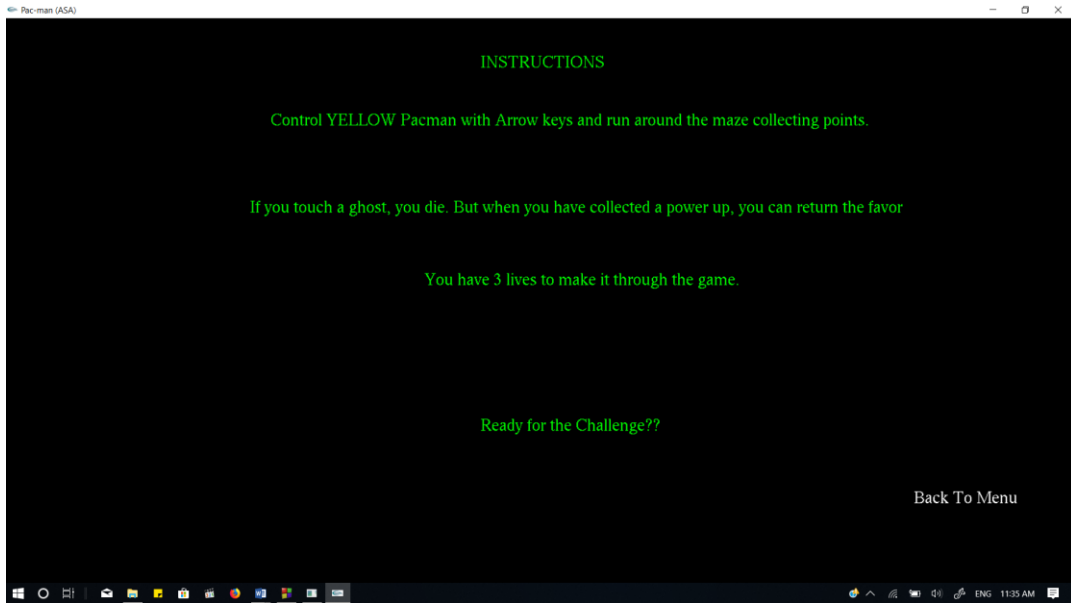
- We have used OpenGL to develop the gaming console.
- We have added our own map that we created using Open Gl Api.
- The outlook of the Pac-man and enemy are different than that of the original Pac-man arcade game.

7. Results:

After the days of hard work, research and coding our code was successfully compiled and we became able to play game. We designed the layout of map of the game with the name of our one of the project member AMRIT. The menu option before gameplay were also displayed successfully.







8. Limitations and recommendations:

8.1 Limitations:

- The graphics for Pac-man and ghost is not good it's just a sphere.
- We were able to create 3D map but could not create the 3D game play.
- We were able to implement and integrate only one map in the whole game.
- We have thought of implementing different difficulty level in the game. As we were only able to implement one map in the gameplay, we could not do it so.

8.2 Recommendations:

Anyone who wants to further improve our game we would recommend him the follow suggestions:

- Be familiar with each aspect of OpenGL and its toolkit i.e. Glut library.

- Learn how to create 3D gameplay with different map so that different levels can be added.

We plan on adding features like cherries, advanced maps (3D and 2D maps) as well as 3D game play options. We will also try to create a better GUI layout in the days to come.

9. References:

We used the following references for better understanding and useful notes on various ideas of our project:

- <http://www.lighthouse3d.com/>
- <https://www.opengl.org/>
- tetris (xhacker, 2014), chess (xenaheart, 2015) github repos