
**Faculty of Engineering and Architecture**

**Department of Electrical and Electronics Engineering**

**EEE316 – Microprocessors**

# Final Report

# Snake Game

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# Contents

# *Abstract*

In this project it is aimed to recreate the classic snake game using a Microchip PIC18 series microcontroller on Labcenter Proteus simulation software. The game screen is provided by connecting the necessary circuit components to the microcontroller in Labcenter Proteus Software. The movement of the snake in the game is provided by an android mobile application via the bluetooth module using UART serial communication. Graphical LCD was used to simulate the game.. The user is greeted by the start screen at the first opening. After selecting start option, the game enters main menu. Game settings can be changed through this menu. There are language option and sound options as settings. Users can see the highest score and the score of the last played game by choosing through the main menu again. For the gameplay, the user is offered three levels of difficulty. Such, easy, medium and difficult. There are different maps at each level of difficulty.

# *Methodology*

In first week of the project creating process, I examined the programming codes and the circuit designs of the projects made in the past years. I reviewed the built-in libraries like UART and GLCD libraries of “mikroC PRO for PIC” platform. I tested the last years project and identified the sections that I wanted to change in the project before moving on to the features that I wanted to, to be added.

With the start of second week of five weeks we’ve been given, I started to clean the unused variables in the codes of the project. I started to create the visual interface of the project. I created the visuals of my logo, game entrance screens, game over screens through the “GLCD Bitmap Editor” of mikroC PRO for PIC platform. I converted the images that I created to the Monochrome BMP format with help of Paint program on Windows. With the help of the “GLCD Bitmap Editor” of mikroC PRO for PIC, the images were converted to arrays and they were ready to use.

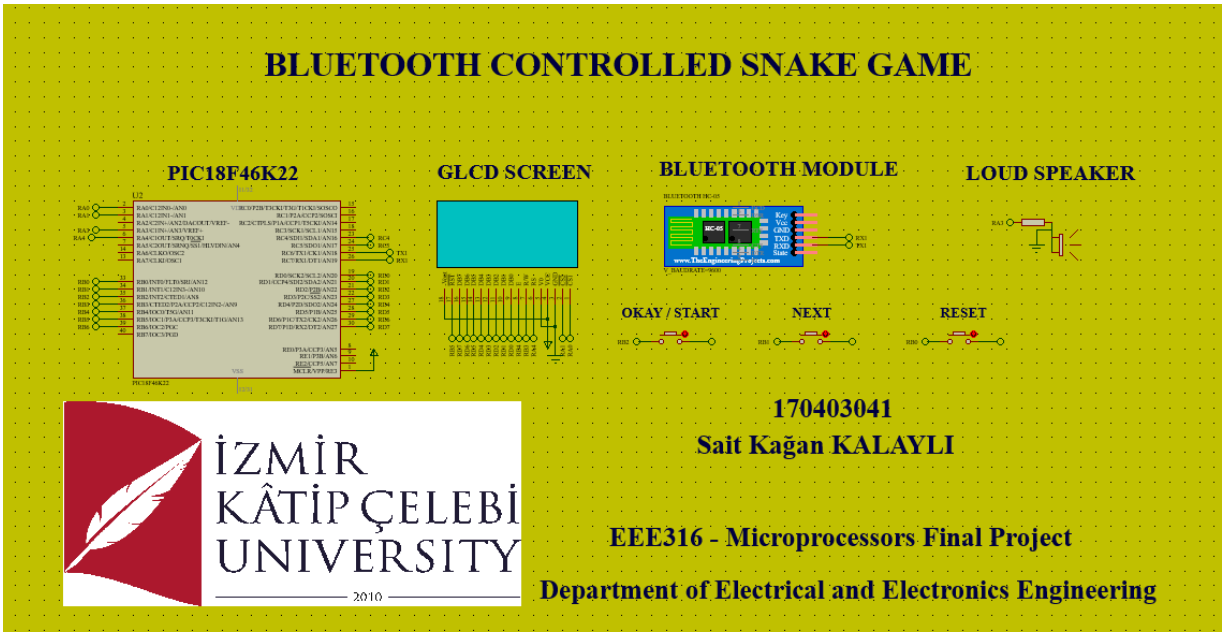
In third week of the process, I checked the three interrupt buttons that navigate the gameplay. These buttons are connected to RB0, RB1 and RB2 interrupt pins of PORTB. These buttons were defined as "OKAY", "NEXT“ and “RESET". They were already adequately placed and programmed. Thus, I did not make any changes on them. I added a countdown to the game. There are 3 options in the main menu. These options are "PLAY", "SCORES" and "OPTIONS". When the user select "PLAY", there are three options as “EASY”, ”MEDIUM” and “HARD”. After user selects one of the three difficulty levels, there is a countdown welcoming the user. Countdown starts from 3 to 1 and the game starts right after the countdown finishes.

In fourth week of the process, I removed the push buttons from last year that were used to movement control of the snake. I added the HC-05 bluetooth module library to the Proteus Software and made the connections between PIC18F46K22 microcontroller. The RX pin of the bluetooth module connects with the TX pin of microcontroller. The TX pin of the bluetooth module connects with RX pin of microcontroller. The bluetooth module uses UART (Universal Asynchronous Receiver Transmitter) serial communication protocol. I wrote the codes of necessary UART initialization for the bluetooth communication.

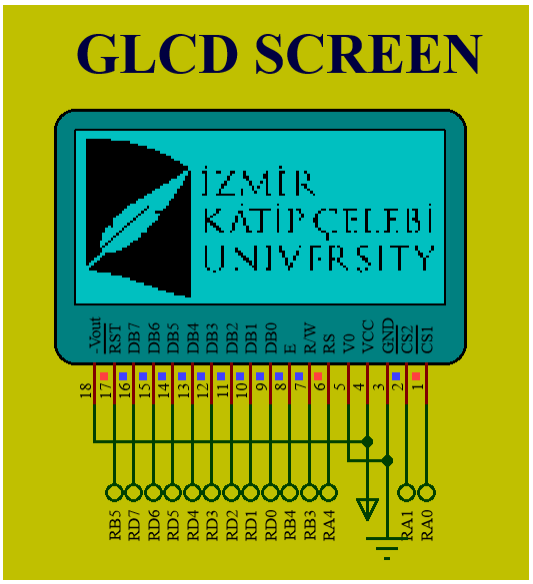
I designed an android application using MIT App Inverter and provided the bluetooth connection between my mobile phone and computer.

In the final week, I made the final checks and tests of the game for my presentation.

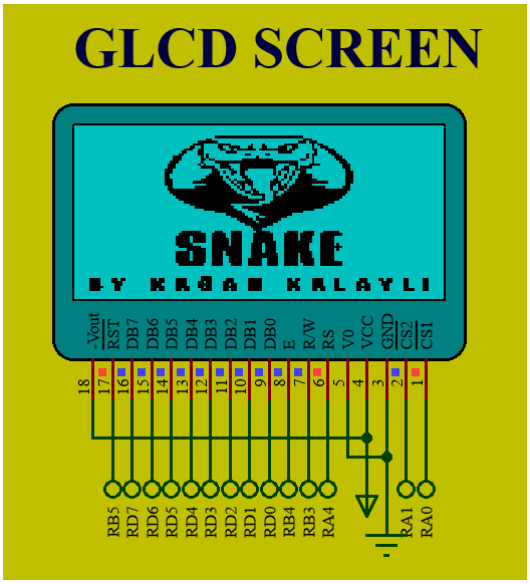
## *Schematics*



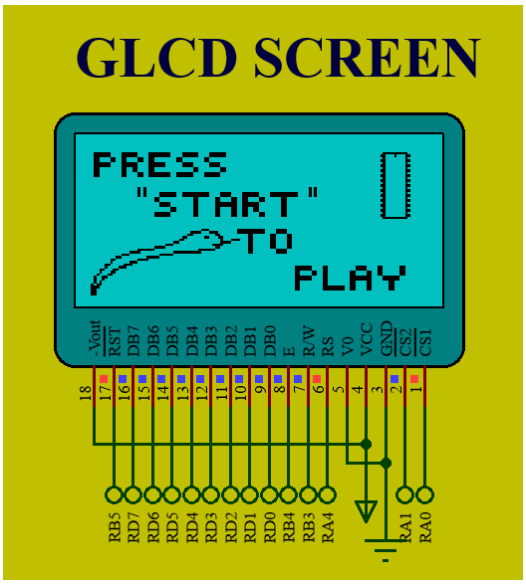

*Circuit Diagram of the Project*



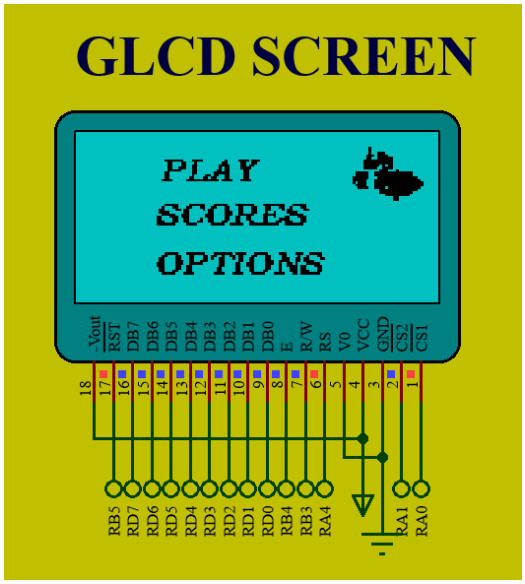

*Izmir Katip Celebi University Logo*



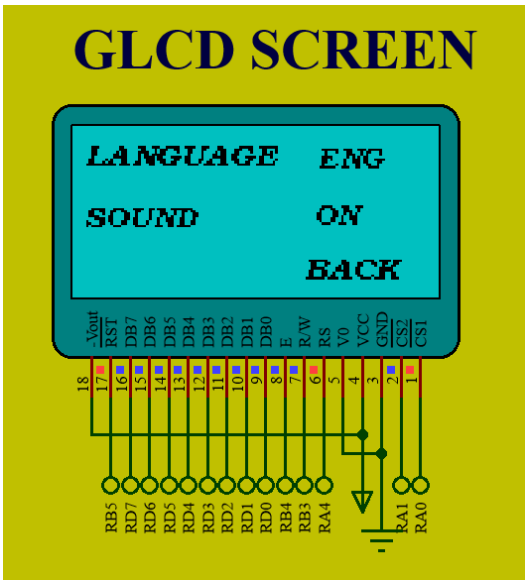

*My Snake Game Logo*



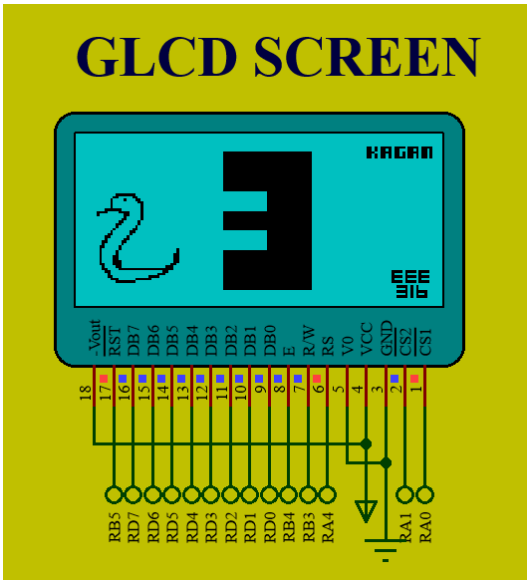

*Game Entrance Screen*



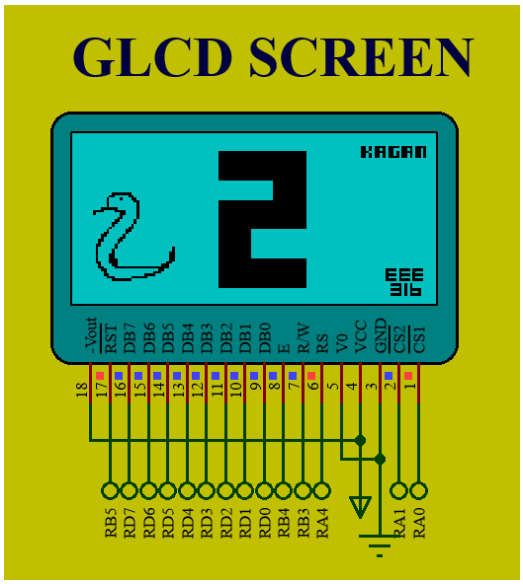

*Main Menu*



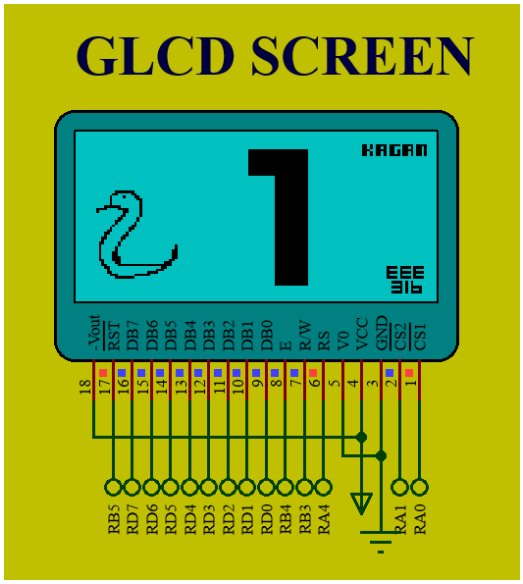

*Options*



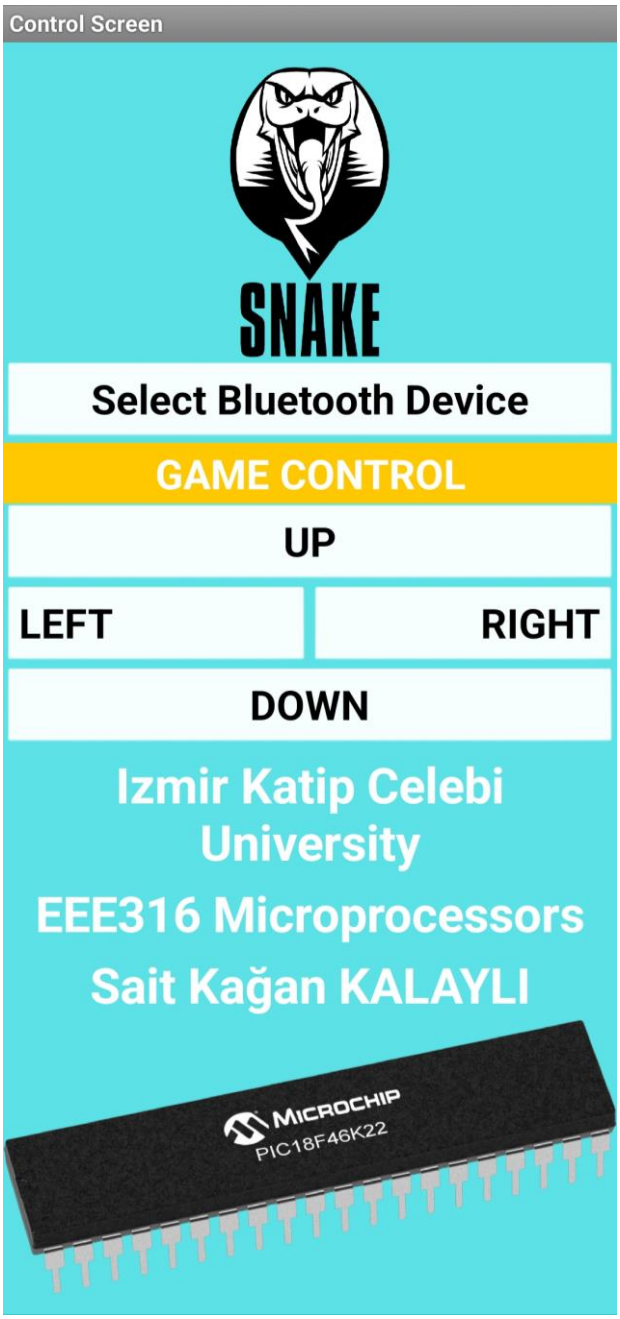

*Countdown 3*




*Countdown 2*




*Countdown 1*




*The Android Application Designed for the Movement Control of the Snake*

## *Future Works*

A pause button can be added to the game.

A special bonus food can be added to the game. When the snake eats the special bonus food, it won't affected by obstacles for a certain period of time.

Changing the volume of the sound can be added.

## *Conclusion*

As a fan of this game since childhood, it was a really fun and very instructive process for me. Although sometimes I had difficulties, with decent effort and research, I managed the problems and learned a lot about the microcontrollers.