Snake game

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Objectives

- To make a snake game which is familiar to us using Arduino, shift registers and LED matrix.

- To write the Arduino code to control the shift registers, LCD display and LED matrix.

- To explore the working of shift registers and observe how random dots can be generated in LED matrix which represent a snake.

- To understand the usage of LCD display and how to connect it.
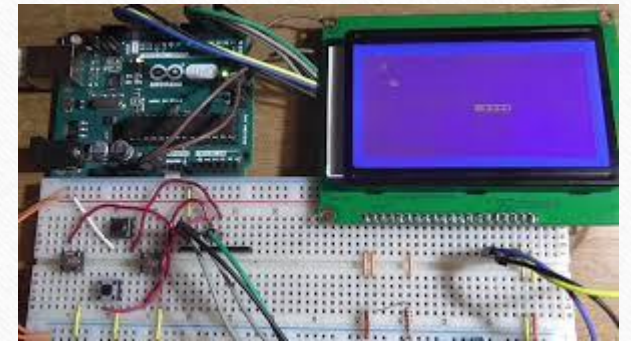
How the game works

- This is a snake game where a random dot appears as food and the snake goes to eat it.

- The moment the snake eats the food, the speed of the snake increases and the length of the snake increases.

- The score is displayed on the LCD display

- The moment the snake touches a wall or itself, the game is over.
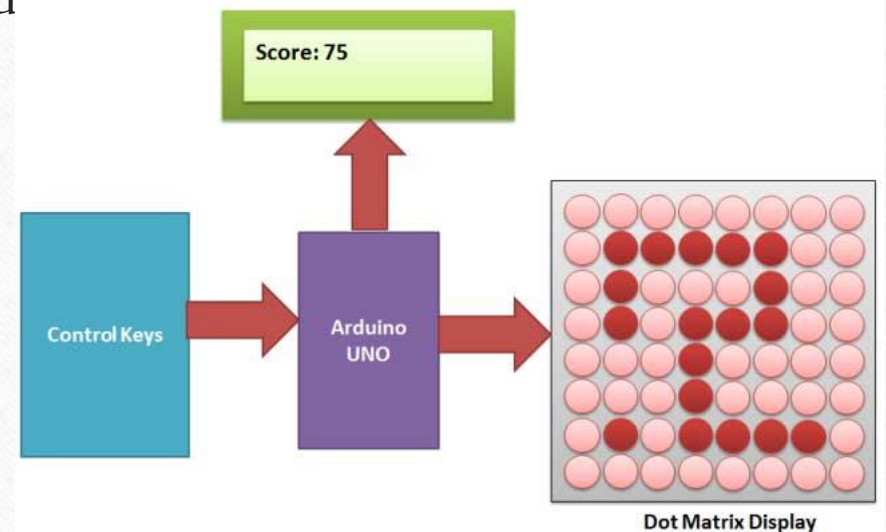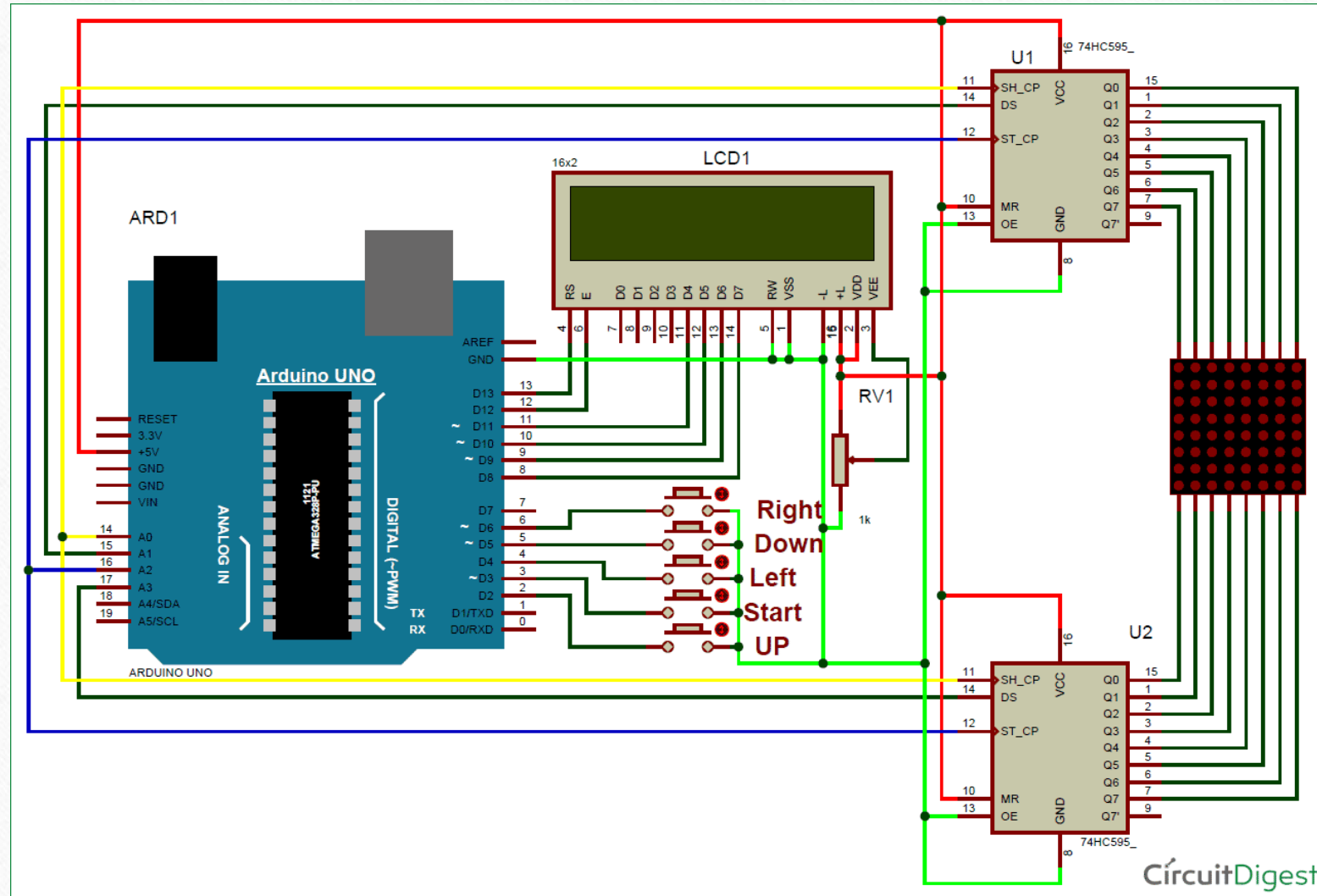

Dot Matrix Display

Components

- Arduino UNO
- 8x8 LED Dot Matrix Display
- Shift Register 74HC595
- 16x2 LCD
- POT 10K
- Push Buttons
- Connecting wires
- Bread Board
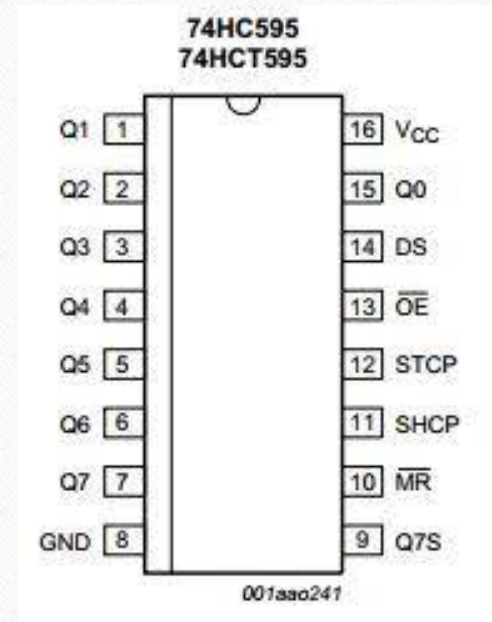
Circuit diagram

Working and connections of the circuit

- First of all we connect the Arduino to the LCD display and we do it as per the connections mentioned in the circuit diagram.

- We also connect the potentiometer to the to the LCD.

- It determines the speed of the snake

- Also the potentiometer is very important in displaying the messages in LCD.

- By turning the knob of the potentiometer the brightness and the visibility of the messages can be adjusted.

Working and connections of the circuit

- The switch buttons are connected to the ground and to Arduino pins.

- They help in movement of the snake.

- Also the start button is responsible for the starting and stopping of the game.

- The next part is the connection of shift registers to the LED matrix.

- The shift registers are connected initially with the ground and VCC pins of the Arduino. Also the serial input will be taken from the Arduino through the DS pin.

- Also we connect a few other connections to the Arduino from the shift register namely ST_CP and SH_CP which are used to give clocks to the flipflops.

Working and connections of the circuit

- The remaining 8 pins of the 8 bit parallel register are connected to the 8x8 LED matrix.

- This is the heart of the project because these registers help in the movement of the snake.

- One of the shift register moves the rows and other moves columns.

- Also we code in the Arduino to generate random place where the food of the snake appears in the LED matrix.

Programming the Arduino

- To write this Arduino snake game code, first of all we include header files and define pins for LCD. And then define some pins for direction buttons and data pin for shift registers.

- Then we initialize all the things that we have used in the program. In the *setup* function we initialize LCD, giving direction to input output pins, pull-up the bits and showing welcome message on LCD.

- And then we start game in *loop* function.

- Then we program the code for controlling the game using push function.

- Finally we display the game over message on the LCD.

Conclusions from the experiment and precautions

- Firstly for any experiment check the working of the components given.

- The snake game works properly if and only if the LED matrix is in proper working condition and any short circuit will result in not working of the circuit.

- The potentiometer must be connected and the knob must be rotated until the LCD display shows the messages properly.

- Handle the switches with care so that they do not get spoiled and thus causing problems.

- The snake game works fine if all the above things are taken into consideration.