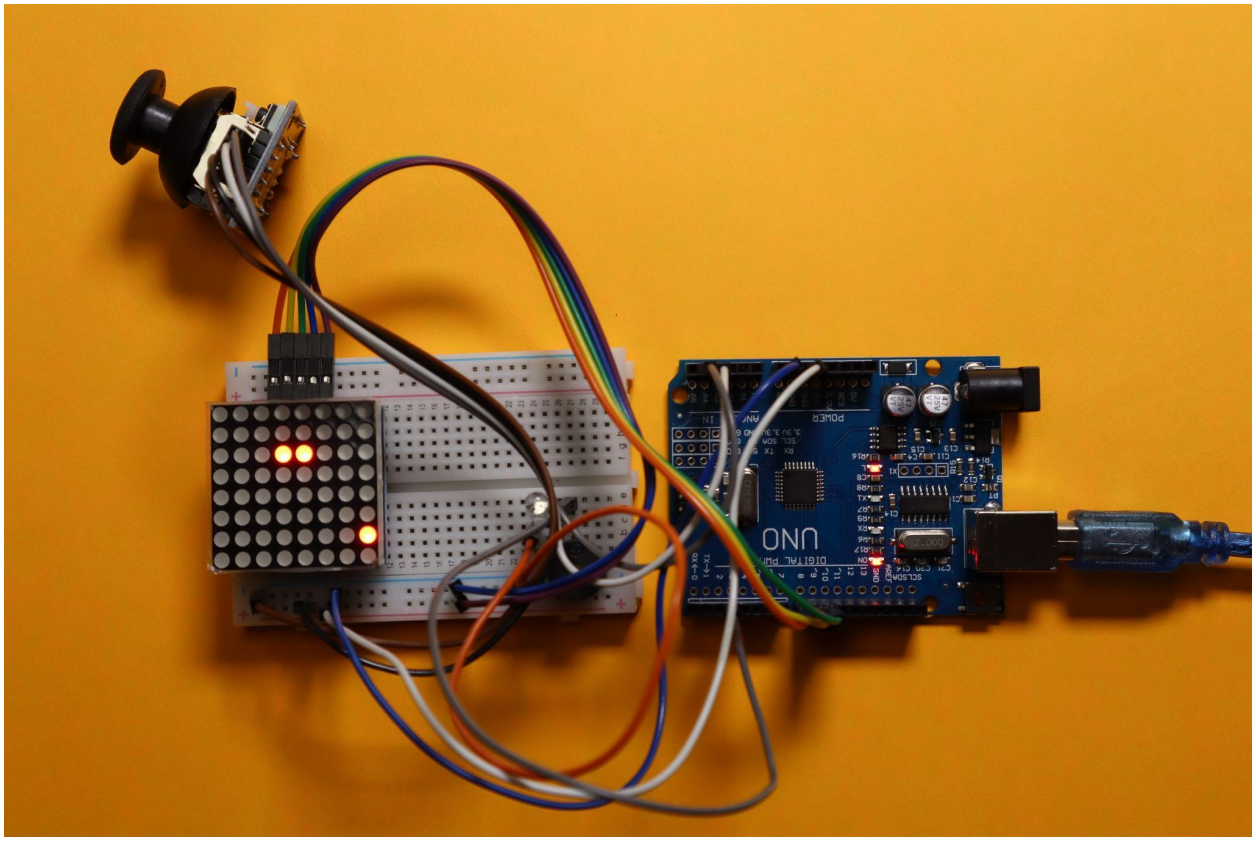
Robotix.io

Joystick controlled snake game using Arduino UNO

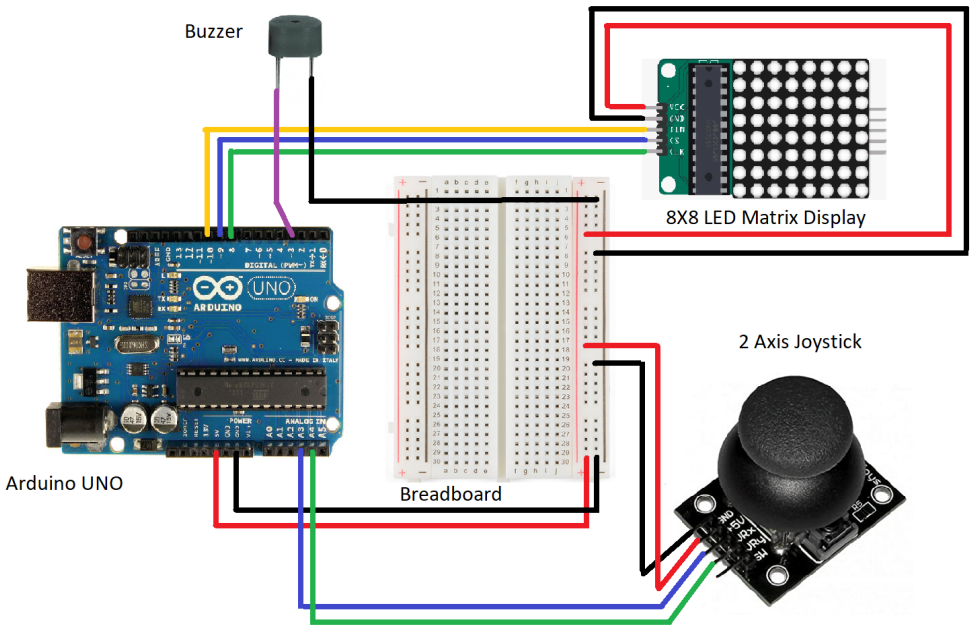
Material Required 🧰 :

S No.	Components	Link
1	Arduino UNO	https://amzn.to/3R5IQPT
2	Breadboard Small	https://amzn.to/3QdsROy
3	8X8 LED Dot matrix display	https://amzn.to/3RnVYPG
4	2 Axis Joystick	https://amzn.to/3roN7CI
5	Buzzer	https://amzn.to/3rpQFos
6	LED	
7	Connecting Wires	https://amzn.to/3cI97EY
8	Arduino UNO Cable	https://amzn.to/3Cqxn8z



Circuit Diagram ⚡ :

Snake Game Circuit Diagram



Code :

```
#include <LedControl.h>

int buzzer = 3;
//Define The Snake as a Struct
typedef struct Snake Snake;
struct Snake{
  int head[2];      // the (row, column) of the snake head
  int body[40][2]; //An array that contains the (row, column) coordinates
  int len;          //The length of the snake
  int dir[2];       //A direction to move the snake along
};

//Define The Apple as a Struct
```

```
typedef struct Apple Apple;
struct Apple{
  int rPos; //The row index of the apple
  int cPos; //The column index of the apple
};

//MAX72XX led Matrix
const int DIN =10;
const int CS =9;
const int CLK = 8;
LedControl lc = LedControl(DIN, CLK, CS,1);

const int varXPin = A3;//X Value  from Joystick
const int varYPin = A4;//Y Value from Joystick

byte pic[8] = {0,0,0,0,0,0,0,0};//The 8 rows of the LED Matrix

Snake snake = {{1,5},{{0,5}, {1,5}}, 2, {1,0}};//Initialize a snake object
Apple apple = {(int)random(0,8),(int)random(0,8)};//Initialize an apple
object

//Variables To Handle The Game Time
float oldTime = 0;
float timer = 0;
float updateRate = 3;

int i,j;//Counters
void setup() {
  // put your setup code here, to run once:
    /*
   The MAX72XX is in power-saving mode on startup,
   we have to do a wakeup call
   */
  pinMode(buzzer,OUTPUT);
  lc.shutdown(0,false);
  /* Set the brightness to a medium values */
  lc.setIntensity(0,8);
  /* and clear the display */
  lc.clearDisplay(0);

  //Set Joystick Pins as INPUTs
  pinMode(varXPin, INPUT);
  pinMode(varYPin, INPUT);
```

```
}

void loop() {
  // put your main code here, to run repeatedly:
  float deltaTime = calculateDeltaTime();
  timer += deltaTime;

  //Check For Inputs
  int xVal = analogRead(varXPin);
  int yVal = analogRead(varYPin);

  if(xVal<100 && snake.dir[1]==0){
    snake.dir[0] = 0;
    snake.dir[1] = -1;
  }else if(xVal >920 && snake.dir[1]==0){
    snake.dir[0] = 0;
    snake.dir[1] = 1;
  }else if(yVal<100 && snake.dir[0]==0){
    snake.dir[0] = -1;
    snake.dir[1] = 0;
  }else if(yVal >920 && snake.dir[0]==0){
    snake.dir[0] = 1;
    snake.dir[1] = 0;
  }

  //Update
  if(timer > 1000/updateRate){
    timer = 0;
    Update();
  }

  //Render
  Render();

}

float calculateDeltaTime(){
  float currentTime = millis();
  float dt = currentTime - oldTime;
  oldTime = currentTime;
  return dt;
}
```

```
void reset(){
  for(int j=0;j<8;j++){
    pic[j] = 0;
  }
}
void Update(){
  reset();//Reset (Clear) the 8x8 LED matrix

  int newHead[2] = {snake.head[0]+snake.dir[0],
snake.head[1]+snake.dir[1]};

  //Handle Borders
  if(newHead[0]==8){
    newHead[0]=0;
  }else if(newHead[0]==-1){
    newHead[0] = 7;
  }else if(newHead[1]==8){
    newHead[1]=0;
  }else if(newHead[1]==-1){
    newHead[1]=7;
  }

  //Check If The Snake hits itself
   for(j=0;j<snake.len;j++){
    if(snake.body[j][0] == newHead[0] && snake.body[j][1] == newHead[1]){
      //Pause the game for 1 sec then Reset it
       digitalWrite(buzzer,HIGH);
      delay(1000);
      digitalWrite(buzzer,LOW);
      snake = {{1,5},{{0,5}, {1,5}}, 2, {1,0}};//Reinitialize the snake
object
      apple = {(int)random(0,8),(int)random(0,8)};//Reinitialize an apple
object
      return;
    }
  }

  //Check if The snake ate the apple
  if(newHead[0] == apple.rPos && newHead[1] ==apple.cPos){
    snake.len = snake.len+1;
    apple.rPos = (int)random(0,8);
    apple.cPos = (int)random(0,8);
    digitalWrite(buzzer,1);
```

```
    delay(100);
    digitalWrite(buzzer,0);
  }else{
    removeFirst();//Shifting the array to the left
  }

  snake.body[snake.len-1][0]= newHead[0];
  snake.body[snake.len-1][1]= newHead[1];

  snake.head[0] = newHead[0];
  snake.head[1] = newHead[1];

  //Update the pic Array to Display(snake and apple)
  for(j=0;j<snake.len;j++){
    pic[snake.body[j][0]] |= 128 >> snake.body[j][1];
  }
  pic[apple.rPos] |= 128 >> apple.cPos;

}

void Render(){

   for(i=0;i<8;i++){
    lc.setRow(0,i,pic[i]);
   }
}

void removeFirst(){
  for(j=1;j<snake.len;j++){
    snake.body[j-1][0] = snake.body[j][0];
    snake.body[j-1][1] = snake.body[j][1];
  }
}
```