Ping Pong Ball Game on LCD

Short description: Ping-pong game works by Arduino Uno on LCD display in which two players hit a ball back and forth using push buttons as paddles.A point is scored when a player hits the ball and if fails to hit back,The game gets over and one with highest score wins.Each player gets two push buttons to move its paddle Up & Down.Play is fast and demands quick reactions. Spinning the ball alters its trajectory and limits an opponent's options, giving the hitter a great advantage.The one who loses, red led glows by its side and green on the other.

List of components used: Arduino UNO, LCD, 2 Neopixel leds, Breadboard, 5 (220ohm) Resistors, 5 Push buttons, Piezo Electric Sound Crystal,Potentiometer.

Arduino Sketch:

Code:-

```
#include <LiquidCrystal.h>
const int RS=12,EN=11,D4=5,D5=4,D6=3,D7=2;
LiquidCrystal lcd(RS,EN,D4,D5,D6,D7);
#include <Adafruit_NeoPixel.h>
// LED for player 1
#define neoPixel1 0
// LED for player 2
#define neoPixel2 1
#define LEDs 1
Adafruit_NeoPixel  strip1  =  Adafruit_NeoPixel(LEDs,  neoPixel1,
NEO_GRB + NEO_KHZ800);
Adafruit_NeoPixel  strip2  =  Adafruit_NeoPixel(LEDs,  neoPixel2,
NEO_GRB + NEO_KHZ800);
//Start, pause button
#define start 13
// Player1 up push button pin
#define P1U 6
// Player1 down push button pin
#define P1D 7
// Player2 up push button pin
#define P2U 8
// Player2 down push button pin
#define P2D 9
// piezo electric crystal pin
```

```
#define piezo 10

//paddle1
byte paddle1[16] = {0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 0, 0, 0, 0, 0,
0};  // array to hold paddle1 LCD row-0&1 values
byte player11[8] = {0, 0, 0, 0, 0, 0, 1, 1};
          // array to hold paddle1 LCD row-0 values
byte player12[8] = {1, 1, 0, 0, 0, 0, 0, 0};
          // array to hold paddle1 LCD row-1 values

//paddle2
byte paddle2[16] = {0, 0, 0, 0, 0, 0, 16, 16, 16, 16, 0, 0, 0,
0, 0, 0};// array to hold paddle2 LCD row-0&1 values
byte player21[8] = {0, 0, 0, 0, 0, 0, 16, 16};
               // array to hold paddle2 LCD row-0 values
byte player22[8] = {16, 16, 0, 0, 0, 0, 0, 0};
               // array to hold paddle2 LCD row-1 values

//ball
byte ball[16] = {0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0,
0};       // array to hold ball LCD row-0&1 values
byte ball1[8] = {0, 0, 0, 0, 0, 0, 0, 1};
               // array to hold ball LCD row-0 values
byte ball2[8] = {0, 0, 0, 0, 0, 0, 0, 0};
               // array to hold ball LCD row-1 values
int x = 0;//x-cursor for ball
int bounce = 0;//bounce-status of bounce(0-ball moves down
,1-ball moves up)
int v1 = 0, v2 = 0, v3 = 0;// variables used to check whether
ball hits thecpaddle or not
char direction = 'L';// direction of ball-(L-left,R-right)
int score1 = 0, score2 = 0;//scores of player 1 and 2
boolean game = 0;// game starts/stop(stop-0,start-1)
int a = 0;
void setup() {
  strip1.begin();
  strip1.show();
  strip2.begin();
  strip2.show();
  pinMode(P1U, INPUT);
  pinMode(P1D, INPUT);
  pinMode(P2U, INPUT);
  pinMode(P2D, INPUT);
  pinMode(start, INPUT);
  pinMode(piezo, OUTPUT);
  piezoSound(300);//  sound for 50 ms
  lcd.begin(16, 2);
  lcd.clear();
  lcd.setCursor(2, 0);
  lcd.print("Arduino UNO");
  lcd.setCursor(1, 1);
  lcd.print("Ping Pong Game");
  delay(1500);
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Developed by:");
  lcd.setCursor(0, 1);
  lcd.print("PINKY SHERWANI");
  delay(3000);
}
void loop() {
  //executes this while loop untill start button is pressed
  while (game == 0) {
    for (a; a < 1; a++) {
      for (int i = 0; i < 16; i++) {
        if (6 <= i && i <= 9) {
          paddle1[i] = 1;
          paddle2[i] = 16;
        }

        else {
          paddle1[i] = 0;
          paddle2[i] = 0;
        }

        if (i == 7)ball[i] = 1;
        else ball[i] = 0;
      }
```

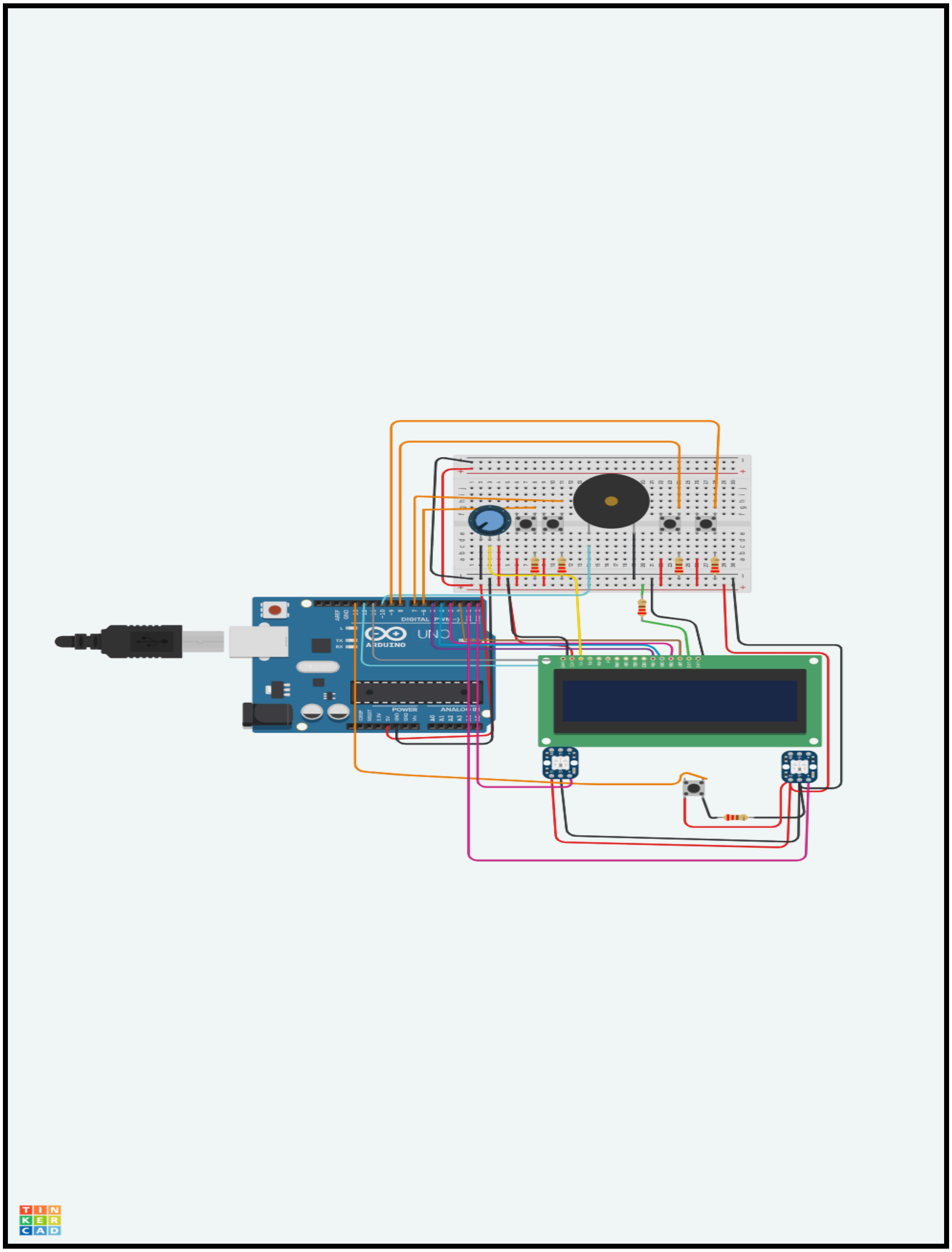
```
     x = 8;
     lcd.clear();
     lcd.setCursor(3, 0);
     lcd.print("Press start");
     lcd.setCursor(3, 1);
     lcd.print("button   =>");
   }
// check whether the start button is pressed
   if (digitalRead(start) == HIGH) {
     lcd.clear();
     lcd.setCursor(5, 0);
     lcd.print("Player");
     lcd.setCursor(0, 1);
     lcd.print("1");
     lcd.setCursor(15, 1);
     lcd.print("2");
     delay(2000);
     for (int i = 3; i > 0; i--) {
       lcd.clear();
       lcd.setCursor(4, 0);
       lcd.print("Be ready!");
       lcd.setCursor(8, 1);
       lcd.print(i);
       if (i == 1)piezoSound(100);
       delay(1000);
     }
     a = 0;
     game = 1;     //exits the while loop and starts the game
   }
   delay(100);
 }
 // game starts
 //when P1U is pressed, the paddle1 moves up
 if (digitalRead(P1U) == HIGH) {
   paddle1Up();
   delay(50);
 }
 //when P1D is pressed, the paddle1 moves down
 if (digitalRead(P1D) == HIGH) {
   paddle1Down();
   delay(50);
 }
 //when P2U is pressed, the paddle2 moves up
 if (digitalRead(P2U) == HIGH) {
   paddle2Up();
   delay(50);
 }
 //when P2D is pressed, the paddle2 moves down
 if (digitalRead(P2D) == HIGH) {
   paddle2Down();
   delay(50);
 }
 //split paddle1 array into 2 arrays, paddle11 and paddle12
 for (int i = 0; i <= 7; i++) {
   player11[i] = paddle1[i];
 }
 for (int i = 0, j = 8; i <= 7, j <= 15; i++, j++) {
   player12[i] = paddle1[j];
 }
 //split paddle2 array into 2 arrays, paddle21 and paddle22
 for (int i = 0; i <= 7; i++) {
   player21[i] = paddle2[i];
 }
 for (int i = 0, j = 8; i <= 7, j <= 15; i++, j++) {
   player22[i] = paddle2[j];
 }
 //split ball array into 2 arrays, ball11 and ball12
 for (int i = 0; i <= 7; i++) {
   ball1[i] = ball[i];
 }
 for (int i = 0, j = 8; i <= 7, j <= 15; i++, j++) {
   ball2[i] = ball[j];
 }
 lcd.createChar(0, player11);
 lcd.createChar(1, player12);
 lcd.createChar(2, player21);
 lcd.createChar(3, player22);
 lcd.createChar(4, ball1);
```

```
  lcd.createChar(5, ball2);
  lcd.clear();


  lcd.setCursor(0, 0);
  lcd.print(score1);
  lcd.setCursor(0, 1);
  lcd.print(score2);
  lcd.setCursor(3, 0);
  lcd.write(byte(0));
  lcd.setCursor(3, 1);
  lcd.write(byte(1));
  lcd.setCursor(15, 0);
  lcd.write(byte(2));
  lcd.setCursor(15, 1);
  lcd.write(byte(3));
  lcd.setCursor(x, 0);   // position of ball1, x is changed to
move the ball on the display
  lcd.write(byte(4));
  lcd.setCursor(x, 1);   // position of ball2, x is changed to
move the ball on the display
  lcd.write(byte(5));
  // checks whether the ball hits the paddle1
  if (x == 3) {
    for (int b = 0; b < 16; b++) {
      if (ball[b] != 0) {
        v1 = ball[b];
        v2 = paddle1[b];
      }
    }
      // if ball hits paddle1, change direction of ball to R
(right)
    if (v1 == v2) {
      direction = 'R';
      score1 += 1;
      piezoSound(10);
    }
    else {
      lcd.clear();
      lcd.setCursor(3, 0);
      lcd.print("Game over");
      lcd.setCursor(4, 1);
      lcd.print("P2 won!");
        // green LED glows for winner and red for looser with
piezo electric crystal sound
      for (int i = 0; i < 3; i++) {
        strip1.setPixelColor(0, 255, 0, 0);
        strip1.show();
        strip2.setPixelColor(0, 0, 255, 0);
        strip2.show();
        piezoSound(500);
        delay(500);
        strip1.setPixelColor(0, 0, 0, 0);
        strip1.show();
        strip2.setPixelColor(0, 0, 0, 0);
        strip2.show();
        delay(500);
      }
      // set scores to 0 and restart the game
      score1 = score2 = 0;
      delay(1000);
      game = 0;
    }
  }
  // checks whether the ball hits the paddle2
  if (x == 15) {
    for (int b = 0; b < 16; b++) {
      if (ball[b] != 0) {
        v1 = ball[b];
        v3 = paddle2[b];
      }
    }
      // if ball hits paddle2, change direction of ball to L
(left)
    if (v1 == v3) {
      direction = 'L';
      score2 += 1;
      piezoSound(10);
    }
    else {
      lcd.clear();
      lcd.setCursor(3, 0);
      lcd.print("Game over");
      lcd.setCursor(4, 1);
      lcd.print("P1 won!");
        // green LED glows for winner and red for looser with
piezo electric crystal sound
      for (int i = 0; i < 3; i++) {
        strip1.setPixelColor(0, 0, 255, 0);
        strip1.show();
        strip2.setPixelColor(0, 255, 0, 0);
        strip2.show();
        piezoSound(500);
        delay(500);
        strip1.setPixelColor(0, 0, 0, 0);
        strip1.show();
        strip2.setPixelColor(0, 0, 0, 0);
        strip2.show();
        delay(500);
      }
      // set scores to 0 and restart the game
      score1 = score2 = 0;
      delay(1000);
      game = 0;
    }
  }

  // if direction is L, move ball to left
  if (direction == 'L') {
    for (int b = 0; b < 16; b++)
      if (ball[b] == 16) x -= 1;
    if (bounce == 0)
      ballLeftDown();
    else
      ballLeftUp();
  }
  // if direction is R, move ball to right
  if (direction == 'R') {
    for (int b = 0; b < 16; b++)
      if (ball[b] == 1) x += 1;

    if (bounce == 0)
      ballRightDown();
    else
      ballRightUp();
  }
}
void paddle1Up() {
  if (paddle1[0] != 1) {
    int temp = paddle1[0], i;
    for (i = 0; i < 16; i++)
      paddle1[i] = paddle1[i + 1];
    paddle1[i] = temp;
  }
}
void paddle1Down() {
  if (paddle1[15] != 1) {
    int temp = paddle1[15], i;
    for (i = 15; i > 0; i--)
      paddle1[i] = paddle1[i - 1];
    paddle1[i] = temp;
  }
}
void paddle2Up() {
  if (paddle2[0] != 16) {
    int temp = paddle2[0], i;
    for (i = 0; i < 16; i++)
      paddle2[i] = paddle2[i + 1];
    paddle2[i] = temp;
  }
}
void paddle2Down() {
  if (paddle2[15] != 16) {
    int temp = paddle2[15], i;
    for (i = 15; i > 0; i--)
```

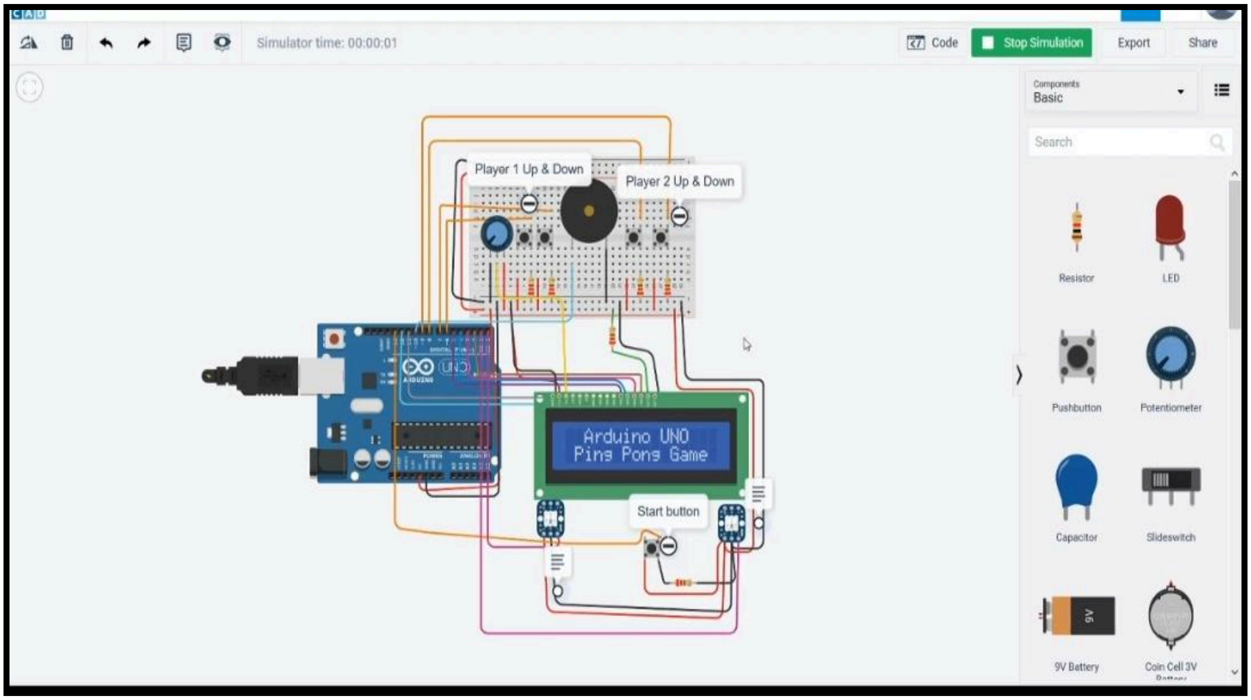
```
      paddle2[i] = paddle2[i - 1];
    paddle2[i] = temp;
  }
}
void ballLeftDown() {

  if (ball[15] == 0) {
    int temp = ball[15], i;
    for (i = 15; i > 0; i--)
      ball[i] = ball[i - 1];
    ball[i] = temp;
    ballLeft();
  }
  else {
    bounce = 1;
    piezoSound(10);
  }
}
void ballLeftUp() {

  if (ball[0] == 0) {
    int temp = ball[0], i;
    for (i = 0; i < 15; i++)
      ball[i] = ball[i + 1];
    ball[i] = temp;
    ballLeft();
  }
  else {
    bounce = 0;
    piezoSound(10);
  }
}
void ballRightDown() {

  if (ball[15] == 0) {
    int temp = ball[15], i;
    for (i = 15; i > 0; i--)
      ball[i] = ball[i - 1];
    ball[i] = temp;
    ballRight();
  }
  else {
    bounce = 1;
    piezoSound(10);
  }
}
void ballRightUp() {

  if (ball[0] == 0) {
    int temp = ball[0], i;
    for (i = 0; i < 15; i++)
      ball[i] = ball[i + 1];
    ball[i] = temp;
    ballRight();
  }
  else {
    bounce = 0;
    piezoSound(10);
  }
}
void ballRight() {
  for (int b = 0; b < 16; b++) {
    if (ball[b] != 0) {
      if (ball[b] == 16)ball[b] = 8;
      else if (ball[b] == 8) ball[b] = 4;
      else if (ball[b] == 4) ball[b] = 2;
      else if (ball[b] == 2) ball[b] = 1;
      else if (ball[b] == 1) ball[b] = 16;
    }
  }
}
void ballLeft() {
  for (int b = 0; b < 16; b++) {
    if (ball[b] != 0) {
      if (ball[b] == 1)ball[b] = 2;
      else if (ball[b] == 2) ball[b] = 4;
      else if (ball[b] == 4) ball[b] = 8;
      else if (ball[b] == 8)ball[b] = 16;
      else if (ball[b] == 16)ball[b] = 1;
    }
  }
}
void piezoSound(int d) {
  analogWrite(piezo, 20);
  delay(d);
  analogWrite(piezo, 0);
}
```

Output Screenshots:

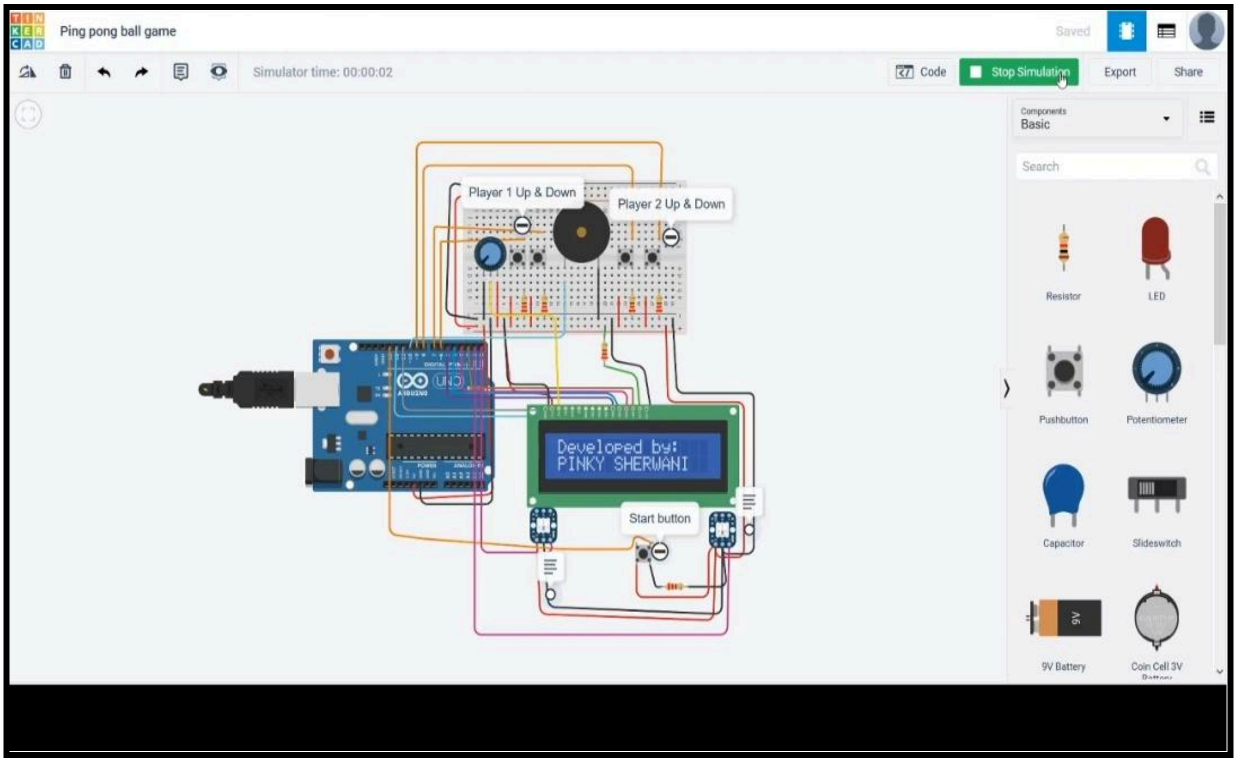
THIS IS THE WHOLE CIRCUIT



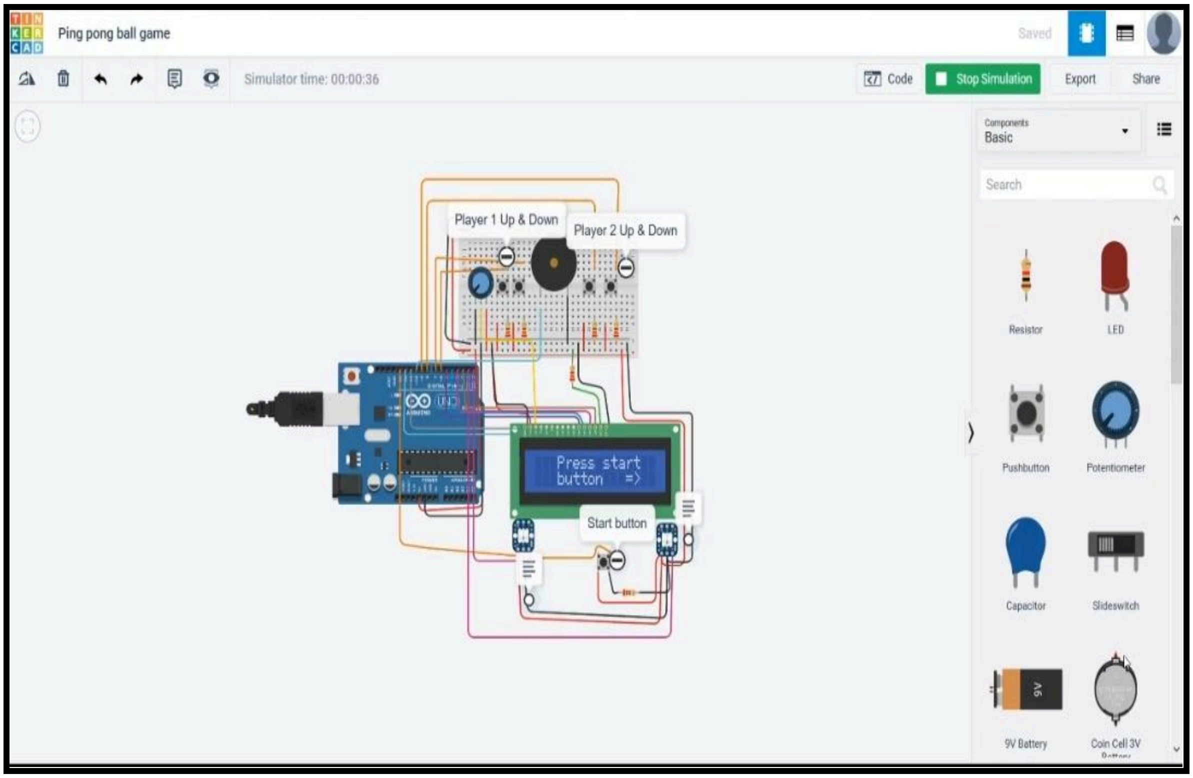
1. As the circuit is simulated,The electric piezo produces sound and The Lcd displays "Arduino UNO "and in the next line "Ping Pong Game".



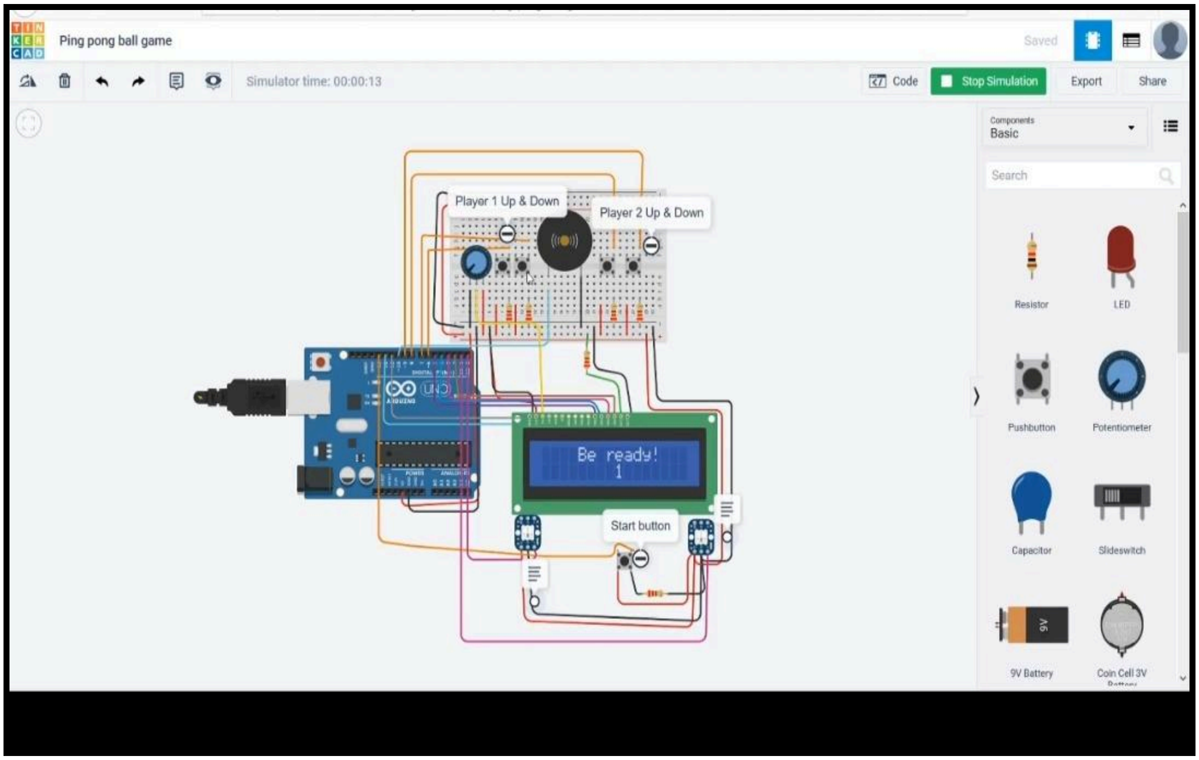
2. It shows the text "Developed by Pinky sherwani",which commands are given by code.



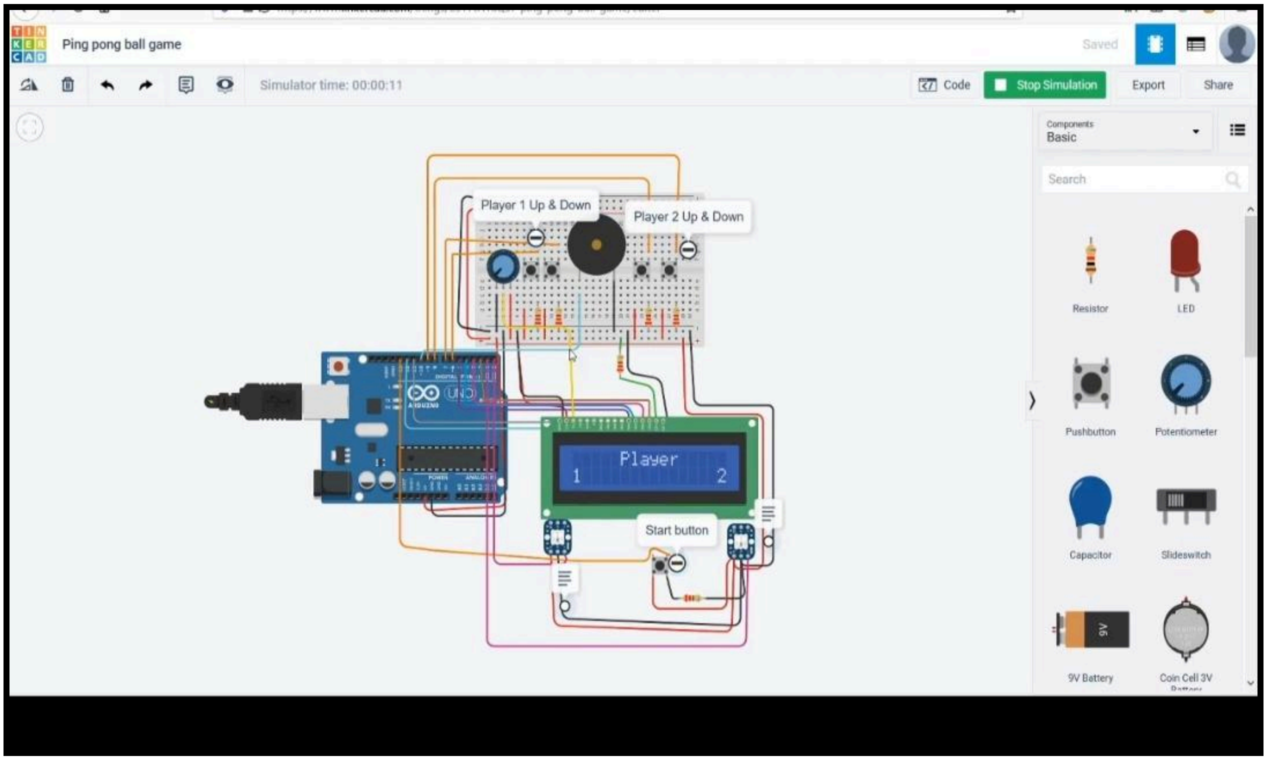
3. After few seconds of delay,it asks to press the start push button to start the game.



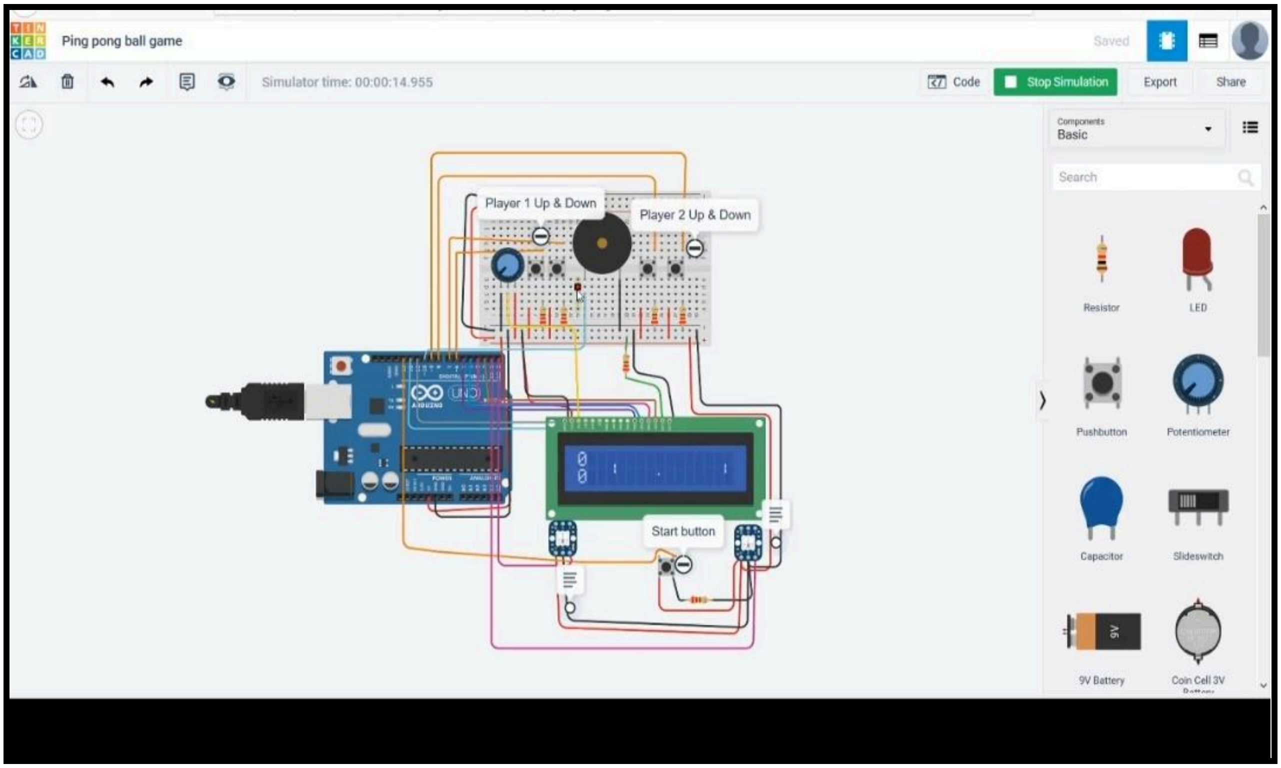
4. Button pressed,it shows countdown for the game to start, at 1 with a sound of piezo ,game starts.



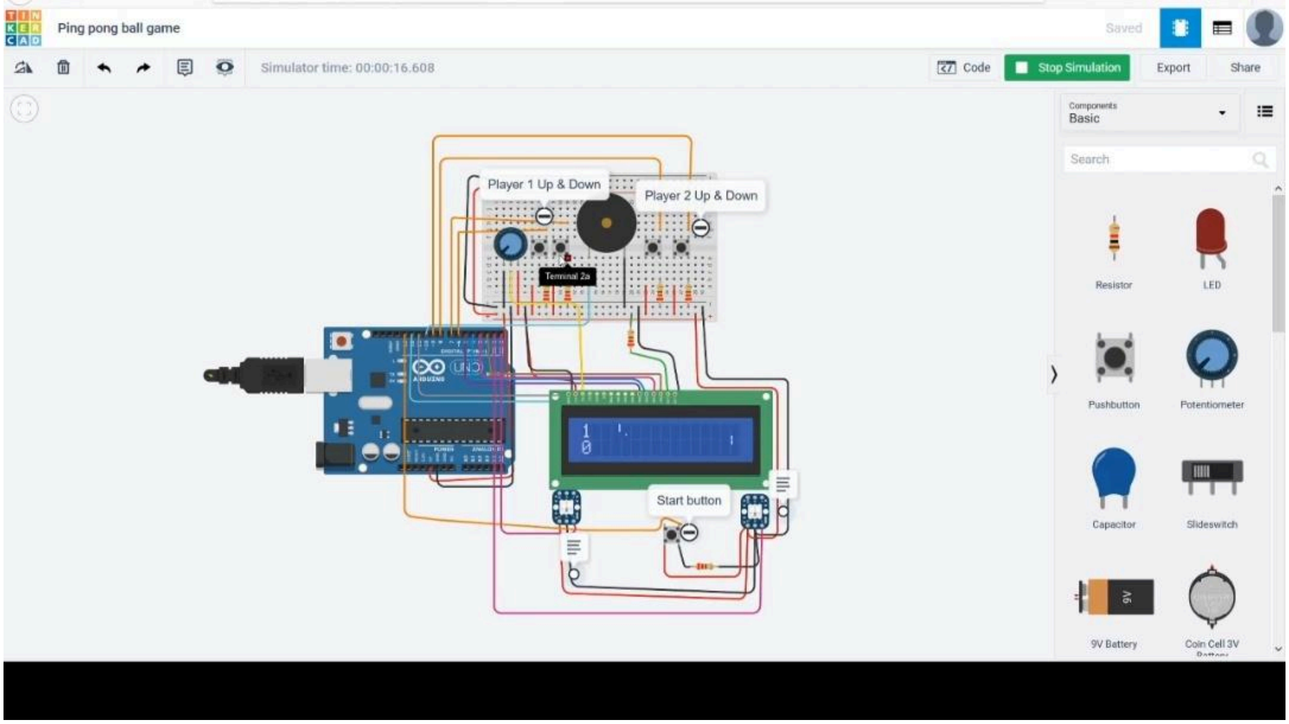
5. It shows us the game is of two players (1&2).



6. Game starts,at left of both rows display the scores of players and the lcd displays paddles of players with ball between them moving.

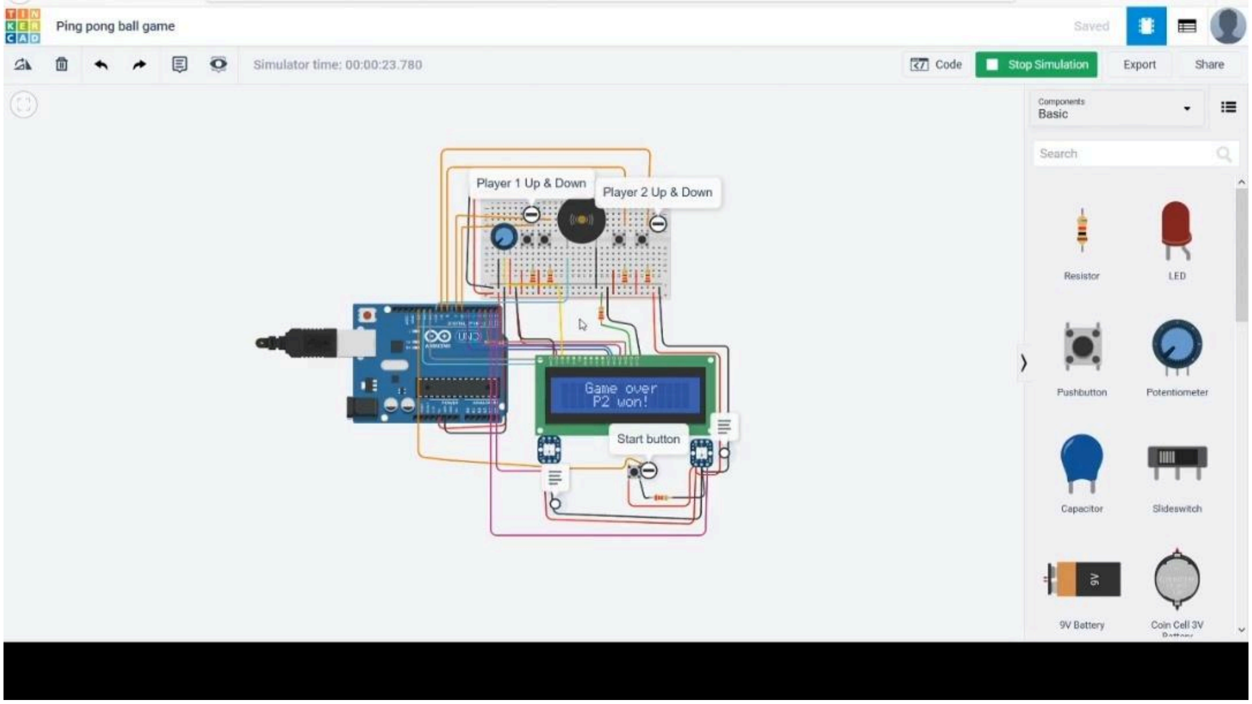


7. Scores increases as the ball gets a hit.



```
1
0
```

8. Game over!Player 2 wins as other missed the hit.



```
Game over
 P2 won!
```

Youtube link:https://youtu.be/-dlXmIlm654