CS3514 Laboratory Session:

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Repeat the following sections for each question

Answer:

I firstly define the ports for both players buttons and their green and red LEDs. Then I declare integers for storing their state. An integer X to store the delay for the buzzer to start.

I then digitalRead the start button and begin the game if this is HIGH. I then loop through a while loop three times to play the game 3 times. Once the game begins I start a timer that will stop for both players when they hit their buttons. To calculate the reaction times I subtract their stop time from the time the timer start.

Then I compare the two players reactions speeds and this is how to determine who won the round. This players green LED is turned on with digitalWrite() and the losers red LED is also turned on.

Once the game is over, aka when the while loop ends, I print the resutls to the Serial monitor.

Code:

```
/*TASK:
 * - press start button to start the game. After X seconds where 0<X<10 buzzzer sounds.
 * - each player has a stop button. The player who hits their button first is winner.
 *    - turn on green LED for winner
 *    - turn on red LED for loser
 * - record the difference in the reactions of winner and loser ( winner speed - loser speed).
 * - if hit stop  button before buzzer, they lose!!
 * - next game should auto start after a new random X seconds.
 * - after 3 games:
 *    - game over, write results of rounds to Serial Monitor
 *    - write winner of each round
 *    - write winning time
 *    - write the difference in player times
 *
```

```
 * EXAMPLE REPORT:
 *  - Winner is Player1:
 *      - Game1 (20ms), Difference (-5ms)
 *      - Game2 (25ms), Difference (3ms)
 *      - Game3 (18ms), Difference (-2ms)
*/
#define ButtonONE 2
#define ButtonTWO 3
#define ButtonSTART 4
//-------------------
#define P1greenLED 13
#define P1redLED 12
//-------------------
#define P2greenLED 11
#define P2redLED 10
//-------------------
#define buzzer 8

int B1state;
int B2state;
int BstartState;
int X;
int startTime;
int P1reactionTime;
int P2reactionTime;
int P1wins;
int P2wins;
String results;

void setup(){
  pinMode(P1greenLED,OUTPUT);
  pinMode(P1redLED,OUTPUT);
  //------------------------
  pinMode(P2greenLED,OUTPUT);
  pinMode(P2redLED,OUTPUT);
  pinMode(ButtonONE,INPUT);
  pinMode(ButtonTWO,INPUT);
  Serial.begin(9600);
}

void loop(){
```

```
  B1state = digitalRead(ButtonONE);
  B2state = digitalRead(ButtonTWO);
  BstartState = digitalRead(ButtonSTART);

  //generate X seconds
  if (BstartState == HIGH){       //start game button
     int var = 1;
     while(var < 3){
        X = random(0,11);            //random X
        X = X*1000;
        delay(X);
        //Sound buzzer
        tone(buzzer,1000,500);
        //start timer
        startTime = millis();
        if (B1state == HIGH){
          //when player one hits the button stop the timer and calculate thier reaction
time
          int P1stopTime;
          P1stopTime = millis();
          P1reactionTime = P1stopTime - startTime;
        }
        if(B2state == HIGH){
          int P2stopTime;
          P2stopTime = millis();
          P2reactionTime = P2stopTime - startTime;
        }
        //find out who is winner turn on Green light for winner and Red light for loser
        if(P1reactionTime < P2reactionTime){    //P1 reacted faster
          String WinningReport = "";
          P1wins++;
          digitalWrite(P1greenLED,HIGH);
          digitalWrite(P2redLED,HIGH);
        }
        else{
          String WinningReport = "";
          P2wins++;
          digitalWrite(P2greenLED,HIGH);
          digitalWrite(P1redLED,HIGH);
        }
     }
```

```
    var++;
   //write results to serial monitor
   if(P1wins > P2wins){
    //P1 won
    String winner = "Winner is Player1";
   }else{
    //P2 won
    String winner = "Winner is Player2";
   }
   Serial.print(winner);
  }
}
```