Natalia de León Bercián

Electrónica Digital 2 carne: 18193

enero 2021 sección: 20

### Laboratorio #4

# Juego de carreras TivaC

#### Link del video:

https://youtu.be/XUzU6N9HT s

#### Link del GitHub:

https://github.com/nataliadlb/LABS\_REPOSITORIO.git

## Pseudocódigo

```
// LEDS J1 //
const byte ledJ1 1 = 3;
                                                    const byte ledJ1 WIN = 19;
const byte ledJ1 2 = 4;
                                                    const byte ledJ2 WIN = 18;
const byte ledJ1 3 = 5;
const byte ledJ1_4 = 6;
                                                    // LEDS SEMAFORO //
const byte ledJ1 5 = 7;
                                                    const byte led_VERDE = GREEN_LED;
const byte ledJ1_6 = 8;
                                                    const byte led_AZUL = BLUE_LED;
const byte ledJ1 7 = 9;
                                                    const byte led ROJO = RED LED;
const byte ledJ1_8 = 10;
                                                    //PUSH INTERRUPCIONES //
const byte ledJ2_1 = 32;
                                                    const byte interruptPin = 2; //para activar
                                                    SEMAFORO
const byte ledJ2 2 = 29;
                                                    const byte interruptPin2 = PUSH1;
const byte ledJ2 3 = 28;
                                                    const byte interruptPin3 = PUSH2;
const byte ledJ2_4 = 27;
const byte ledJ2 5 = 26;
                                                    // BANDERAS //
const byte ledJ2_6 = 25;
                                                    volatile byte flag semaf = LOW;
const byte ledJ2_7 = 24;
                                                    volatile byte flag BEGIN = LOW;
const byte ledJ2_8 = 23;
```

```
volatile byte flag DONE = HIGH;
volatile byte flag J1 WIN = LOW;
                                                   pinMode(ledJ2_1, OUTPUT);
volatile byte flag J2 WIN = LOW;
                                                   pinMode(ledJ2 2, OUTPUT);
                                                   pinMode(ledJ2_3, OUTPUT);
                                                   pinMode(ledJ2_4, OUTPUT);
// CONTADORES JUGADORES //
uint8_t contJ1 = 0;
                                                   pinMode(ledJ2_5, OUTPUT);
uint8 t contJ2 = 0;
                                                   pinMode(ledJ2 6, OUTPUT);
                                                   pinMode(ledJ2_7, OUTPUT);
uint8_t debouncing1 = 0; //Variable que
controla debouncing de un push
                                                   pinMode(ledJ2_8, OUTPUT);
uint8 t debouncing2 = 0;
                                                   pinMode(ledJ1 WIN, OUTPUT);
                                                   pinMode(ledJ2 WIN, OUTPUT);
void setup() {
 pinMode(led_VERDE, OUTPUT);
                                                   //Interrupciones//
 pinMode(led_AZUL, OUTPUT);
 pinMode(led_ROJO, OUTPUT);
                                                  attachInterrupt(digitalPinToInterrupt(interru
                                                  ptPin), semaforo, FALLING); //interrupcion
 pinMode(interruptPin, INPUT PULLUP);
 pinMode(interruptPin2, INPUT PULLUP);
                                                  attachInterrupt(digitalPinToInterrupt(interru
                                                  ptPin2), J1, FALLING);
 pinMode(interruptPin3, INPUT PULLUP);
                                                  attachInterrupt(digitalPinToInterrupt(interru
 //leds//
                                                  ptPin3), J2, FALLING);
 pinMode(ledJ1_1, OUTPUT);
 pinMode(ledJ1_2, OUTPUT);
                                                   Serial.begin(9600);
 pinMode(ledJ1_3, OUTPUT);
 pinMode(ledJ1_4, OUTPUT);
                                                  }
 pinMode(ledJ1_5, OUTPUT);
 pinMode(ledJ1_6, OUTPUT);
                                                  void loop() {
 pinMode(ledJ1 7, OUTPUT);
                                                   sec_semaforo();
 pinMode(ledJ1 8, OUTPUT);
                                                   if (flag BEGIN == HIGH){
```

```
int
                Estado PUSHJ1
digitalRead(interruptPin2);
                                                    }
                Estado_PUSHJ2
  int
digitalRead(interruptPin3);
                                                            semaforo()
                                                    void
                                                                          {
                                                                               //INTERRUPCION
                                                    SEMAFORO
  if (debouncing1 == 1 && Estado_PUSHJ1 ==
                                                     if(flag_DONE == HIGH){
0){
                                                      flag_semaf = !flag_semaf;
    contJ1++;
                                                      }
    debouncing1 = 0;
                                                    }
    //Serial.println(contJ1);
    }
                                                    void J1() { //INTERRUPCION PUSH1
    if (contJ1 > 0 \&\& contJ1 <= 8){
                                                     if (flag_BEGIN == HIGH){
      aumento_J1();
                                                      debouncing1 = 1;
     }
                                                      }
    else{
                                                    }
     ganadorJ1();
     }
                                                    void J2() { //INTERRUPCION PUSH2
                                                     if (flag_BEGIN == HIGH){
  if (debouncing2 == 1 && Estado PUSHJ2 ==
0){
                                                       debouncing2 = 1;
    contJ2++;
                                                      }
    debouncing2 = 0;
                                                    }
    if (contJ2 > 0 \&\& contJ2 <= 8){
                                                    void sec_semaforo(){
      aumento_J2();
                                                      if (flag_semaf == HIGH){
     }
                                                       digitalWrite(ledJ2_WIN, LOW);
    else{
                                                       digitalWrite(ledJ1_WIN, LOW);
     ganadorJ2();
                                                       digitalWrite(led_ROJO, HIGH);
     }
                                                       digitalWrite(led AZUL, LOW);
 }
                                                       digitalWrite(led_VERDE, LOW);
```

```
Serial.print("3 ");
                                                        //Serial.println(contJ1);
   delay(1000);
   digitalWrite(led ROJO, LOW);
                                                       else if (contJ1 == 2)
   digitalWrite(led_AZUL, HIGH);
                                                        digitalWrite(ledJ1 2, HIGH);
   digitalWrite(led_VERDE, LOW);
                                                        //Serial.println(contJ1);
   Serial.print("2 ");
                                                        }
   delay(1000);
                                                       else if (contJ1 == 3)
   digitalWrite(led_ROJO, LOW);
                                                        digitalWrite(ledJ1_3, HIGH);
   digitalWrite(led_AZUL, LOW);
                                                        //Serial.println(contJ1);
   digitalWrite(led_VERDE, HIGH);
                                                        }
   Serial.print("1 ");
                                                       else if (contJ1 == 4)
   delay(1000);
                                                        digitalWrite(ledJ1 4, HIGH);
   digitalWrite(led_ROJO, LOW);
                                                        //Serial.println(contJ1);
   digitalWrite(led AZUL, LOW);
                                                        }
   digitalWrite(led_VERDE, LOW);
                                                       else if (contJ1 == 5)
   Serial.println("GO ");
                                                        digitalWrite(ledJ1_5, HIGH);
   flag semaf = LOW;
                                                        //Serial.println(contJ1);
   flag_BEGIN = HIGH;
                                                        }
   flag DONE = LOW;
                                                       else if (contJ1 == 6){
   contJ1 = 0;
                                                        digitalWrite(ledJ1_6, HIGH);
   contJ2 = 0;
                                                        //Serial.println(contJ1);
  }
                                                        }
 }
                                                       else if (contJ1 == 7)
                                                        digitalWrite(ledJ1_7, HIGH);
                                                        //Serial.println(contJ1);
                                                        }
void aumento_J1(){
                                                       else{
 if (contJ1 == 1)
                                                        digitalWrite(ledJ1_8, HIGH);
  digitalWrite(ledJ1_1, HIGH);
                                                        //Serial.println(contJ1);
```

```
delay(500);
                                                         digitalWrite(ledJ2 4, HIGH);
  digitalWrite(ledJ1 1, LOW);
                                                        //Serial.println(contJ2);
  digitalWrite(ledJ1 2, LOW);
  digitalWrite(ledJ1_3, LOW);
                                                        else if (contJ2 == 5){
  digitalWrite(ledJ1 4, LOW);
                                                        digitalWrite(ledJ2 5, HIGH);
  digitalWrite(ledJ1_5, LOW);
                                                        //Serial.println(contJ2);
  digitalWrite(ledJ1 6, LOW);
                                                        }
  digitalWrite(ledJ1_7, LOW);
                                                        else if (contJ2 == 6){
  digitalWrite(ledJ1_8, LOW);
                                                         digitalWrite(ledJ2_6, HIGH);
  contJ1 = 0;
                                                        //Serial.println(contJ2);
                                                        }
  //Serial.println(contJ1);
  flag J1 WIN = HIGH;
                                                        else if (contJ2 == 7)
  }
                                                        digitalWrite(ledJ2 7, HIGH);
 }
                                                        //Serial.println(contJ2);
                                                        }
void aumento_J2(){
                                                        else{
                                                         digitalWrite(ledJ2_8, HIGH);
 if (contJ2 == 1)
  digitalWrite(ledJ2_1, HIGH);
                                                        //Serial.println(contJ2);
  //Serial.println(contJ2);
                                                         delay(500);
  }
                                                         digitalWrite(ledJ2_1, LOW);
 else if (contJ2 == 2)
                                                         digitalWrite(ledJ2 2, LOW);
  digitalWrite(ledJ2_2, HIGH);
                                                         digitalWrite(ledJ2_3, LOW);
                                                         digitalWrite(ledJ2_4, LOW);
  //Serial.println(contJ2);
  }
                                                         digitalWrite(ledJ2_5, LOW);
                                                         digitalWrite(ledJ2 6, LOW);
 else if (contJ2 == 3){
  digitalWrite(ledJ2_3, HIGH);
                                                         digitalWrite(ledJ2_7, LOW);
  //Serial.println(contJ2);
                                                         digitalWrite(ledJ2_8, LOW);
                                                        contJ2 = 0;
 else if (contJ2 == 4){
                                                        flag_J2_WIN = HIGH;
```

```
}
                                                    }
 }
                                                    void ganadorJ2(){
                                                     if(flag_J2_WIN == HIGH){
 void ganadorJ1(){
                                                      digitalWrite(ledJ2_WIN, HIGH);
 if(flag_J1_WIN == HIGH){
                                                      digitalWrite(ledJ1_WIN, LOW);
  digitalWrite(ledJ1_WIN, HIGH);
                                                      digitalWrite(ledJ1_1, LOW);
  digitalWrite(ledJ2_WIN, LOW);
                                                      digitalWrite(ledJ1_2, LOW);
  digitalWrite(ledJ2_1, LOW);
                                                      digitalWrite(ledJ1_3, LOW);
  digitalWrite(ledJ2_2, LOW);
                                                      digitalWrite(ledJ1_4, LOW);
  digitalWrite(ledJ2 3, LOW);
                                                      digitalWrite(ledJ1 5, LOW);
  digitalWrite(ledJ2_4, LOW);
                                                      digitalWrite(ledJ1_6, LOW);
  digitalWrite(ledJ2_5, LOW);
                                                      digitalWrite(ledJ1_7, LOW);
  digitalWrite(ledJ2_6, LOW);
                                                      digitalWrite(ledJ1_8, LOW);
  digitalWrite(ledJ2_7, LOW);
                                                      flag_J1_WIN = LOW;
  digitalWrite(ledJ2_8, LOW);
                                                      flag_J2_WIN = LOW;
  flag_J1_WIN = LOW;
                                                      contJ1 = 0;
  flag_J2_WIN = LOW;
                                                      contJ2 = 0;
  contJ1 = 0;
                                                      flag_DONE = HIGH;
  contJ2 = 0;
                                                      flag_BEGIN = LOW;
                                                      Serial.println("---GANADOR---");
  flag_DONE = HIGH;
                                                                             ");
  flag_BEGIN = LOW;
                                                      Serial.println(" J2
  Serial.println("---GANADOR---");
                                                      }
  Serial.println(" J1
                         ");
                                                     }
  }
Código
                                                     Natalia de León Bercián
```

carné: 18193

Laboratorio #4

```
Digital 2
                                                   const byte led ROJO = RED LED;
 Marzo 2021
*/
                                                   //PUSH INTERRUPCIONES //
                                                   const byte interruptPin = 2; //para activar
                                                   SEMAFORO
// LEDS J1 //
                                                   const byte interruptPin2 = PUSH1;
const byte ledJ1_1 = 3;
                                                   const byte interruptPin3 = PUSH2;
const byte ledJ1 2 = 4;
const byte ledJ1_3 = 5;
                                                   // BANDERAS //
const byte ledJ1_4 = 6;
                                                   volatile byte flag_semaf = LOW;
const byte ledJ1_5 = 7;
                                                   volatile byte flag BEGIN = LOW;
const byte ledJ1 6 = 8;
                                                   volatile byte flag_DONE = HIGH;
const byte ledJ1 7 = 9;
                                                   volatile byte flag_J1_WIN = LOW;
const byte ledJ1_8 = 10;
                                                   volatile byte flag_J2_WIN = LOW;
const byte ledJ2_1 = 32;
                                                   // CONTADORES JUGADORES //
const byte ledJ2 2 = 29;
                                                   uint8 t contJ1 = 0;
const byte ledJ2 3 = 28;
                                                   uint8 t contJ2 = 0;
const byte ledJ2_4 = 27;
                                                   uint8 t debouncing1 = 0; //Variable que
const byte ledJ2 5 = 26;
                                                   controla debouncing de un push
const byte ledJ2_6 = 25;
                                                   uint8_t debouncing2 = 0;
const byte ledJ2 7 = 24;
const byte ledJ2_8 = 23;
                                                   void setup() {
const byte ledJ1_WIN = 19;
                                                    pinMode(led_VERDE, OUTPUT);
const byte ledJ2 WIN = 18;
                                                    pinMode(led_AZUL, OUTPUT);
                                                    pinMode(led_ROJO, OUTPUT);
// LEDS SEMAFORO //
                                                    pinMode(interruptPin, INPUT_PULLUP);
const byte led_VERDE = GREEN_LED;
                                                    pinMode(interruptPin2, INPUT_PULLUP);
const byte led_AZUL = BLUE_LED;
                                                    pinMode(interruptPin3, INPUT_PULLUP);
```

```
attachInterrupt(digitalPinToInterrupt(interru
 //leds//
                                                   ptPin3), J2, FALLING); //interrupción J2
 pinMode(ledJ1 1, OUTPUT);
 pinMode(ledJ1_2, OUTPUT);
                                                    Serial.begin(9600);
 pinMode(ledJ1 3, OUTPUT);
                                                   }
 pinMode(ledJ1_4, OUTPUT);
 pinMode(ledJ1_5, OUTPUT);
                                                   void loop() {
 pinMode(ledJ1_6, OUTPUT);
                                                    sec_semaforo();
 pinMode(ledJ1_7, OUTPUT);
                                                    if (flag_BEGIN == HIGH){
 pinMode(ledJ1_8, OUTPUT);
                                                       if (contJ1 > 0 \&\& contJ1 <= 8){//Que se}
                                                   mantenga dentro de los 8 bits J1
 pinMode(ledJ2 1, OUTPUT);
                                                         aumento_J1(); //Encender los leds del
 pinMode(ledJ2 2, OUTPUT);
                                                   J1
 pinMode(ledJ2 3, OUTPUT);
                                                        }
 pinMode(ledJ2_4, OUTPUT);
                                                       else{
 pinMode(ledJ2_5, OUTPUT);
                                                        ganadorJ1(); //Cuando gana J1
 pinMode(ledJ2_6, OUTPUT);
                                                        }
 pinMode(ledJ2_7, OUTPUT);
 pinMode(ledJ2_8, OUTPUT);
                                                       if (contJ2 > 0 \&\& contJ2 <= 8){//Que se}
                                                   mantenga dentro de los 8 bits J2
 pinMode(ledJ1_WIN, OUTPUT);
                                                         aumento_J2(); //Encender los leds del
                                                   J2
 pinMode(ledJ2_WIN, OUTPUT);
                                                        }
                                                       else{
 //Interrupciones//
                                                        ganadorJ2(); //Cuando gana J2
attachInterrupt(digitalPinToInterrupt(interru
                                                        }
ptPin), semaforo, FALLING); //interrupcion
                                                    }
semáforo
                                                   }
attachInterrupt(digitalPinToInterrupt(interru
ptPin2), J1, FALLING); //interrupción J1
```

```
void semaforo() { //INTERRUPCION
                                                       digitalWrite(ledJ1 WIN, LOW);
SEMAFORO
                                                       digitalWrite(led_ROJO, HIGH);
 if(flag_DONE == HIGH){
                                                       digitalWrite(led AZUL, LOW);
  flag_semaf = !flag_semaf;
                                                       digitalWrite(led_VERDE, LOW);
  }
                                                       Serial.print("3 ");
}
                                                       delay(1000);
                                                       digitalWrite(led_ROJO, LOW);
void J1() { //INTERRUPCION PUSH1
                                                       digitalWrite(led_AZUL, HIGH);
 if (flag BEGIN == HIGH){
                                                       digitalWrite(led_VERDE, LOW);
  int Estado PUSHJ1 =
                                                       Serial.print("2 ");
digitalRead(interruptPin2);
                                                       delay(1000);
  if (Estado_PUSHJ1 == 0){
                                                       digitalWrite(led ROJO, LOW);
   contJ1++;
                                                       digitalWrite(led_AZUL, LOW);
   }
                                                       digitalWrite(led_VERDE, HIGH);
  }
                                                       Serial.print("1 ");
}
                                                       delay(1000);
                                                       digitalWrite(led_ROJO, LOW);
void J2() { //INTERRUPCION PUSH2
                                                       digitalWrite(led_AZUL, LOW);
 if (flag_BEGIN == HIGH){
                                                       digitalWrite(led_VERDE, LOW);
   int Estado_PUSHJ2 =
digitalRead(interruptPin3);
                                                       Serial.println("GO ");
   if (Estado_PUSHJ2 == 0){
                                                       flag_semaf = LOW;
    contJ2++;
                                                       flag_BEGIN = HIGH;
   }
                                                       flag DONE = LOW;
  }
                                                       contJ1 = 0;
}
                                                       contJ2 = 0;
                                                      }
void sec_semaforo(){
                                                     }
  if (flag_semaf == HIGH){
   digitalWrite(ledJ2_WIN, LOW);
```

```
void aumento J1(){
                                                        else{
                                                         digitalWrite(ledJ1_8, HIGH);
 if (contJ1 == 1)
  digitalWrite(ledJ1 1, HIGH);
                                                         //Serial.println(contJ1);
  //Serial.println(contJ1);
                                                         delay(500);
                                                         digitalWrite(ledJ1 1, LOW);
 else if (contJ1 == 2){
                                                         digitalWrite(ledJ1_2, LOW);
  digitalWrite(ledJ1_2, HIGH);
                                                         digitalWrite(ledJ1 3, LOW);
                                                         digitalWrite(ledJ1_4, LOW);
  //Serial.println(contJ1);
  }
                                                         digitalWrite(ledJ1_5, LOW);
 else if (contJ1 == 3){
                                                         digitalWrite(ledJ1_6, LOW);
                                                         digitalWrite(ledJ1 7, LOW);
  digitalWrite(ledJ1 3, HIGH);
  //Serial.println(contJ1);
                                                         digitalWrite(ledJ1 8, LOW);
  }
                                                         contJ1 = 0;
 else if (contJ1 == 4)
                                                         //Serial.println(contJ1);
  digitalWrite(ledJ1_4, HIGH);
                                                         flag_J1_WIN = HIGH;
  //Serial.println(contJ1);
                                                         }
                                                        }
 else if (contJ1 == 5){
                                                       void aumento_J2(){
  digitalWrite(ledJ1_5, HIGH);
  //Serial.println(contJ1);
                                                        if (contJ2 == 1){
  }
                                                         digitalWrite(ledJ2_1, HIGH);
 else if (contJ1 == 6){
                                                         //Serial.println(contJ2);
  digitalWrite(ledJ1 6, HIGH);
                                                         }
  //Serial.println(contJ1);
                                                        else if (contJ2 == 2)
                                                         digitalWrite(ledJ2 2, HIGH);
  }
 else if (contJ1 == 7){
                                                         //Serial.println(contJ2);
  digitalWrite(ledJ1_7, HIGH);
                                                         }
  //Serial.println(contJ1);
                                                        else if (contJ2 == 3){
                                                         digitalWrite(ledJ2_3, HIGH);
  }
```

```
//Serial.println(contJ2);
                                                      digitalWrite(ledJ2 8, LOW);
                                                      contJ2 = 0;
else if (contJ2 == 4)
                                                      flag J2 WIN = HIGH;
digitalWrite(ledJ2 4, HIGH);
                                                      }
                                                     }
//Serial.println(contJ2);
}
else if (contJ2 == 5){
digitalWrite(ledJ2_5, HIGH);
                                                     void ganadorJ1(){
//Serial.println(contJ2);
                                                     if(flag_J1_WIN == HIGH){
}
                                                      digitalWrite(ledJ1_WIN, HIGH);
else if (contJ2 == 6){
                                                      digitalWrite(ledJ2 WIN, LOW);
digitalWrite(ledJ2 6, HIGH);
                                                      digitalWrite(ledJ2 1, LOW);
//Serial.println(contJ2);
                                                      digitalWrite(ledJ2 2, LOW);
}
                                                      digitalWrite(ledJ2 3, LOW);
else if (contJ2 == 7){
                                                      digitalWrite(ledJ2_4, LOW);
                                                      digitalWrite(ledJ2_5, LOW);
digitalWrite(ledJ2_7, HIGH);
//Serial.println(contJ2);
                                                       digitalWrite(ledJ2 6, LOW);
}
                                                      digitalWrite(ledJ2_7, LOW);
                                                      digitalWrite(ledJ2_8, LOW);
else{
digitalWrite(ledJ2_8, HIGH);
                                                      flag_J1_WIN = LOW;
                                                      flag J2 WIN = LOW;
//Serial.println(contJ2);
delay(500);
                                                      contJ1 = 0;
 digitalWrite(ledJ2 1, LOW);
                                                      contJ2 = 0;
 digitalWrite(ledJ2_2, LOW);
                                                      flag_DONE = HIGH;
                                                      flag BEGIN = LOW;
 digitalWrite(ledJ2 3, LOW);
                                                      Serial.println("---GANADOR---");
 digitalWrite(ledJ2_4, LOW);
 digitalWrite(ledJ2_5, LOW);
                                                      Serial.println(" J1
                                                                              ");
 digitalWrite(ledJ2_6, LOW);
                                                      }
 digitalWrite(ledJ2_7, LOW);
                                                    }
```

```
void ganadorJ2(){
 if(flag_J2_WIN == HIGH){
  digitalWrite(ledJ2_WIN, HIGH);
  digitalWrite(ledJ1_WIN, LOW);
  digitalWrite(ledJ1_1, LOW);
  digitalWrite(ledJ1_2, LOW);
  digitalWrite(ledJ1_3, LOW);
  digitalWrite(ledJ1_4, LOW);
  digitalWrite(ledJ1_5, LOW);
  digitalWrite(ledJ1_6, LOW);
  digitalWrite(ledJ1_7, LOW);
  digitalWrite(ledJ1_8, LOW);
  flag_J1_WIN = LOW;
  flag_J2_WIN = LOW;
  contJ1 = 0;
  contJ2 = 0;
  flag_DONE = HIGH;
  flag_BEGIN = LOW;
  Serial.println("---GANADOR---");
                        ");
  Serial.println(" J2
  }
 }
```