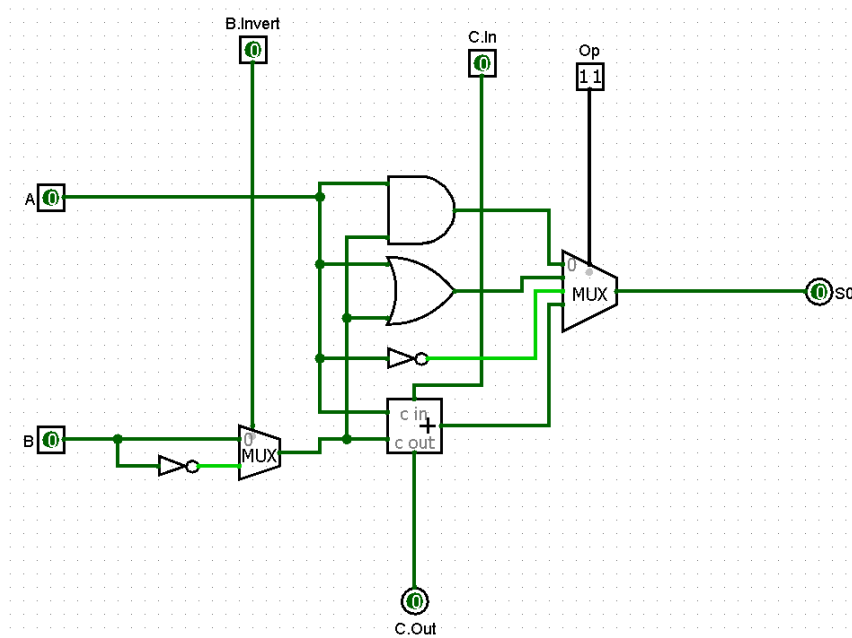


Exercício Prático 02 - Ricardo Henrique Guedes Furiati

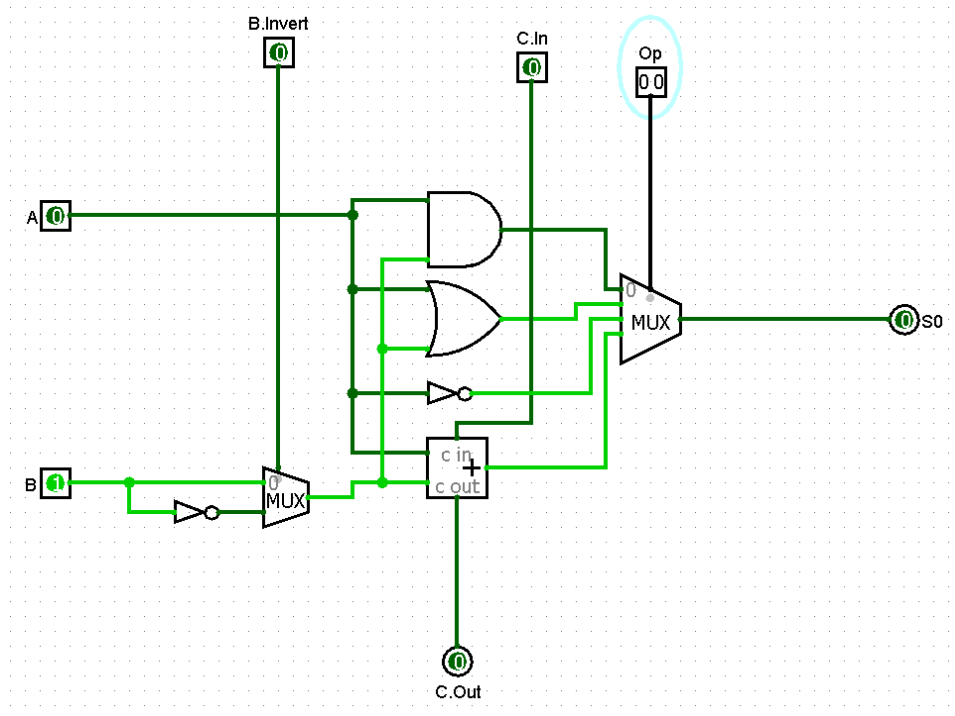
Parte 1)

ULA 1 Bit

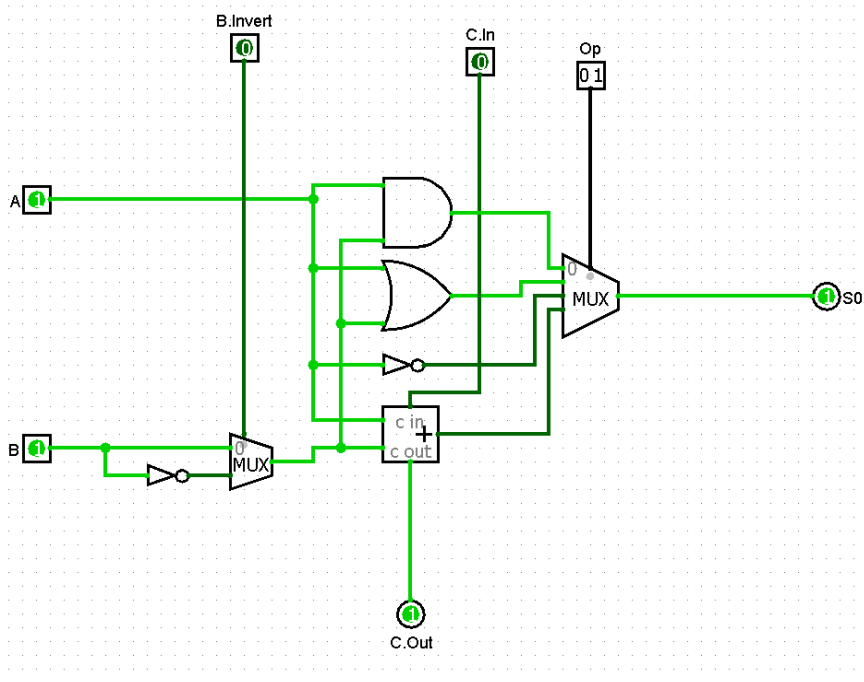


Testes

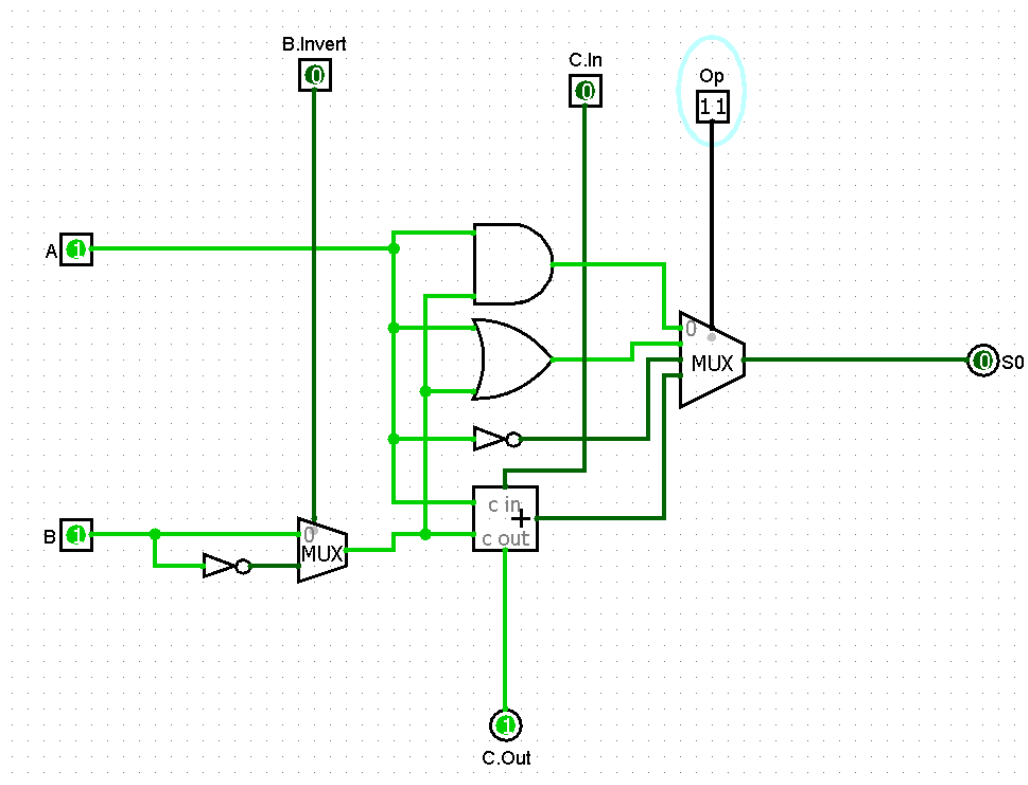
Variáveis: A=0 B=1 Operação: AND(A,B)



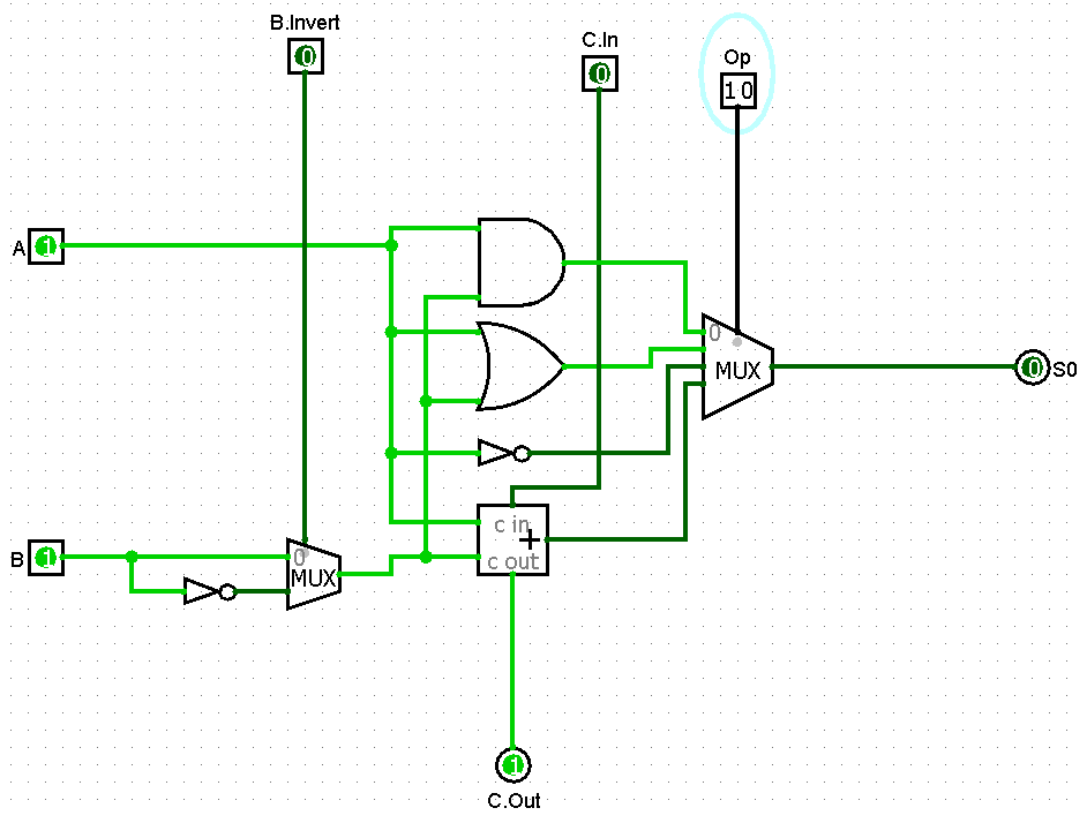
Variáveis: A=1 B=1 Operação: OR(A,B)



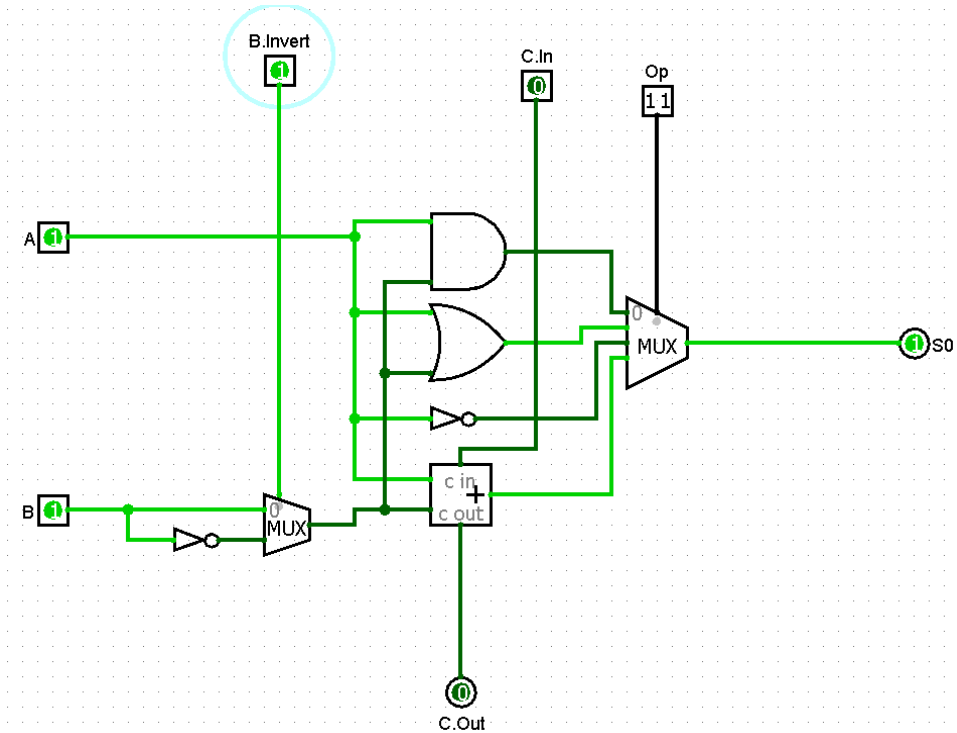
Variáveis: A=1 B=1 Operação: SOMA(A,B)



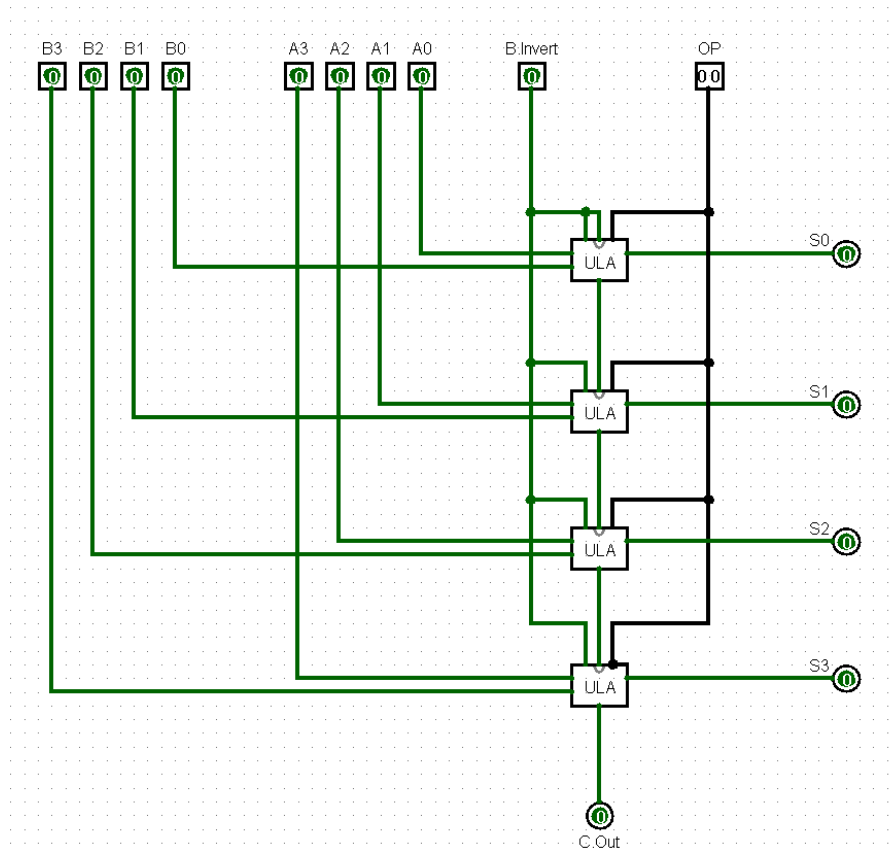
Variáveis: A=1 B=1 Operação: NOT(A)



Variáveis: A=1 B=1 Operação: SOMA(A,-B)

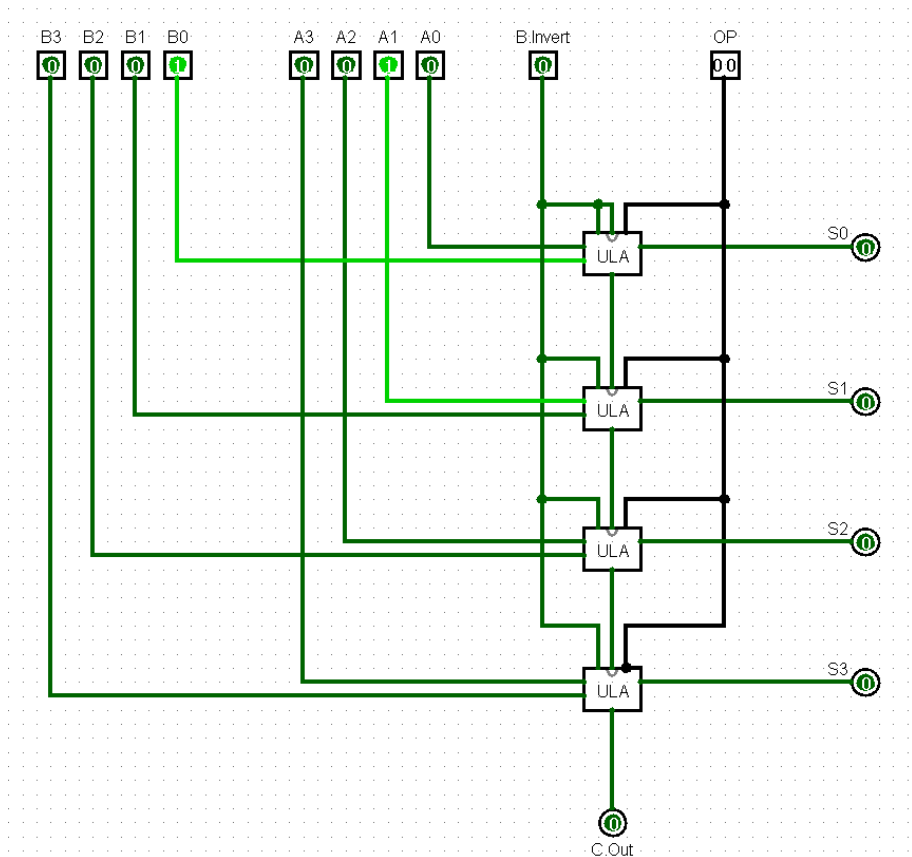


ULA 4 Bits

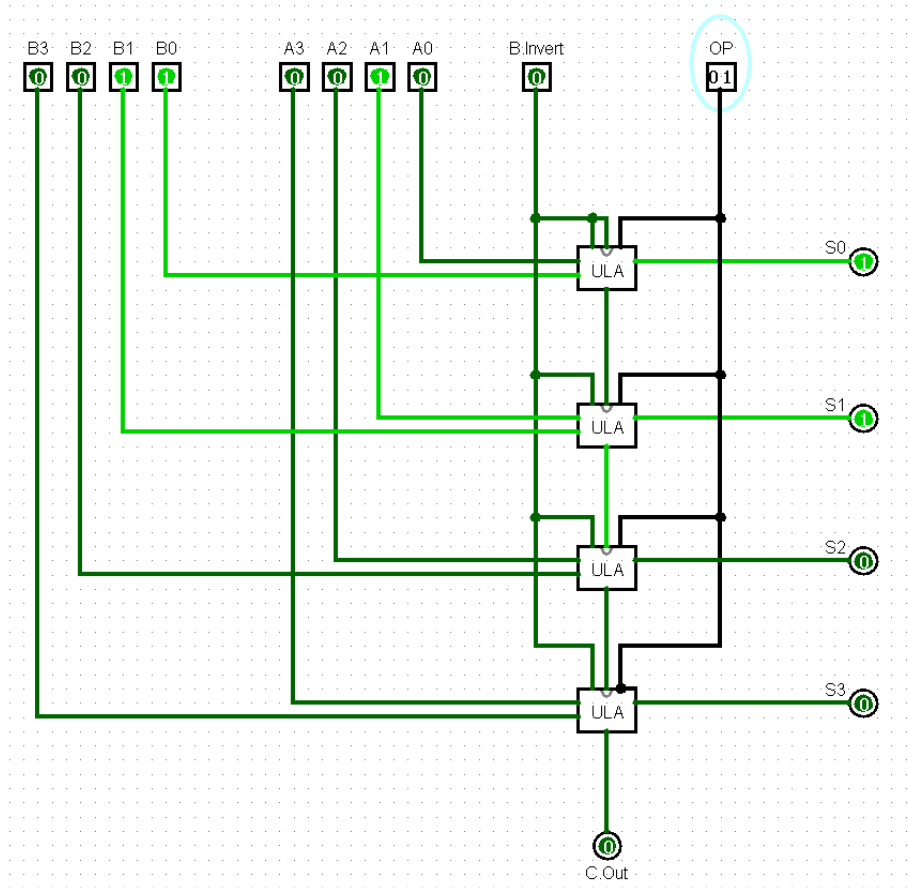


Testes:

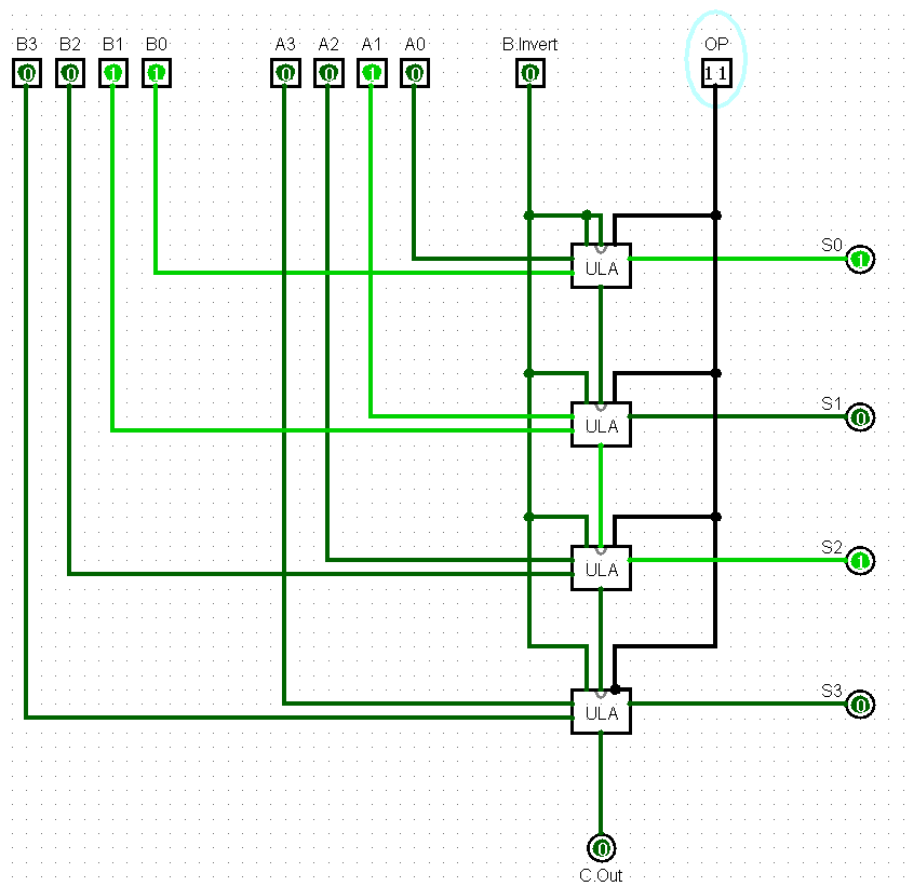
Variáveis: A=2 B=1 Operação: AND(A,B)



Variáveis: A=2 B=3 Operação: OR(A,B)



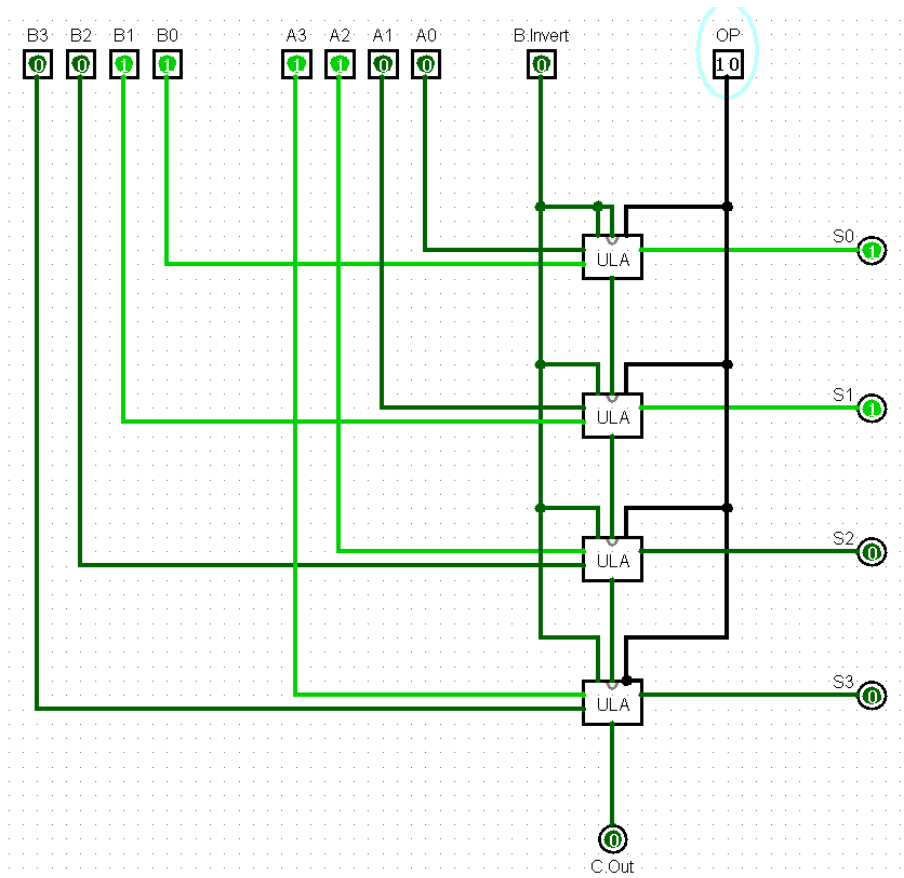
Variáveis: A=2 B=3 Operação: Soma(A,B)



A=12 - NOT(A)

Variáveis: A=12 B=1

Operação: NOT(A)



Variáveis: A=12 B=13

Operação: AND(A,B)

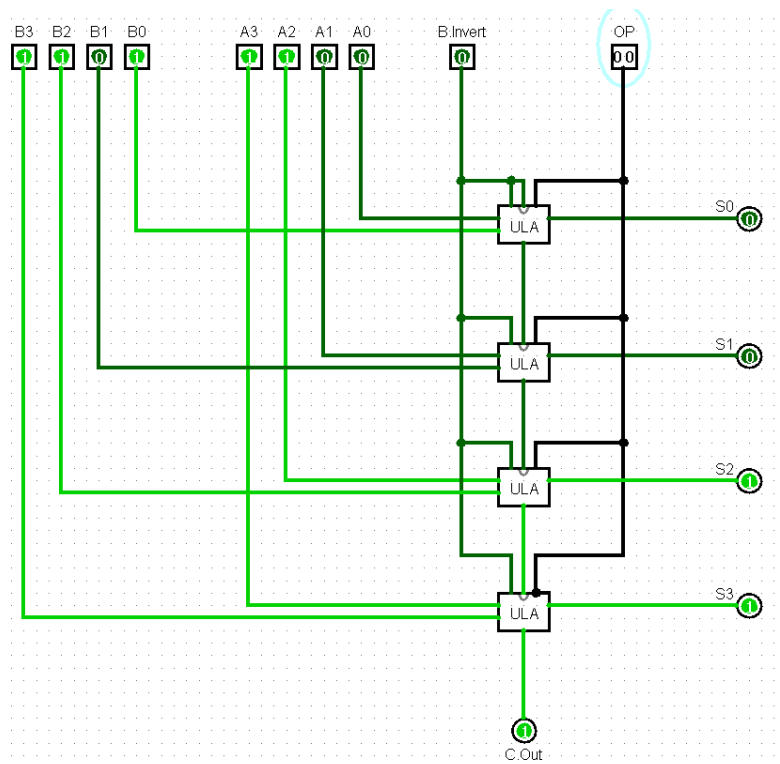
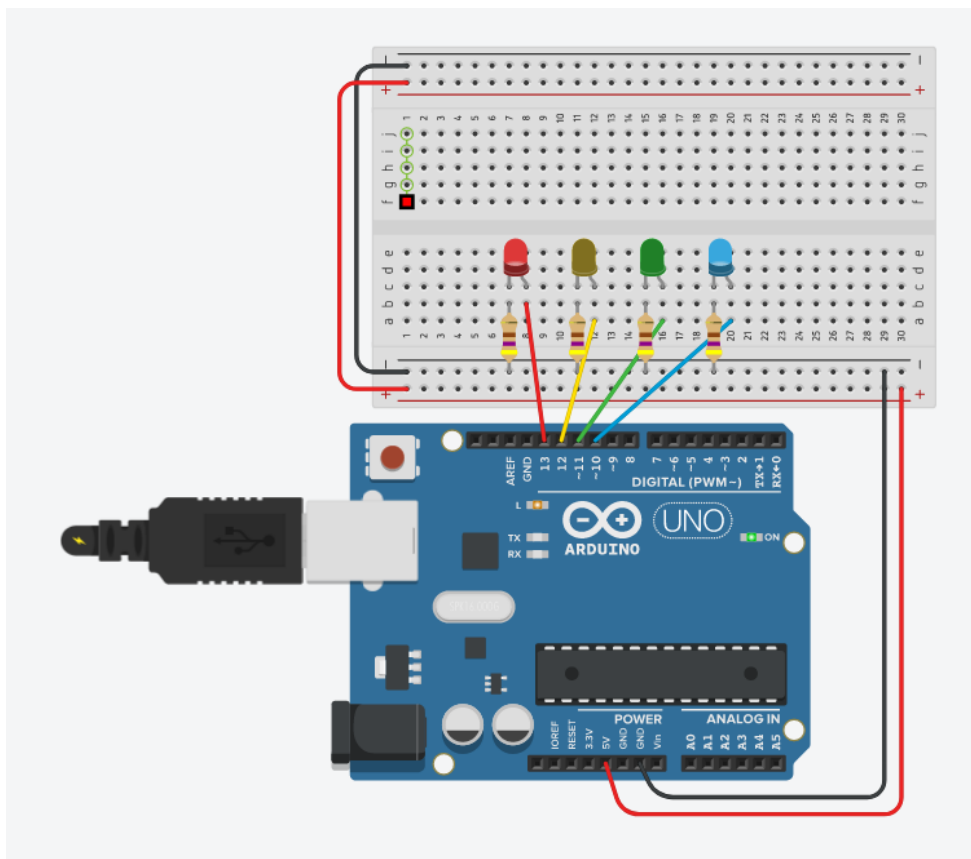


Tabela:

Instrução	Binário (A,B,Op)	Hexa	Resultado (Binário)
AND(A,B)	0010 0001 00	0x084	0000
OR(A,B)	0010 0011 01	0x08D	0011
SOMA(A,B)	0011 0011 11	0x0CF	0101
NOT(A)	1100 0011 10	0x30E	0011
AND(B,A)	1100 1101 00	0x334	1100

Parte 2)

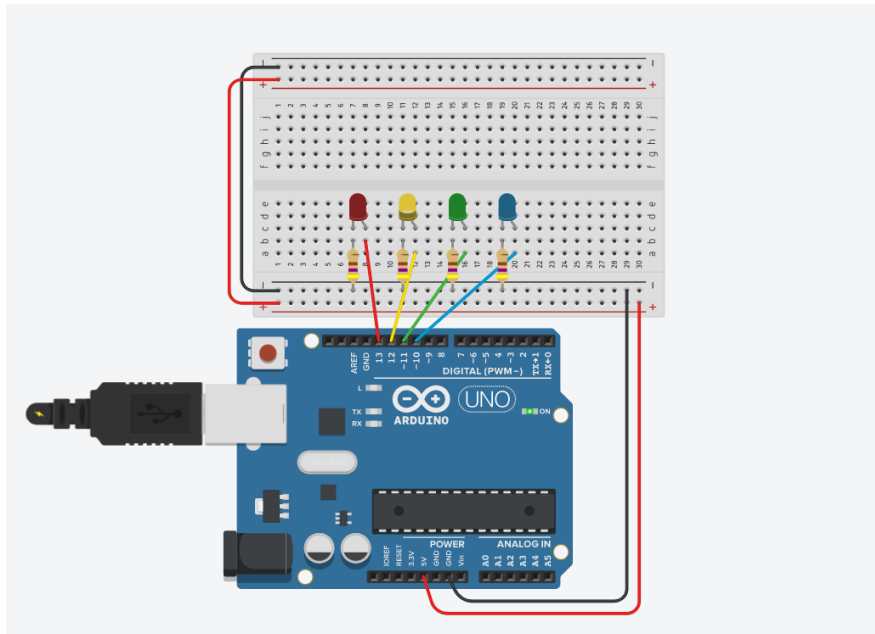
Exercicio 01



/*	delay(1000);
Programa 01	digitalWrite(led10, HIGH);
Semáforo Temporizado	delay(1000);
*/	digitalWrite(led10, LOW);
// Definição de valores para variáveis	digitalWrite(led13, LOW);
int led10 = 10;	delay(1000);
int led11 = 11;	
int led12 = 12;	digitalWrite(led10, HIGH);
int led13 = 13;	digitalWrite(led11, HIGH);
	delay(1000);
	digitalWrite(led10, LOW);
	delay(1000);
// Rotina executada 1 vez e que em geral	digitalWrite(led10, HIGH);
configura entradas e saídas	delay(1000);
void setup() {	digitalWrite(led10, LOW);
// configura os pinos como saídas	delay(1000);
DIGITAIS.	digitalWrite(led10, HIGH);
pinMode(led10, OUTPUT);	delay(1000);
pinMode(led11, OUTPUT);	digitalWrite(led10, LOW);
pinMode(led12, OUTPUT);	delay(1000);
pinMode(led13, OUTPUT);	digitalWrite(led10, HIGH);
	delay(1000);
}	digitalWrite(led10, LOW);
	digitalWrite(led11, LOW);
	delay(1000);
// the loop routine runs over and over	digitalWrite(led10, HIGH);
again forever:	digitalWrite(led12, HIGH);
void loop() {	delay(1000);
digitalWrite(led10, HIGH); // Faz a saída	digitalWrite(led10, LOW);
do respectivo Led ser alta ou High)	delay(1000);
digitalWrite(led13, HIGH);	digitalWrite(led10, HIGH);
delay(1000);	delay(1000);
digitalWrite(led10, LOW);	digitalWrite(led10, LOW);
delay(1000);	digitalWrite(led12, LOW);
digitalWrite(led10, HIGH);	delay(1000);
delay(1000);	
digitalWrite(led10, LOW);	}

Exercicio 02)

Variáveis: A=0 B=1 Operação: AND(A,B)



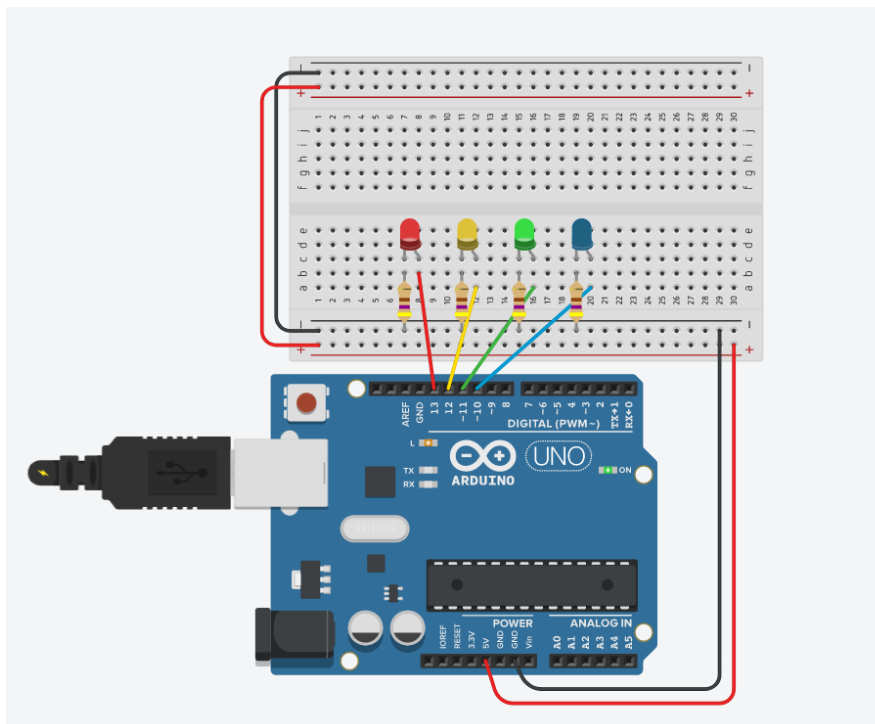
The image shows an Arduino Uno microcontroller board connected to a breadboard. Four LEDs (red, yellow, green, and blue) are connected to the breadboard. The red LED is connected to digital pin 13, the yellow LED to pin 12, the green LED to pin 11, and the blue LED to pin 10. All LEDs have their negative terminals connected to ground. A USB cable is plugged into the Arduino's USB port.

```
75 int mostra (int entrada1, int e
76 {
77     if(entrada1==1){
78         digitalWrite(vermelho,1);
79     }else{
80         digitalWrite(vermelho,0);
81     }
82     if(entrada2==1){
83         digitalWrite(amarelo,1);
84     }else{
85         digitalWrite(amarelo,0);
86     }
87     if(saida>0){
88         if(saida==2){
89             digitalWrite(azul,1);
90         }
91         digitalWrite(verde,1);
92     }else{
93         digitalWrite(verde,0);
94     }
95 }
96 int soma (int a, int b)
97 {
98     return (a+b);
99 }
```

Serial Monitor

A= 0
B= 1
OP Code= 0
Saida= 0

Variáveis: A=1 B=1 Operação: OR(A,B)



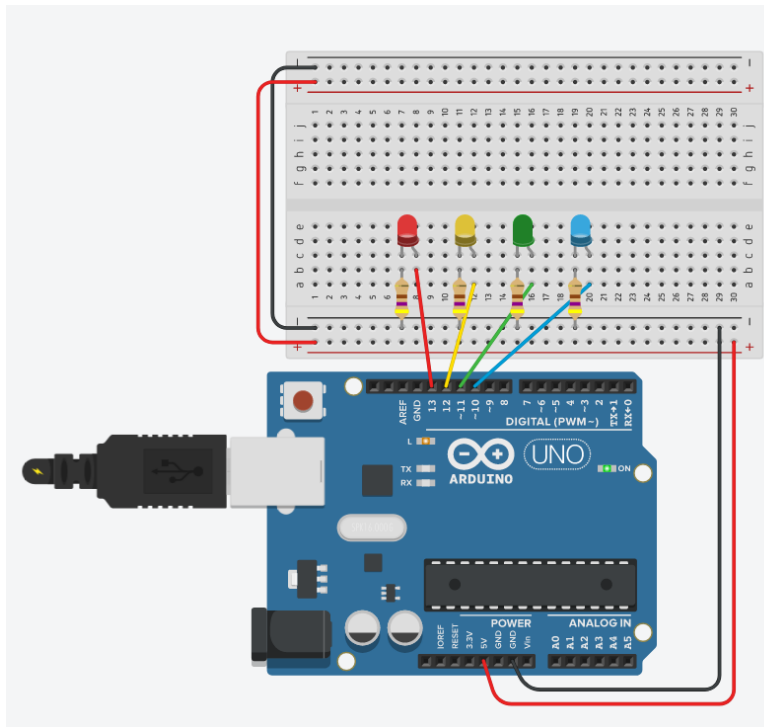
The image shows an Arduino Uno microcontroller board connected to a breadboard. Four LEDs (red, yellow, green, and blue) are connected to the breadboard. The red LED is connected to digital pin 13, the yellow LED to pin 12, the green LED to pin 11, and the blue LED to pin 10. All LEDs have their negative terminals connected to ground. A USB cable is plugged into the Arduino's USB port.

```
75 int mostra (i
76 {
77     if(entrada1:
78         digitalWr
79     }else{
80         digitalWr
81     }
82     if(entrada2:
83         digitalWr
84     }else{
85         digitalWr
86     }
87     if(saida>0)
88     if(saida==
89         digital
90     }
91     digitalWrite
92 }else{
93     digitalWrite
94 }
95 }
96 int soma (int
97 {
98     return (a+b)
99 }
```

Serial Monitor

A= 1
B= 1
OP Code= 1
Saida= 1

Variáveis: A=1 B=1 Operação: SOMA(A,B)



```

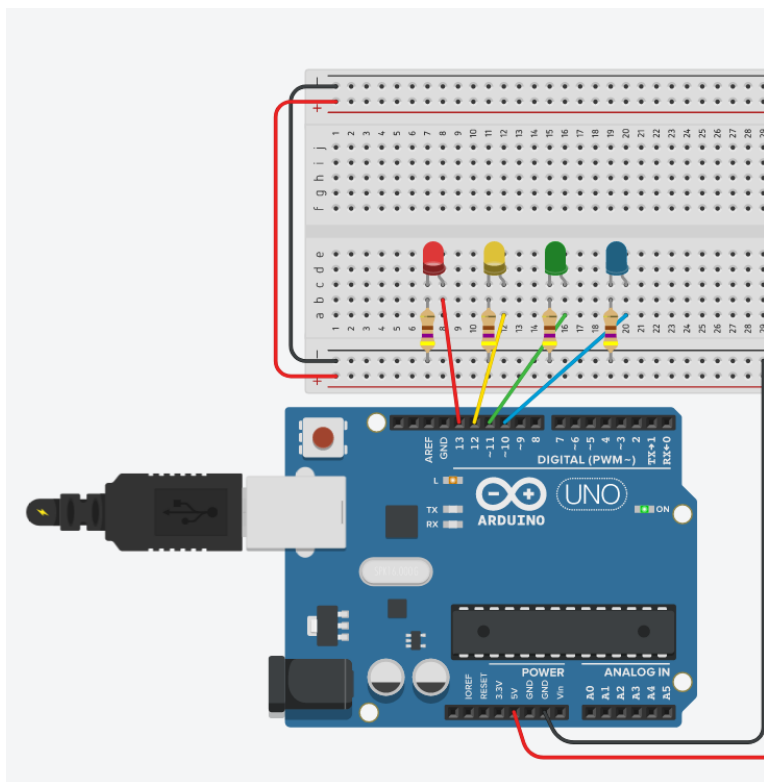
79  }else{
80      digitalWrite(LED_B, LOW);
81  }
82  if(entrada2 == 1){
83      digitalWrite(LED_A, HIGH);
84  }else{
85      digitalWrite(LED_A, LOW);
86  }
87  if(saida > 0){
88      if(saida == 1){
89          digitalWrite(LED_C, HIGH);
90          digitalWrite(LED_D, LOW);
91      }
92  }else{
93      digitalWrite(LED_C, LOW);
94      digitalWrite(LED_D, HIGH);
95  }
96  }
97  int soma(int a, int b){
98  {
99      return(a+b);
100  }
101  }
102

```

Serial Monitor

A= 1
B= 1
OP Code= 3
Saida= 2

Variáveis: A=1 B=1 Operação: NOT(A)



```

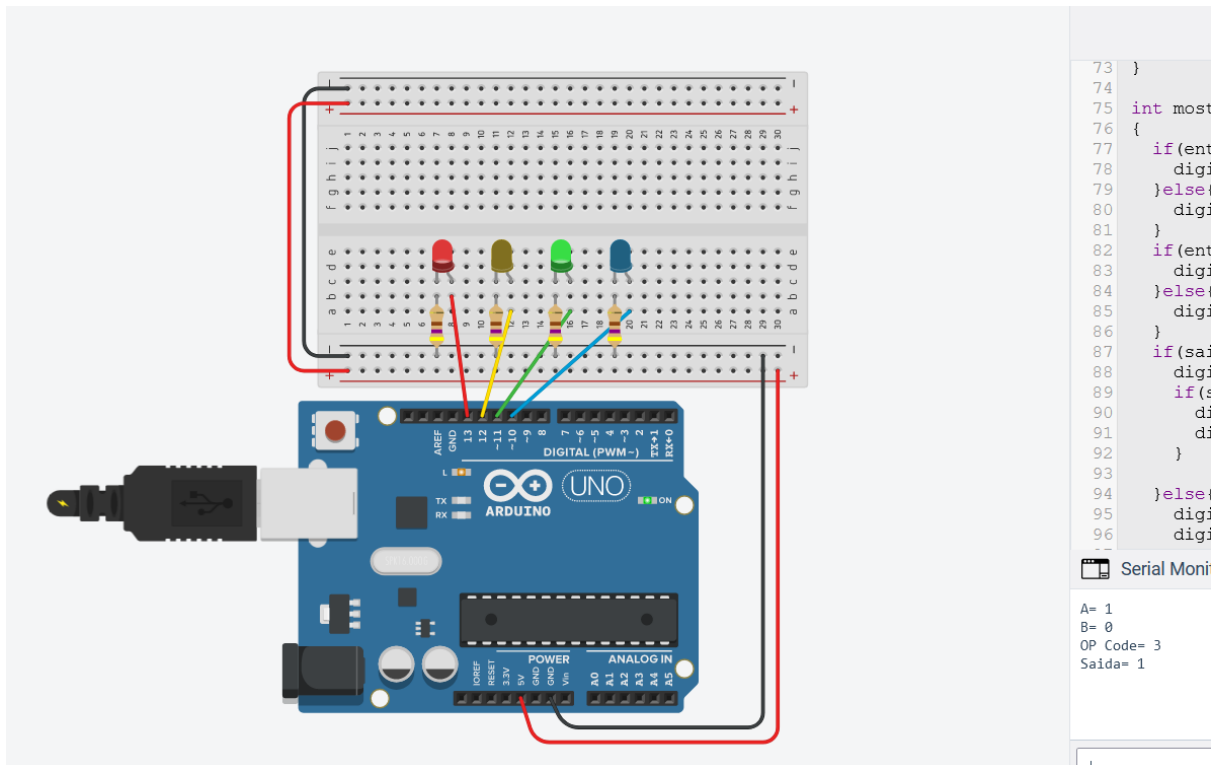
79  }else{
80      digitalWrite(LED_B, LOW);
81  }
82  if(entrada2 == 1){
83      digitalWrite(LED_A, HIGH);
84  }else{
85      digitalWrite(LED_A, LOW);
86  }
87  if(saida > 0){
88      if(saida == 1){
89          digitalWrite(LED_C, HIGH);
90          digitalWrite(LED_D, LOW);
91      }
92  }else{
93      digitalWrite(LED_C, LOW);
94      digitalWrite(LED_D, HIGH);
95  }
96  }
97  }
98  }
99  int soma(int a, int b){
100  {
101      return(a+b);
102  }
103  }

```

Serial Monitor

A= 1
B= 1
OP Code= 2
Saida= -2

Variáveis: A=1 B=1 Operação: SOMA(A,-B)



Codigo:

```
/*
  Programa 02
  ULA
*/
int entrada1 = 0;
int entrada2 = 0;
int entrada3 = 0;
int vermelho = 13;
int amarelo = 12;
int verde = 11;
int azul = 10;

int saida;

void setup() {
  Serial.begin(9600);
  pinMode(vermelho,OUTPUT);
  pinMode(amarelo, OUTPUT);
  pinMode(verde, OUTPUT);
  pinMode(azul, OUTPUT);
}

void loop() {
  if (Serial.available() > 0) {
    entrada1 = Serial.parseInt();
    entrada2 = Serial.parseInt();
    entrada3 = Serial.parseInt();
    Serial.print("A= ");
    Serial.print(entrada1);
    Serial.println();
    Serial.print("B= ");
    Serial.print(entrada2);
    Serial.println();
    Serial.print("OP Code= ");
    Serial.print(entrada3);
    Serial.println();

    if(entrada3==0){
      saida=portaand(entrada1,entrada2);
    }
    else if(entrada3==1){
      saida=portaor(entrada1,entrada2);
    }
  }
}
```

```

    }
    else if(entrada3==2){
        saida=portanot(entrada1);
    }
    else if(entrada3==3){
        saida=soma(entrada1,entrada2);
    };
    mostra(entrada1,entrada2,saida);
    Serial.print("Saida= ");
    Serial.print(saida);
    Serial.println();
}

}

int portaxor(int a, int b)
{
    return(a^b);
}

int portaor(int a, int b)
{
    return(a|b);
}

int portaand(int a, int b)
{
    return(a&b);
}

int portanot(int a)
{
    return(~a);
}

```

```

}

int mostra (int entrada1, int entrada2,int
saida)
{
    if(entrada1==1){
        digitalWrite(vermelho,1);
    }else{
        digitalWrite(vermelho,0);
    }
    if(entrada2==1){
        digitalWrite(amarelo,1);
    }else{
        digitalWrite(amarelo,0);
    }
    if(saida>0){
        digitalWrite(verde,1);
        if(saida==2){
            digitalWrite(azul,1);
            digitalWrite(verde,0);
        }
    }else{
        digitalWrite(verde,0);
        digitalWrite(azul,0);
    }
}

int soma(int a, int b)
{
    return(a+b);
}

```