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SUB – EMBEDDED MINI PROJECT

Arduino :

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a

physical programmable circuit board and a piece of software, or IDE runs on your computer, used to

write and upload computer code to the physical board. Arduino UNO has 14 digital pins and 6

analog pins.

Breadboard :

It is a way of constructing electronics without having to use a soldering iron. Components are pushed

into the sockets on the breadboard and then extra 'jumper' wires are used to make connections.

LED:

A light-emitting diode (LED) is a semiconductor device that produces light from

electricity. LEDs last a long time and do not break easily.

Hardware Requirement:

1 X Arduino

```
1 X Breadboard
1 XLED
2 X Resistors
Jump Wires
CODE:
#define t 30
#define t1 20
#define t2 100
#define t3 50
void setup() {
// set up pins 2 to 13 as outputs
for (int i = 2; i <= 13; i++) {
 pinMode(i, OUTPUT);
}
}
void loop()
{
effect_1();
effect_1();
effect_2();
effect_2();
```

effect_3();

```
effect_3();
effect_4();
effect_4();
effect_5();
effect_5();
effect_6();
effect_6();
effect_7();
effect_7();
}
//left to right and right to left
void effect_1()
{
for(int i=2; i<14; i++){
digitalWrite(i, HIGH);
delay(t1);
digitalWrite(i+1, HIGH);
delay(t1);
digitalWrite(i+2, HIGH);
delay(t1);
digitalWrite(i, LOW);
delay(t1);
digitalWrite(i+1, LOW);
delay(t1);
}
```

```
for(int i=13; i>1; i--){
digitalWrite(i, HIGH);
delay(t1);
digitalWrite(i-1, HIGH);
delay(t1);
digitalWrite(i-2, HIGH);
delay(t1);
digitalWrite(i, LOW);
delay(t1);
digitalWrite(i-1, LOW);
delay(t1);
}
void effect_2()
{
int count = 13; // keeps track of second LED movement
// move first LED from left to right and second from right to left
for (int i = 2; i < 13; i++) {
  clear();
  digitalWrite(i, HIGH); // chaser 1
  digitalWrite(count, HIGH); // chaser 2
  count--;
 // stop LEDs from appearing to stand still in the middle
```

```
if (count != 7) {
  delay(t2);
 }
}
// move first LED from right to left and second LED from left to right
for (int i = 13; i > 2; i--) {
  clear();
  digitalWrite(i, HIGH); // chaser 1
 digitalWrite(count, HIGH); // chaser 2
  count++;
 // stop LEDs from appearing to stand still in the middle
 if (count != 8) {
  delay(t2);
 }
}
}
void effect_3()
{
for(int i=2; i<14; i++){
digitalWrite(i, HIGH);
delay(t3);
```

```
}
for(int i=2; i<14; i++){
 digitalWrite(i, LOW);
delay(t3);
}
for(int i = 14; i>=2; i--){
 digitalWrite(i, HIGH);
 delay(t3);
}
for(int i = 14; i>=2; i--){
digitalWrite(i, LOW);
 delay(t3);
}
}
void effect_4()
{
for(int j = 2; j \le 13; j++){
digitalWrite(j, HIGH);
delay(t2);
j=j+1;
 }
for(int j = 2; j \le 13; j++){
```

```
digitalWrite(j, LOW);
delay(t2);
}
for(int k = 15; k > 2; k--){
digitalWrite(k, HIGH);
delay(t2);
k=k-1;
}
for(int k = 15; k > 2; k--){
digitalWrite(k, LOW);
delay(t2);
}
}
void effect_5()
{
for(int pin = 13; pin >= 2; pin--)
{
digitalWrite(pin, HIGH);
delay(t1);
digitalWrite(pin+1, LOW);
delay(t1);
}
for(int pin = 13; pin >= 2; pin--)
```

```
{
digitalWrite(pin+1, HIGH);
delay(t1);
digitalWrite(pin+2, LOW);
delay(t1);
}
for(int pin = 13; pin >= 2; pin--)
{
digitalWrite(pin+2, HIGH);
delay(t1);
digitalWrite(pin+3, LOW);
delay(t1);
}
for(int pin = 13; pin >= 2; pin--)
{
digitalWrite(pin+3, HIGH);
delay(t1);
digitalWrite(pin+4, LOW);
delay(t1);
}
 for(int pin = 13; pin >= 2; pin--)
{
digitalWrite(pin+4, HIGH);
delay(t1);
digitalWrite(pin+5, LOW);
```

```
delay(t1);
}
for(int pin = 13; pin >= 2; pin--)
{
digitalWrite(pin+5, HIGH);
delay(t1);
digitalWrite(pin+6, LOW);
delay(t1);
}
for(int pin = 13; pin >= 2; pin--)
{
digitalWrite(pin+6, HIGH);
delay(t1);
digitalWrite(pin+7, LOW);
delay(t1);
}
for(int pin = 13; pin >= 2; pin--)
{
digitalWrite(pin+7, HIGH);
delay(t1);
digitalWrite(pin+8, LOW);
delay(t1);
}
for(int pin = 9; pin >= 2; pin--)
{
```

```
digitalWrite(pin+8, HIGH);
delay(t1);
digitalWrite(pin+9, LOW);
delay(t1);
}
 for(int pin = 9; pin \geq 2; pin--)
{
digitalWrite(pin+9, HIGH);
delay(t1);
digitalWrite(pin+10, LOW);
delay(t1);
}
for(int pin = 9; pin \geq 2; pin--)
{
digitalWrite(pin+10, HIGH);
delay(t1);
digitalWrite(pin+11, LOW);
delay(t1);
}
for(int pin = 14; pin >= 2; pin--)
{
digitalWrite(pin+11, HIGH);
delay(t1);
}
for(int pin = 13; pin >= 2; pin--)
```

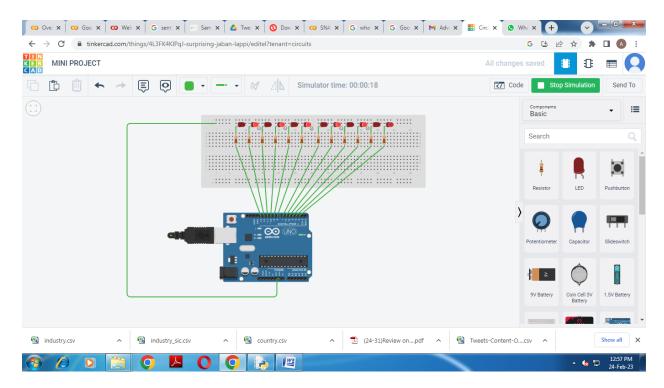
```
{
 digitalWrite(pin, LOW);
delay(t1);
 }
}
void effect_6()
{
for(int j=2; j<14; j++){
digitalWrite(j, LOW);
delay(t);
digitalWrite(j, HIGH);
delay(t);
digitalWrite(j-2, LOW);
delay(t);
digitalWrite(j, HIGH);
}
for(int k = 15; k>2; k--){
digitalWrite(k, LOW);
delay(t);
digitalWrite(k, HIGH);
delay(t);
digitalWrite(k+2, LOW);
delay(t);
digitalWrite(k, HIGH);
```

```
}
for(int k = 2; k<14; k++){
 digitalWrite(k, LOW);
 delay(t);
 digitalWrite(k, HIGH);
 delay(t);
 digitalWrite(k-2, LOW);
 delay(t);
 digitalWrite(k, HIGH);
}
for(int k = 15; k>2; k--){
 digitalWrite(k, LOW);
 delay(t);
 digitalWrite(k, HIGH);
 delay(t);
 digitalWrite(k+4, LOW);
 delay(t);
 digitalWrite(k, HIGH);
}
for(int k = 2; k<14; k++){
 digitalWrite(k, LOW);
 delay(t);
 digitalWrite(k, HIGH);
 delay(t);
 digitalWrite(k-4, LOW);
```

```
delay(t);
digitalWrite(k, HIGH);
}
}
void effect_7()
{
for(int j=2; j<14; j++){
digitalWrite(j, HIGH);
delay(t);
digitalWrite(j+2, LOW);
delay(t);
}
for(int k = 15; k>2; k--){
digitalWrite(k, HIGH);
delay(t);
digitalWrite(k+2, LOW);
delay(t);
}
}
// function to switch all LEDs off
void clear(void)
{
for (int i = 2; i <= 13; i++) {
```

```
digitalWrite(i, LOW);
}
```

Hardware Configuration:



Internal 2

```
#include<Keypad.h>
const byte ROWS = 4;
const byte COLS = 4;
String text = "";
char hexaKeys[ROWS][COLS] = {
```

```
{'1','2','3','A'},
 {'4','5','6','B'},
 {'7','8','9','c'},
 {'*','0','#','D'}
};
byte rowPins[ROWS] = {9,8,7,6};
byte colPins[COLS] = {5,4,3,2};
Keypad customKeypad =
Keypad(makeKeymap(hexaKeys),rowPins,colPins,ROWS,COLS);
void setup(){
 pinMode(8,OUTPUT);
 Serial.begin(9600);
}
void loop(){
 char Key = customKeypad.getKey();
 if(Key != NO_KEY)
```

```
Serial.println(Key);
if (Key == '*')
{
 text = "";
}
else
{
 if (Key == '#')
{
   Serial.println(text);
   if (text == "1234")
   {
    digitalWrite(8,HIGH);
   }
   else
  text = "";
```

}

```
else
    {
      text += Key;
    }
}
```

