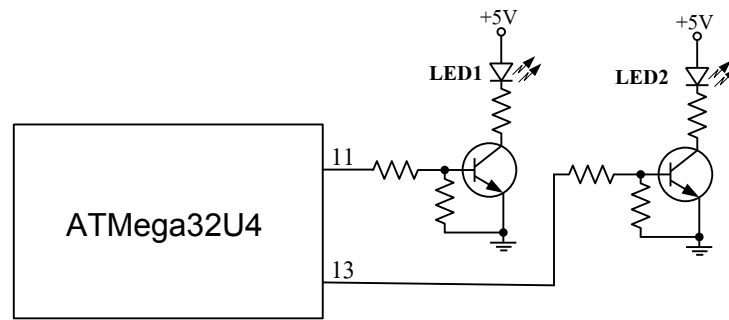


## 1. ไฟกระพริบ



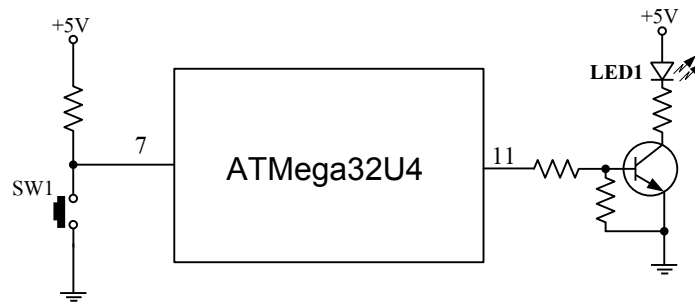
```
#define LED1 11

#define LED2 13

void setup()
{
    pinMode(LED1, OUTPUT);
    pinMode(LED2, OUTPUT);
}

void loop()
{
    digitalWrite(LED1, HIGH);
    digitalWrite(LED2, LOW);
    delay(1000);
    digitalWrite(LED1, LOW);
    digitalWrite(LED2, HIGH);
    delay(1000);
}
```

## 2. กดสวิตช์ให้ LED สว่าง 'ไม่กด LED ดับ



```
#define LED1 11

#define IN1 7

int val = 0;

void setup()
{
    pinMode(LED1, OUTPUT);
    pinMode(IN1, INPUT);
}

void loop()
{
    val = digitalRead(IN1);
    if (val == LOW)
    {
        digitalWrite(LED1, HIGH);
    }
    else
    {
        digitalWrite(LED1, LOW);
    }
}
}
```

### 3. กดสวิตช์ ON กดอีกที OFF

```
#define LED1 11

#define IN1 7

boolean STLED1 = false;

void setup()

{

  pinMode(LED1, OUTPUT);

  pinMode(IN1, INPUT);

}

void loop()

{

  if (digitalRead(IN1)== LOW)

  {

    STLED1 = !STLED1 ;

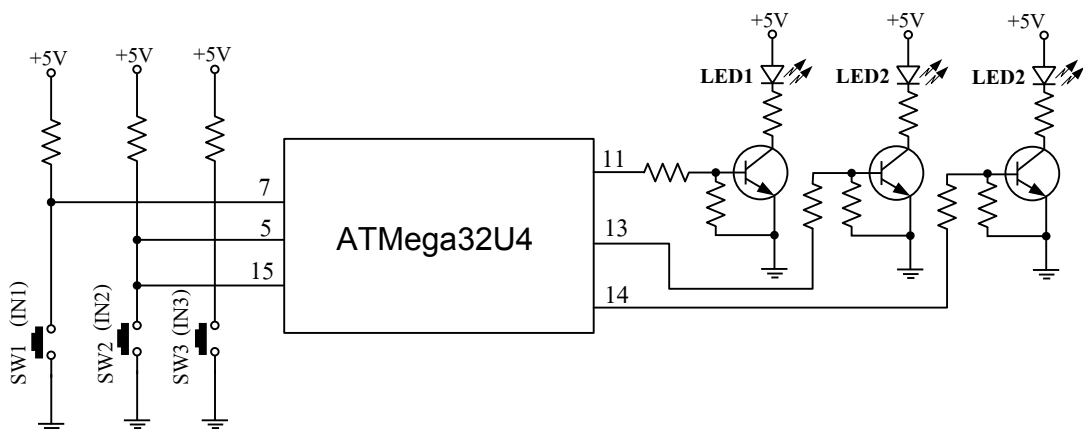
    digitalWrite(LED1, STLED1);

    delay(200);

  }

}
```

### 4. กดสวิตช์ ON กดอีกที OFF จำนวน 3 ชุด



```
#define LED1 11
```

```
#define LED2 13

#define LED3 14

#define IN1 7

#define IN2 5

#define IN3 15

boolean STLED1 = false;

boolean STLED2 = false;

boolean STLED3 = false;

void setup()

{

    pinMode(LED1, OUTPUT);

    pinMode(LED2, OUTPUT);

    pinMode(LED3, OUTPUT);

    pinMode(IN1, INPUT);

    pinMode(IN2, INPUT);

    pinMode(IN3, INPUT);

}

void loop()

{

    if (digitalRead(IN1)== LOW)

    {

        STLED1 = !STLED1;

        digitalWrite(LED1, STLED1);

        delay(200);

    }

    if (digitalRead(IN2)== LOW)

    {

        STLED2 = !STLED2;
```

```
digitalWrite(LED2, STLED2);  
delay(200);  
}  
if (digitalRead(IN3)== LOW)  
{  
    STLED3 = !STLED3;  
    digitalWrite(LED3, STLED3);  
    delay(200);  
}  
}
```

## 5. แสดงข้อความที่จอคอมพิวเตอร์



```
void setup()  
{  
    Serial.begin(9600);  
}  
void loop()  
{  
    int data = 2345;  
    Serial.println("Welcome to number");  
    Serial.print(data, DEC);  
}
```

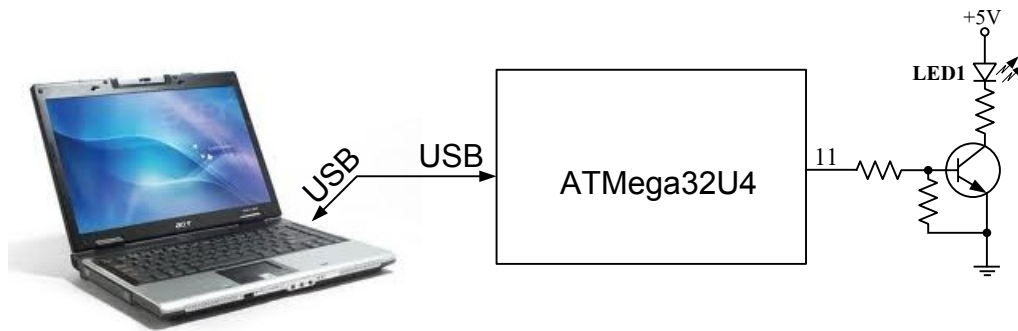
```
Serial.print("\t");  
Serial.print(data, HEX);  
Serial.print("\t");  
Serial.print(data, OCT);  
Serial.print("\t");  
Serial.print(data, BIN);  
Serial.print("\t");  
Serial.write(data);  
Serial.println();  
delay(1000);
```

```
}
```

## 6. แสดงชื่อตัวเองที่จอกอมพิวเตอร์

```
void setup()  
{  
  Serial.begin(9600);  
}  
  
void loop()  
{  
  Serial.println("Manoch");  
  Serial.print("\n");  
  delay(1000);  
  Serial.print("Thawatchai");  
  Serial.print("\n");  
  delay(1000);  
}
```

## 7. ส่งตัวเลขจากคอมเพื่อควบคุมความเร็วการกะพริบของ LED



```
#define LED1 11

int incomingByte = 0;

int delayTime = 500;

void setup()
{
  pinMode(LED1, OUTPUT);
  Serial.begin(9600);
  delay(5000);
  Serial.print("Press 1-5 for control speed of LED :");
}

void loop()
{
  if (Serial.available() > 0)
  {
    incomingByte = Serial.read();
    if(incomingByte >= 49 && incomingByte <=53)
    {
      Serial.write(incomingByte);
      Serial.println();
      delayTime=(incomingByte-48)*1000;
    }
  }
  Serial.print("Press 1-5 for control speed of LED :");
```

```

}

digitalWrite(LED1, HIGH);

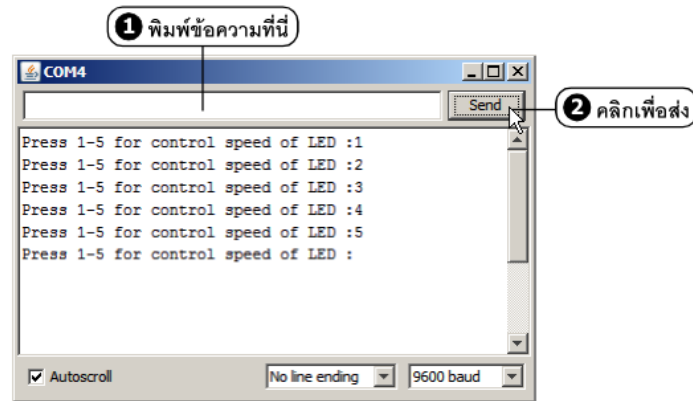
delay(delayTime);

digitalWrite(LED1, LOW);

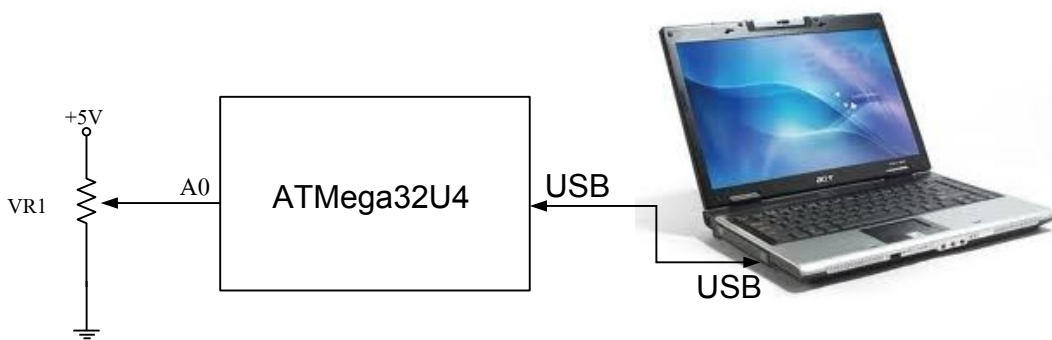
delay(delayTime);

}

```



8.อ่านค่า Analog 0-5 V แปลงเป็นดิจิตอลความละเอียด 10 บิต แสดงผลที่จอมอนิเตอร์



```

#define ANALOG_PIN 0

int analogValue = 0;

void setup()
{
  Serial.begin(9600);
}

```



```

void loop()
{
  analogValue = analogRead(ANALOG_PIN);
  Serial.print("Analog input0 = ");
  Serial.println(analogValue);
  delay(200);
}

```

### 9.อ่านค่า Analog 0-5 V แปลงเป็นดิจิทัลความละเอียด 10 บิต แสดงผลที่จอมอนิเตอร์ เป็นค่าแรงดัน VDC

```

#define ANALOG_PIN 0

int analogValue = 0;

void setup()
{
  Serial.begin(9600);
}

void loop()
{
  char str[5];

  int temp;

  analogValue = analogRead(ANALOG_PIN);

  temp = analogValue*5.0/1023*1000;

  sprintf(str,"%4d",temp);

  Serial.print("Analog input0 = ");

  Serial.print(str[0]);

  Serial.print(".");

  if(str[1]==' ') Serial.print("0");

  else Serial.print(str[1]);

  if(str[2]==' ') Serial.print("0");

  else Serial.print(str[2]);
}

```

```

Serial.print(str[3]);

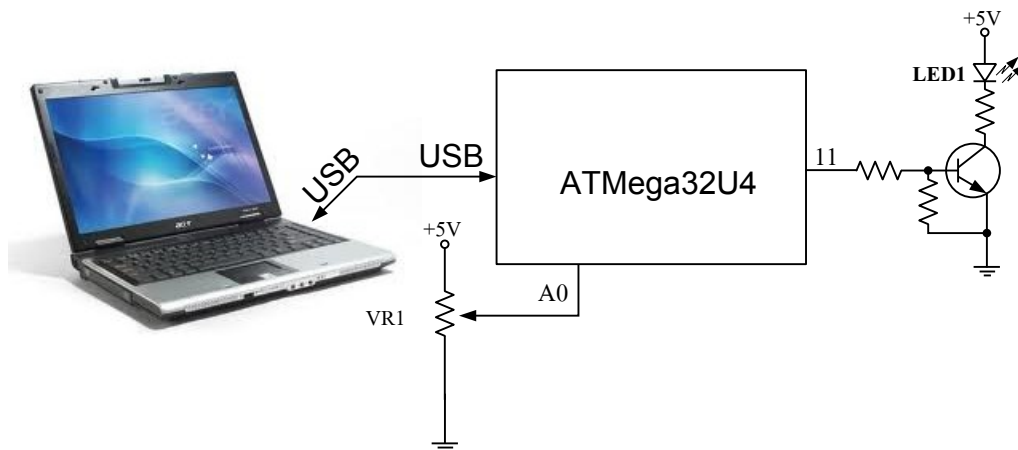
Serial.println(" Volt");

delay(200);

}

```

10. เปรียบเทียบแรงดันแสดงผลที่ LED ถ้ามากกว่า 3.00V ให้ LED 1 สว่าง



```

#include <stdio.h>

#define DC_PIN 0

int DC = 0;

#define LED1 11

void setup()
{
    Serial.begin(9600);
    pinMode(LED1, OUTPUT);
}

void loop()
{
    char str[5];

    int temp;

    DC = analogRead(DC_PIN);

    if (DC >= 613 )

        digitalWrite(LED1, HIGH);

```

```

else
    digitalWrite(LED1, LOW);
temp = DC*5.0/1023*1000;
sprintf(str,"%4d",temp);
Serial.print("Analog input0 = ");
Serial.print(str[0]);
Serial.print(".");
if(str[1]==' ') Serial.print("0");
else Serial.print(str[1]);
if(str[2]==' ') Serial.print("0");
else Serial.print(str[2]);
Serial.print(str[3]);
Serial.println(" Volt");
    delay(200);
}

```

#### 11. เปรียบเทียบแรงดันแสดงผลที่ LED ถ้าอยู่ระหว่าง 3.00 V ถึง 4.00 V ให้ LED 1 สว่าง

```

#include <stdio.h>

#define DC_PIN 0

int DC = 0;

#define LED1 11

void setup()
{
    Serial.begin(9600);
    pinMode(LED1, OUTPUT);
}

void loop()
{
    char str[5];

```

```

int temp;

DC = analogRead(DC_PIN);

if (DC >= 613 && DC <= 818)

    digitalWrite(LED1, HIGH);

else

    digitalWrite(LED1, LOW);

temp = DC*5.0/1023*1000;

sprintf(str,"%4d",temp);

Serial.print("Analog input0 = ");

Serial.print(str[0]);

Serial.print(".");

if(str[1]==' ') Serial.print("0");

else Serial.print(str[1]);

if(str[2]==' ') Serial.print("0");

else Serial.print(str[2]);

Serial.print(str[3]);

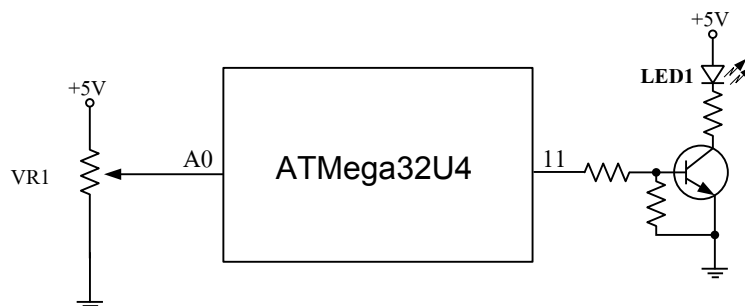
Serial.println(" Volt");

delay(200);

}

```

## 12. อ่านค่า Analog นำไปควบคุมการกระพริบของ LED



```
#define LED1 11
```

```
#define ANA 0
```

```
int DC = 0;
```

```

void setup(){
    pinMode(LED1,OUTPUT);
}

void loop() {
    DC = analogRead(ANA);
    digitalWrite(LED1,HIGH);
    delay(DC);
    digitalWrite(LED1,LOW);
    delay(DC);
}

```

## 12. การควบคุมความสว่างของ LED ด้วย PWM

```

#define LED 11

int value = 0;

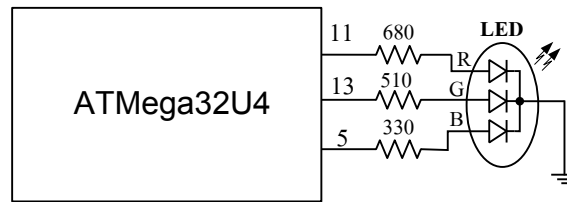
void setup()
{}

void loop()
{
    for(value = 0 ; value <= 255; value+=5)
    {
        analogWrite(LED, value);
        delay(30);
    }

    for(value = 255; value >=0; value-=5)
    {
        analogWrite(LED, value);
        delay(30);
    }
}

```

## 14. การควบคุม LED 3 สี ด้วยวิธีการ PWM



```
const int redPin = 13;

const int greenPin = 11;

const int bluePin = 5;

int Level;

int LevelR;

int LevelG;

int LevelB;

void setup()
{
  pinMode(redPin, OUTPUT);
  pinMode(greenPin, OUTPUT);
  pinMode(bluePin, OUTPUT);
  analogWrite(redPin, 200);
  delay(300);
  Level=0;
}

void loop()
{
  Level++;
  LevelR = Level + 200;
  LevelG = Level;
  LevelB = Level;
  analogWrite(redPin, LevelR);
```

```

analogWrite(bluePin, LevelB);

analogWrite(greenPin, LevelG);

delay(50);

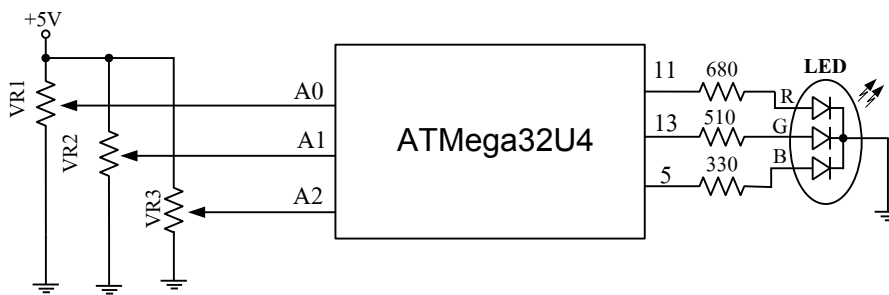
if (Level > 255)
{
    Level = 0;

    analogWrite(redPin, 200);

    delay(300);
}
}

```

### 15. การนำสัญญาณ Analog ไปควบคุม LED 3 สี



๑

```

const int redPin = 13;

const int greenPin = 11;

const int bluePin = 5;

const int redPot = 0;

const int greenPot = 1;

const int bluePot = 2;

int RedValue;

int GreenValue;

int BlueValue;

```

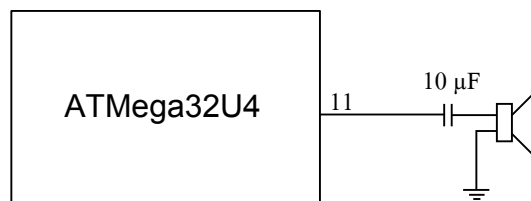
```

void setup()
{
    pinMode(redPin, OUTPUT);
    pinMode(greenPin, OUTPUT);
    pinMode(bluePin, OUTPUT);
}

void loop()
{
    RedValue = (map(analogRead(redPot), 0, 1023, 0, 255));
    BlueValue = (map(analogRead(bluePot), 0, 1023, 0, 255));
    GreenValue = (map(analogRead(greenPot), 0, 1023, 0, 255));
    analogWrite(redPin, RedValue);
    analogWrite(bluePin, BlueValue);
    analogWrite(greenPin, GreenValue);
}

```

## 16. สร้างสัญญาณเสียง



```

#define PIEZO 11

void setup()
{
    pinMode(PIEZO,OUTPUT);
}

```

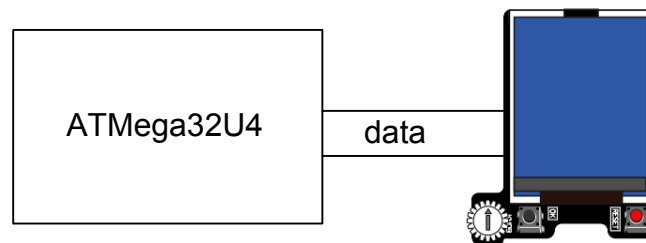


```

void loop()
{
    int i;
    for(i=0;i<500;i++)
    {
        digitalWrite(PIEZO,HIGH);
        delayMicroseconds(500);
        digitalWrite(PIEZO,LOW);
        delayMicroseconds(500);
    }
    delay(500);
}

```

17. การแสดงผลที่ GLCD สี แสดงตัวหนังสือ Size สีเหลือง ขนาด 1 เท่า (5x7) , 2 เท่า, 3 เท่า และ 4 เท่า



```

#include <unicon.h>
#include <glcd.h>
void setup()
{
    setTextSize(1);
    setTextColor(GLCD_YELLOW);
    glcd(0,0,"Size1");
    setTextSize(2);
    glcd(1,0,"Size2");
    setTextSize(3);

```

```

        glcd(2,0,"Size3");

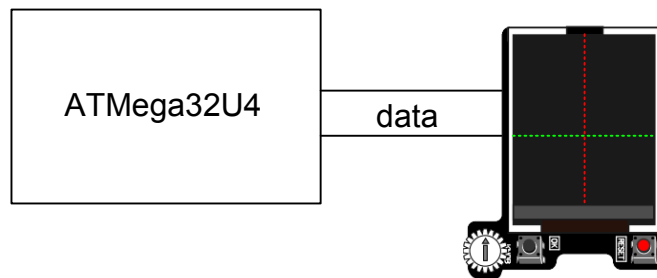
        setTextSize(4);

        glcd(3,0,"Size4");
    }

    void loop()
    {}

```

18. สร้างเส้นสีเขียวกลางจอทางแนวนอน สร้างเส้นสีแดงกลางจอทางแนวตั้ง



```

#include <unicon.h>

#include <glcd.h>

int i;

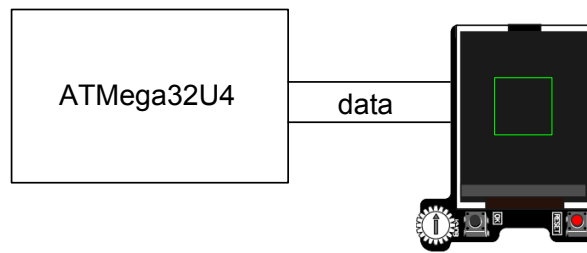
void setup()
{
    for (i=0;i<128;i+=4)
    {
        glcdPixel(i,80,GLCD_GREEN);
    }

    for (i=0;i<160;i+=4)
    {
        glcdPixel(64,i,GLCD_RED);
    }
}

void loop()
{}

```

## 19. สร้างรูปสี่เหลี่ยมสีเขียวกลางจอ



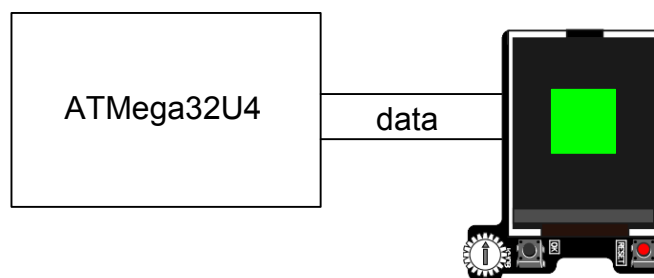
```
#include <unicon.h>

#include <glcd.h>

void setup()
{
    glcdRect(32,40,64,80,GLCD_GREEN);
}

void loop()
{}
```

## 20. ระบายสีเขียวลงในรูปสี่เหลี่ยม



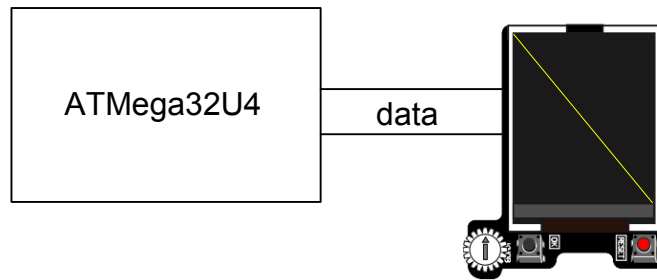
```
#include <unicon.h>

#include <glcd.h>

void setup()
{
    glcdFillRect(32,40,64,80,GLCD_GREEN);
}

void loop()
{}
```

## 21. สร้างเส้นสีเหลืองจากมุมบนซ้ายไปทางล่างขวา



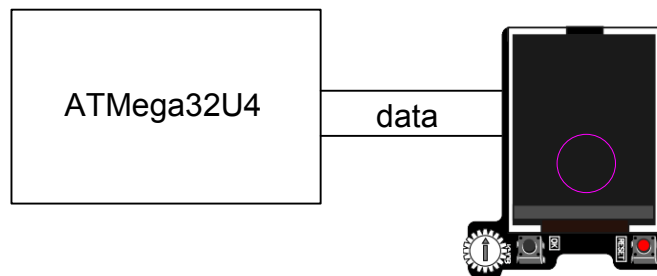
```
#include <unicon.h>

#include <glcd.h>

void setup()
{
    glcdLine(0,0,127,159,GLCD_YELLOW);
}

void loop()
{}
```

## 22. สร้างวงกลมสีชมพู พื้นสีดำ รัศมี 31 พิกเซล



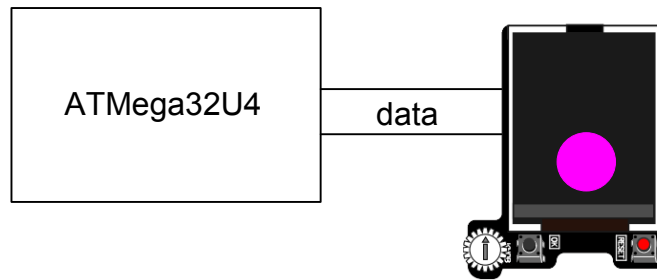
```
#include <unicon.h>

#include <glcd.h>

void setup()
{
    glcdCircle(60,120,31,GLCD_MAGENTA);
}

void loop()
{}
```

### 23. สร้างวงกลมสีชมพู พื้นสีชมพูรัศมี 31 พิกเซล



```
#include <unicon.h>

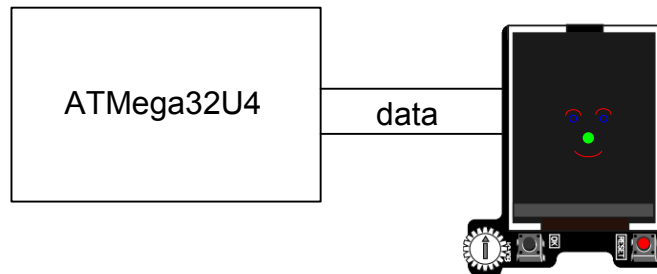
#include <glcd.h>

void setup()
{
    glcdFillCircle(60,120,31,GLCD_MAGENTA);
}

void loop()
{}

```

### 24. สร้างภาพดังรูป



```
#include <unicon.h>

#include <glcd.h>

void setup()
{
    glcdArc(48,80,16,30,150,GLCD_RED);
    glcdCircle(48,75,5,GLCD_BLUE);
    glcdCircle(80,75,5,GLCD_BLUE);
    glcdArc(80,80,16,30,150,GLCD_RED);
}

```

```

        glcdFillCircle(64,90,7,GLCD_GREEN);
        glcdArc(64,100,30,220,320,GLCD_RED);
    }
    void loop()
    {}

```

#### 25. สร้างตัวอักษร Hello world ที่บรรทัดที่ 2 คอลัมน์ที่ 4

```

#include <unicon.h>

#include <glcd.h>

void setup()
{
    glcd(2,4,"Hello World");
}

void loop()
{}

```

#### 26. แสดงตัวหนังสือ คำว่า ROW 1-ROW 15 โดยเรียงลงไปทีละ 1 คอลัมน์

```

#include <unicon.h>

#include <glcd.h>

int i,j;

void setup()
{
    glcdFillScreen(GLCD_WHITE);
    setTextColor(GLCD_BLACK);
    setTextBackgroundColor(GLCD_WHITE);
    for (i=0;i<16;i++)
    {
        glcd(i,i,"Row %d ",i);
    }
}

```

```

    }
void loop()
{

```

## 27. สร้างกราฟฟิคต่าง ๆ

```

#include <unicon.h>

#include <glcd.h>

int i,j;

void setup()
{

void loop()
{

    glcdClear;

    for (i=0;i<160;i+=4)
    {
        glcdLine(0,0,128,i,GLCD_WHITE);
    }

    for (i=0;i<128;i+=4)
    {
        glcdLine(0,0,i,160,GLCD_RED);
    }

    glcdRect(32,40,64,80,GLCD_BLUE);
    glcdFillCircle(32,40,31,GLCD_GREEN);
    glcdFillCircle(96,40,31,GLCD_YELLOW);
    glcdFillCircle(32,120,31,GLCD_MAGENTA);
    glcdFillCircle(96,120,31,GLCD_SKY);
    glcdCircle(64,40,31,GLCD_GREEN);

```



```

glcdCircle(32,80,31,GLCD_BLUE);
glcdCircle(64,120,31,GLCD_YELLOW);
glcdCircle(96,80,31,GLCD_SKY);
glcdFillRect(0,0,128,160,GLCD_YELLOW);
}

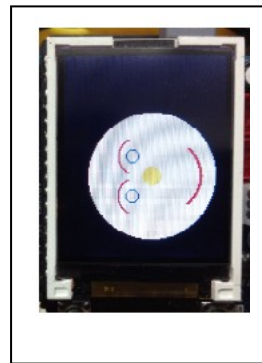
```

## 28. สร้างรูปการ์ตูน

```

#include <unicon.h>
#include <glcd.h>
int i;
void face()
{
    glcdFillCircle(64,70,50,GLCD_WHITE);
    glcdArc(48,60,16,30,150,GLCD_RED);
    glcdCircle(48,55,5,GLCD_BLUE);
    glcdCircle(80,55,5,GLCD_BLUE);
    glcdArc(80,60,16,30,150,GLCD_RED);
    glcdFillCircle(64,70,7,GLCD_YELLOW);
    glcdArc(64,80,30,220,320,GLCD_RED);
    glcdArc(64,80,29,220,320,GLCD_RED);
}
void setup()
{}
void loop()
{
    for(i=0;i<4;i++)
    {
        glcdClear();
        glcdMode(i);
    }
}

```





```

    face();

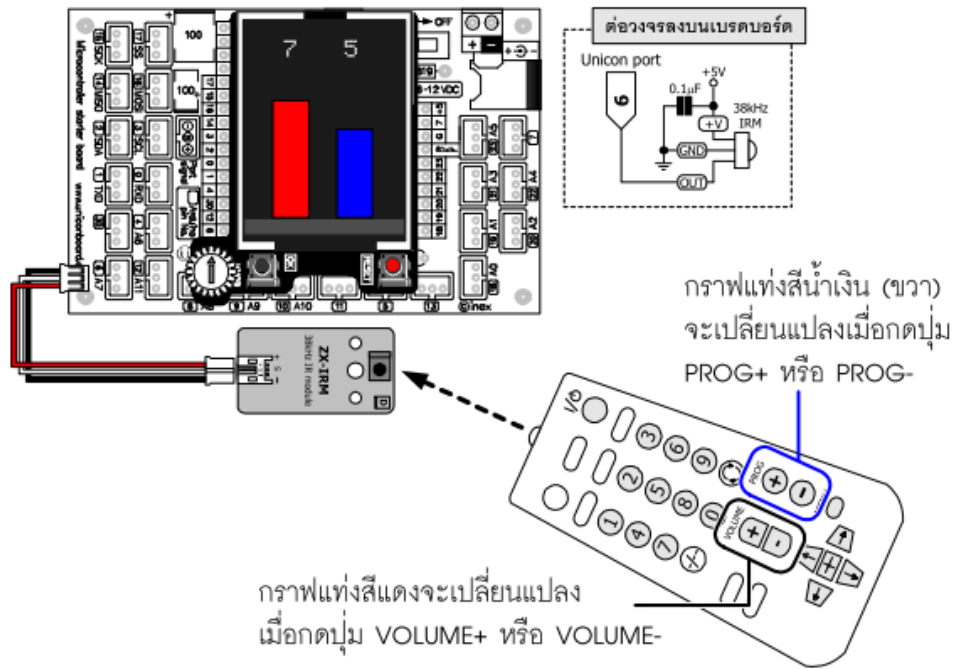
    delay(1000);

}

}

```

29. สร้างแท่งกราฟโวลจุ่ม และ แชลแนล



```

#include <unicon.h>

#include <IRremote.h>

int RECV_PIN = 6;

int VOLUME_MAX = 10;

int VOLUME = 5;

int CHANNEL_MAX = 10;

int CHANNEL = 5;

int BARGRAPH_HEIGHT = 120;

int BARGRAPH_WIDTH = 30;

int MARGIN_TOP = 29;

int MARGIN_SIDE = 20;

IRrecv irrecv(RECV_PIN);

decode_results results;

```

```
void setup()
{
    setTextSize(2);
    glcdClear();
    irrecv.enableIRIn();
    drawVolumeGraph();
    drawChannelGraph();
}

void loop()
{
    if (irrecv.decode(&results))
    {
        if(results.value == 1168 && VOLUME < VOLUME_MAX)
        {
            VOLUME++;
            drawVolumeGraph();
        }
        else if(results.value == 3216 && VOLUME > 0)
        {
            VOLUME--;
            drawVolumeGraph();
        }
        else if(results.value == 144 && CHANNEL < CHANNEL_MAX)
        {
            CHANNEL++;
            drawChannelGraph();
        }
    }
}
```

```

else if(results.value == 2192 && CHANNEL > 0)
{
    CHANNEL--;
    drawChannelGraph();
}
irrecv.resume();
}
}

void drawVolumeGraph()
{
    int VALUE = VOLUME_MAX - VOLUME;
    int LEVEL_HIGH = BARGRAPH_HEIGHT / VOLUME_MAX;
    clearBarGraph(MARGIN_SIDE, MARGIN_TOP, BARGRAPH_WIDTH, BARGRAPH_HEIGHT);
    glcdFillRect( MARGIN_SIDE, MARGIN_TOP + (VALUE * LEVEL_HIGH)
        , BARGRAPH_WIDTH, (VOLUME * LEVEL_HIGH), GLCD_RED);
    glcd(0, 2, "%d ", VOLUME);
}

void drawChannelGraph()
{
    int VALUE = CHANNEL_MAX - CHANNEL;
    int LEVEL_HIGH = BARGRAPH_HEIGHT / CHANNEL_MAX;
    clearBarGraph(128 - (MARGIN_SIDE + BARGRAPH_WIDTH), MARGIN_TOP
        , BARGRAPH_WIDTH, BARGRAPH_HEIGHT);
    glcdFillRect( 128 - (MARGIN_SIDE + BARGRAPH_WIDTH), MARGIN_TOP + (VALUE *
LEVEL_HIGH)
        , BARGRAPH_WIDTH, (CHANNEL * LEVEL_HIGH), GLCD_BLUE);
    glcd(0, 7, "%d ", CHANNEL);
}

```

```
void clearBarGraph(int x, int y, int width, int height)
{
  glcdFillRect( x, y, width, height, GLCD_BLACK);
}
```

### 30. แสดงค่าปุ่มกด

```
#include <unicon.h>

#include <IRremote.h>

int RECV_PIN = 6;

IRrecv irrecv(RECV_PIN);

decode_results results;

void setup()
{
  setTextSize(2);

  glcdClear();

  irrecv.enableIRIn();
}

void loop()
{
  if (irrecv.decode(&results))
  {
    if (results.decode_type == SONY)
    {
      if(results.value == 16)
      {
        glcd(2, 1, "1  ");
      }

      else if(results.value == 2064)
```

```
    {  
        glcd(2, 1, "2    ");  
    }  
else if(results.value == 1040)  
    {  
        glcd(2, 1, "3    ");  
    }  
else if(results.value == 3088)  
    {  
        glcd(2, 1, "4    ");  
    }  
else if(results.value == 528)  
    {  
        glcd(2, 1, "5    ");  
    }  
else if(results.value == 2576)  
    {  
        glcd(2, 1, "6    ");  
    }  
else if(results.value == 1552)  
    {  
        glcd(2, 1, "7    ");  
    }  
else if(results.value == 3600)  
    {  
        glcd(2, 1, "8    ");  
    }
```

```
else if(results.value == 272)
{
    glcd(2, 1, "9  ");
}

else if(results.value == 2320)
{
    glcd(2, 1, "0  ");
}

else if(results.value == 112)
{
    glcd(2, 1, "MENU  ");
}

else if(results.value == 2704)
{
    glcd(2, 1, "POWER  ");
}

else if(results.value == 1168)
{
    glcd(2, 1, "VOL+  ");
}

else if(results.value == 3216)
{
    glcd(2, 1, "VOL-  ");
}

else if(results.value == 144)
{
    glcd(2, 1, "CH+  ");
}
```

```

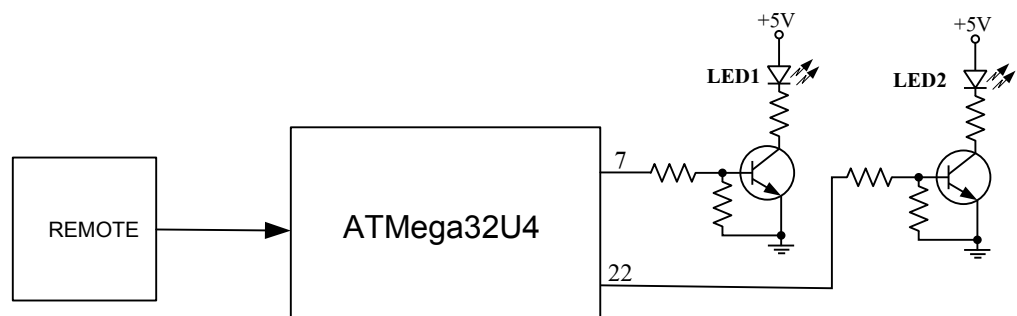
else if(results.value == 2192)
{
    glcd(2, 1, "CH-  ");
}
}

else
{
    glcd(2, 1, "UNKNOWN");
}

irrecv.resume();
}
}

```

### 31. รีโมทปิดเปิดหลอดLED 2 หลอด



```

#include <unicon.h>

#include <IRremote.h>

int RECV_PIN = 6;

int LED1_PIN = 7;

int LED2_PIN = 22;

int t=0;

int t1=0;

IRrecv irrecv(RECV_PIN);

decode_results results;

```

```
void setup()
{
    pinMode(LED1_PIN,OUTPUT);
    pinMode(LED2_PIN,OUTPUT);
    set textSize(2);
    glcdClear();
    irrecv.enableIRIn();
}
```

```
void loop()
{
    if (irrecv.decode(&results))
    {
        if (results.decode_type == SONY)
        {
            if(results.value == 16)
            {
                glcd(2, 1, "1");
                if(t==0;
                else t=1;
                if(t)
                    digitalWrite(LED1_PIN,HIGH);
                else
                    digitalWrite(LED1_PIN,LOW);
            }

            if(results.value == 2064)
            {
```

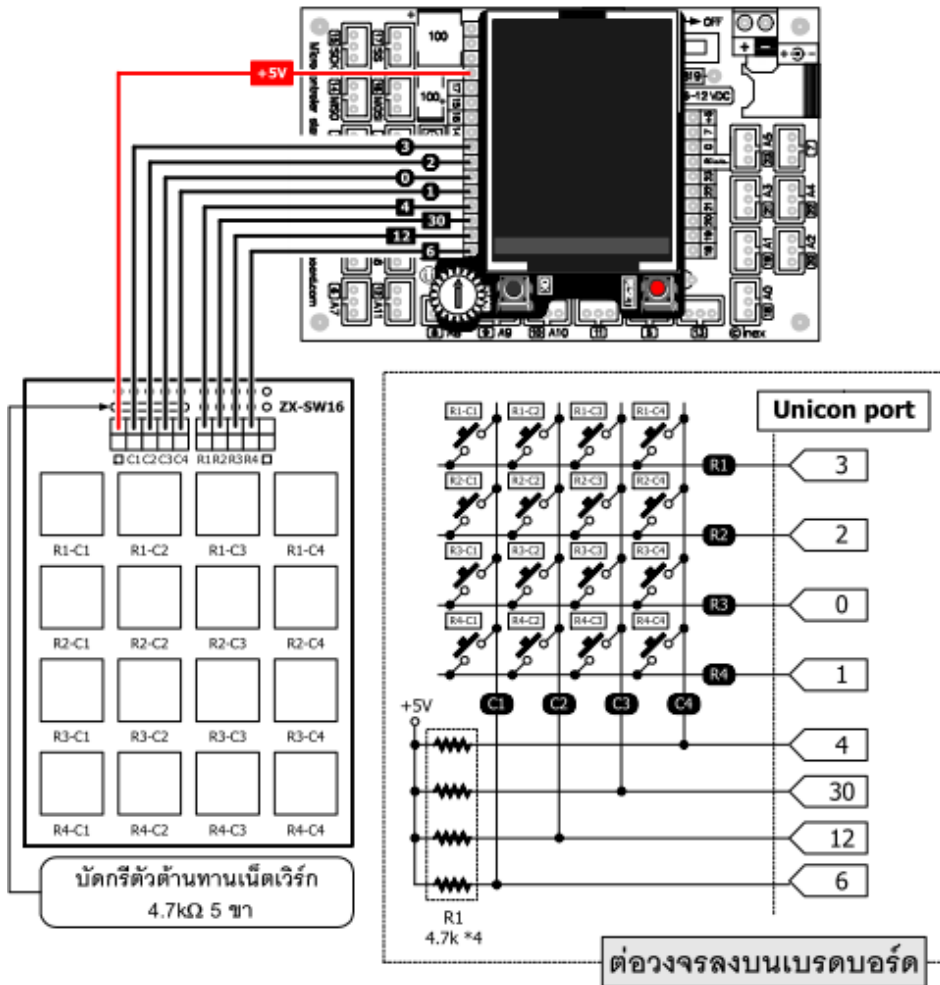


```

glcd(2, 1, "2  ");
if(t1)t1=0;
else t1=1;
if(t1)
    digitalWrite(LED2_PIN,HIGH);
else
    digitalWrite(LED2_PIN,LOW);
}
}
irrecv.resume();
}
}

```

32. การอ่านค่าจาก 4x4 matrix switch



```

#include <unicon.h>

#include <glcd.h>

char Rpin[4] = {4,30,12,6};

char Cpin[4] = {3,2,0,1};

int i;

int j;

int key;

void Keypad()
{
    for (i=0;i<4;i++)
    {
        digitalWrite(Rpin[i],0);
        delay(10);
        for(j=0;j<4;j++)
        {
            pinMode(Rpin[i],OUTPUT);
            pinMode(Cpin[j],INPUT);
            if (digitalRead(Cpin[j])==0)
            {
                key=(i*4)+j;
            }
            else
            {
                key=key;
            }
        }
        digitalWrite(Rpin[i],1);
    }
}

```

```

        }
    }
void setup()
{
    glcdClear();
    setTextSize(5);
    setTextColor(GLCD_SKY);
    glcd(1,1,"??");
    {
        Keypad();
    }
}
void loop()
{
    Keypad();
    glcd(1,1,"%d ",key);
}

```

### 33. การอ่านค่าจาก 4x4 matrix switch คววมุมรีเลย์แบบเลขฐาน2

```

#include <unicon.h>

#include <glcd.h>

char Rpin[4] = {4,30,12,6};

char Cpin[4] = {3,2,0,1};

int i;

int j;

int key;

#define REL1 18

#define REL2 19

```

```
#define REL3 20

#define REL4 21

void Keypad()
{
    for (i=0;i<4;i++)
    {
        digitalWrite(Rpin[i],0);

        delay(10);

        for(j=0;j<4;j++)
        {
            pinMode(Rpin[i],OUTPUT);

            pinMode(Cpin[j],INPUT);

            if (digitalRead(Cpin[j])==0)
            {
                key=(i*4)+j;
            }

            else

            {
                key=key;
            }

        }

        digitalWrite(Rpin[i],1);
    }
}

void setup()
{
    glcdClear();
```

```

    setTextSize(5);

    setTextColor(GLCD_SKY);

    glcd(1,1,"??");

    pinMode(REL1,OUTPUT);

    pinMode(REL2,OUTPUT);

    pinMode(REL3,OUTPUT);

    pinMode(REL4,OUTPUT);

    while (key==0)
    {
        Keypad();
    }
}

void loop()
{
    Keypad();

    glcd(1,1,"%d ",key);

    RELAY();
}

void RELAY()
{
    if (key == 0)
    {
        digitalWrite(REL1, LOW);

        digitalWrite(REL2, LOW);

        digitalWrite(REL3, LOW);

        digitalWrite(REL4, LOW);
    }
}

```

```
else if (key == 1)
{
    digitalWrite(REL1, HIGH);
    digitalWrite(REL2, LOW);
    digitalWrite(REL3, LOW);
    digitalWrite(REL4, LOW);
}

else if (key == 2)
{
    digitalWrite(REL1, LOW);
    digitalWrite(REL2, HIGH);
    digitalWrite(REL3, LOW);
    digitalWrite(REL4, LOW);
}

else if (key == 3)
{
    digitalWrite(REL1, HIGH);
    digitalWrite(REL2, HIGH);
    digitalWrite(REL3, LOW);
    digitalWrite(REL4, LOW);
}

else if (key == 4)
{
    digitalWrite(REL1, LOW);
    digitalWrite(REL2, LOW);
    digitalWrite(REL3, HIGH);
    digitalWrite(REL4, LOW);
}
```

```
else if (key == 5)
{
    digitalWrite(REL1, HIGH);
    digitalWrite(REL2, LOW);
    digitalWrite(REL3, HIGH);
    digitalWrite(REL4, LOW);
}
else if (key == 6)
{
    digitalWrite(REL1, LOW);
    digitalWrite(REL2, HIGH);
    digitalWrite(REL3, HIGH);
    digitalWrite(REL4, LOW);
}
else if (key == 7)
{
    digitalWrite(REL1, HIGH);
    digitalWrite(REL2, HIGH);
    digitalWrite(REL3, HIGH);
    digitalWrite(REL4, LOW);
}
else if (key == 8)
{
    digitalWrite(REL1, LOW);
    digitalWrite(REL2, LOW);
    digitalWrite(REL3, LOW);
    digitalWrite(REL4, HIGH);
}
```

```
else if (key == 9)
{
    digitalWrite(REL1, HIGH);
    digitalWrite(REL2, LOW);
    digitalWrite(REL3, LOW);
    digitalWrite(REL4, HIGH);
}

else if (key == 10)
{
    digitalWrite(REL1, LOW);
    digitalWrite(REL2, HIGH);
    digitalWrite(REL3, LOW);
    digitalWrite(REL4, HIGH);
}

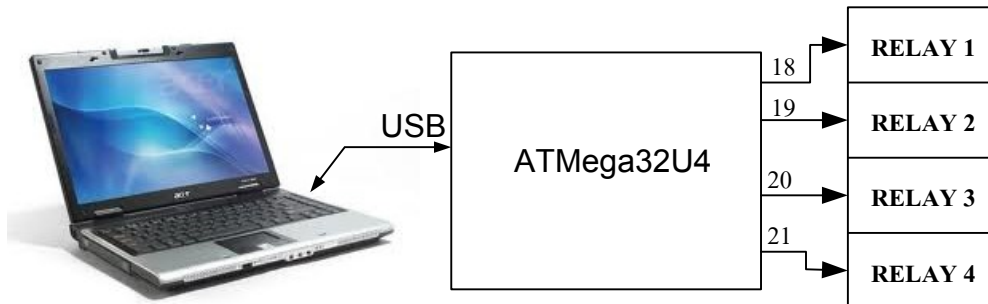
else if (key == 11)
{
    digitalWrite(REL1, HIGH);
    digitalWrite(REL2, HIGH);
    digitalWrite(REL3, LOW);
    digitalWrite(REL4, HIGH);
}

else if (key == 12)
{
    digitalWrite(REL1, LOW);
    digitalWrite(REL2, LOW);
    digitalWrite(REL3, HIGH);
    digitalWrite(REL4, HIGH);
}
```



```
else if (key == 13)
{
digitalWrite(REL1, HIGH);
digitalWrite(REL2, LOW);
digitalWrite(REL3, HIGH);
digitalWrite(REL4, HIGH);
}
else if (key == 14)
{
digitalWrite(REL1, LOW);
digitalWrite(REL2, HIGH);
digitalWrite(REL3, HIGH);
digitalWrite(REL4, HIGH);
}
else if (key == 15)
{
digitalWrite(REL1, HIGH);
digitalWrite(REL2, HIGH);
digitalWrite(REL3, HIGH);
digitalWrite(REL4, HIGH);
}
}
```

### 34. การควบคุมรีเลย์จากคอมพิวเตอร์



```
int RELAY1 = 18;

int RELAY2 = 19;

int RELAY3 = 20;

int RELAY4 = 21;

byte command = 0;

void setup()
{
  Serial.begin(9600);

  delay(5000);

  Serial.println("Arduino with RELAY4i");

  Serial.println("Ready. Type 0 to OFF all relays, 1 - 4 to ON each relay.");

  pinMode(RELAY1,OUTPUT);

  pinMode(RELAY2,OUTPUT);

  pinMode(RELAY3,OUTPUT);

  pinMode(RELAY4,OUTPUT);

  resetAll();

  delay(1000);

}
```

```
void loop()
{
  if (Serial.available())
  {
    command = Serial.read();

    if( command == '0' )
    {
      resetAll();

      Serial.println("Turn-off all relays");
    }

    if( command == '1' )
    {
      digitalWrite(RELAY1, HIGH);

      Serial.println("Turn-on relay 1");
    }

    if( command == '2' )
    {
      digitalWrite(RELAY2, HIGH);

      Serial.println("Turn-on relay 2");
    }

    if( command == '3' )
    {
      digitalWrite(RELAY3, HIGH);

      Serial.println("Turn-on relay 3");
    }

    if( command == '4' )
    {
      digitalWrite(RELAY4, HIGH);
```

```

Serial.println("Turn-on relay 4");

}

}

}

void resetAll()
{
digitalWrite(RELAY1, LOW);

digitalWrite(RELAY2, LOW);

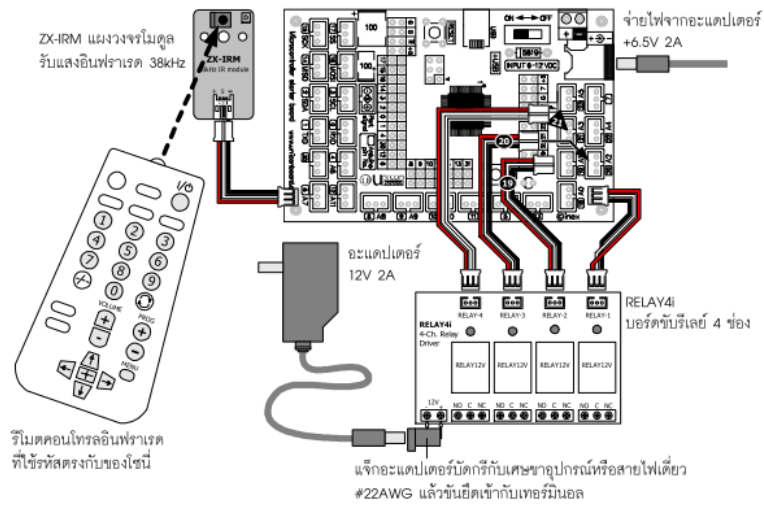
digitalWrite(RELAY3, LOW);

digitalWrite(RELAY4, LOW);

}

```

35. ควบลุมรีเลย์จากรีโมท (ปุ่ม 1-4 ON-OFF Relay 1-4 ปุ่ม power on/off รีเซตทั้งหมด)



```

#include <IRremote.h>

int RECV = 6;

IRrecv irrecv(RECV);

decode_results results;

int RELAY1 = 18;

int RELAY2 = 19;

int RELAY3 = 20;

```

```
int RELAY4 = 21;

boolean STRELAY1 = false;

boolean STRELAY2 = false;

boolean STRELAY3 = false;

boolean STRELAY4 = false;

void setup()
{
    irrecv.enableIRIn();

    pinMode(RELAY1, OUTPUT);
    pinMode(RELAY2, OUTPUT);
    pinMode(RELAY3, OUTPUT);
    pinMode(RELAY4, OUTPUT);

    digitalWrite(RELAY1, STRELAY1);
    digitalWrite(RELAY2, STRELAY2);
    digitalWrite(RELAY3, STRELAY3);
    digitalWrite(RELAY4, STRELAY4);
}

void loop()
{
    if (irrecv.decode(&results))
    {
        if (results.decode_type == SONY)
        {
            if(results.value == 16)
            {
                STRELAY1 = !STRELAY1;
            }
        }
    }
}
```

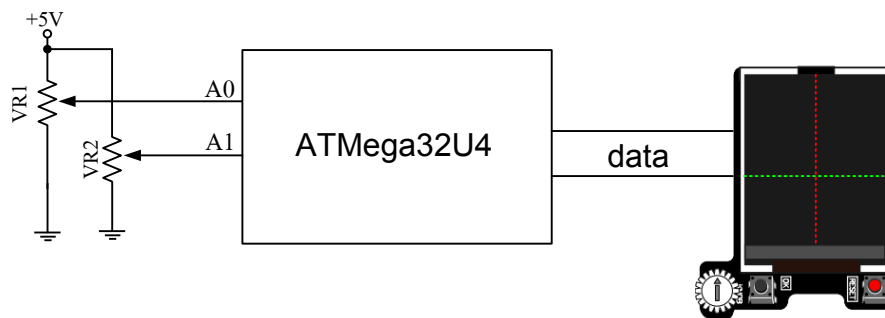
```
    digitalWrite(RELAY1, STRELAY1);  
    delay(300);  
}  
else if(results.value == 2064)  
{  
    STRELAY2 = !STRELAY2;  
    digitalWrite(RELAY2, STRELAY2);  
    delay(300);  
}  
else if(results.value == 1040)  
{  
    STRELAY3 = !STRELAY3;  
    digitalWrite(RELAY3, STRELAY3);  
    delay(300);  
}  
else if(results.value == 3088)  
{  
    STRELAY4 = !STRELAY4;  
    digitalWrite(RELAY4, STRELAY4);  
    delay(300);  
}  
else if(results.value == 2704)  
{  
    digitalWrite(RELAY1, LOW);  
    digitalWrite(RELAY2, LOW);  
    digitalWrite(RELAY3, LOW);  
    digitalWrite(RELAY4, LOW);  
    delay(300);  
}
```

```

    }
}
irrecv.resume();
}
}

```

### 36. อ่านค่า Analog 1 มาสร้างเส้นแกน X อ่านค่า Analog 2 มาสร้างเส้นแกน Y



```

#include <unicon.h>

#define X 0

#define Y 1

int XV = 0;

int YV = 0;

int i;

void setup()
{
    pinMode(X,INPUT);
    pinMode(Y,INPUT);
}

void loop()
{
    ANAIN ();
    DISPO;
}

```

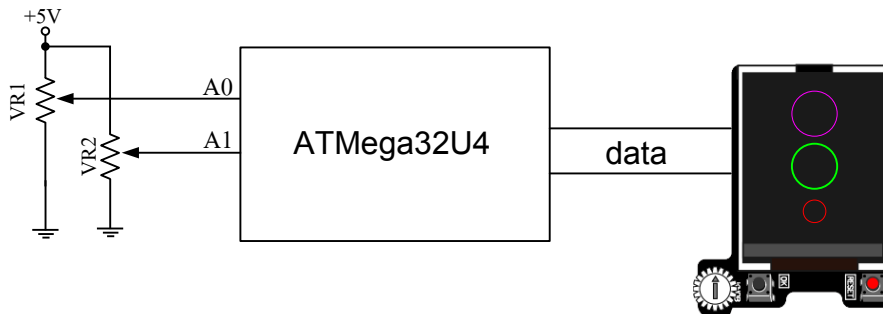
```

void ANAIN()
{
    XV = analogRead(X);
    XV = XV/8;
    YV = analogRead(Y);
    YV = YV*10/64;
}

void DISP()
{
    for (i=0;i< XV;i+=2);
    {
        glcdPixel(i,80,GLCD_YELLOW);
    }
    for(i=0;i<YV;i+=2);
    {
        glcdPixel(64,i,GLCD_RED);
    }
}

```

37. อ่านค่าสัญญาณ Analog 1-2 มาสร้างวงกลม 3 วง วงที่ 1 สีชมพู รัศมีได้จาก Analog1 วงที่ 2 สีg-up; รัศมีได้จาก Analog2 วงที่ 3 สีcf รัศมีได้จาก Analog1 โดยมีรัศมีครึ่งหนึ่งของวงที่ 1



```

#include <unicon.h>

#define X 0

#define Y 1

```



```
int XV = 0;

int YV = 0;

int i;

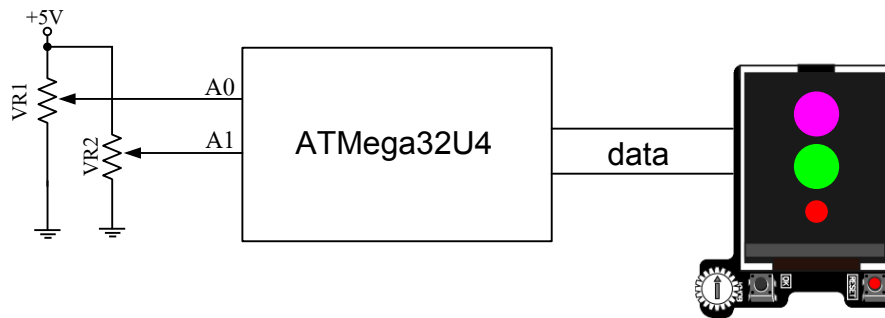
void setup()
{
    pinMode(X,INPUT);
    pinMode(Y,INPUT);
}

void loop()
{
    ANAIN ();
    DISP();
}

void ANAIN()
{
    XV = analogRead(X);
    XV = XV/34;
    YV = analogRead(Y);
    YV = YV/34;
}

void DISP()
{
    glcdCircle(60,30,XV,GLCD_MAGENTA);
    glcdCircle(60,90,YV,GLCD_GREEN);
    glcdCircle(60,130,XV/2,GLCD_RED);
    delay(1000);
    glcdClear();
}
```

38. อ่านค่าสัญญาณ Analog 1-2 มาสร้างวงกลม 3 วง วงที่ 1 พื้นสีชมพู รัศมีได้จาก Analog1 วงที่ 2 สีเขียว รัศมีได้จาก Analog2 วงที่ 3 พื้นแดงรัศมีได้จาก Analog1 โดยมีรัศมีครึ่งหนึ่งของวงที่ 1



```
#include <unicorn.h>

#define X 0

#define Y 1

int XV = 0;

int YV = 0;

int i;

void setup()
{
    pinMode(X,INPUT);
    pinMode(Y,INPUT);
}

void loop()
{
    ANAIN ();
    DISP();
}

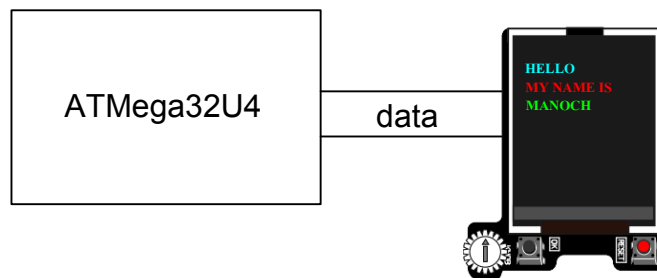
void ANAIN()
{
    XV = analogRead(X);
    XV = XV/34;
    YV = analogRead(Y);
```

```

        YV = YV/34;
    }
void DISP()
{
    glcdFillCircle(60,30,XV,GLCD_MAGENTA);
    glcdFillCircle(60,90,YV,GLCD_GREEN);
    glcdFillCircle(60,130,XV/2,GLCD_RED);
    delay(1000);
    glcdClear();
}

```

### 39. แสดงชื่อตัวเอง



```

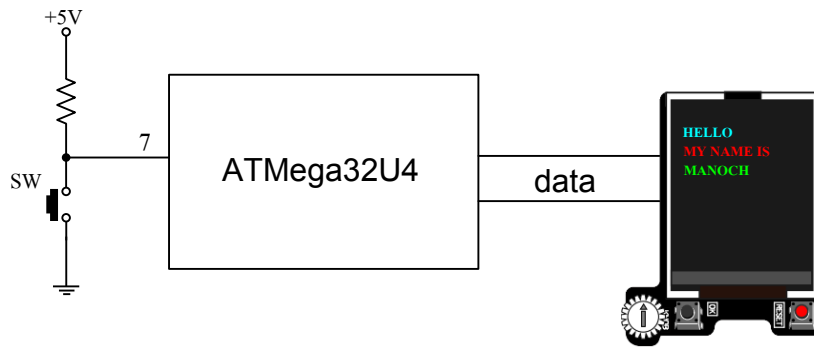
#include <unicon.h>

void setup()
{
}

void loop()
{
    setTextColor(GLCD_SKY);
    glcd(2,1,"HELLO ");
    setTextColor(GLCD_RED);
    glcd(4,1,"MY NAME IS ");
    setTextColor(GLCD_GREEN);
    glcd(6,1,"MANOCH ");
}

```

#### 40. กดสวิทช์แล้วแสดงชื่อตัวเอง



```
#include <unicon.h>

#define SW 7

void setup()
{
  pinMode(SW,INPUT);
}

void loop()
{
  if (digitalRead(SW)== LOW )
  {
    setTextColor(GLCD_SKY);
    glcd(2,1,"HELLO ");
    delay(2000);

    setTextColor(GLCD_RED);
    glcd(4,1,"MY NAME IS ");
    delay(2000);

    setTextColor(GLCD_GREEN);
    glcd(6,1,"MANOCH ");
    delay(2000);

    glcdClear();
    delay(1000);
  }
}
```