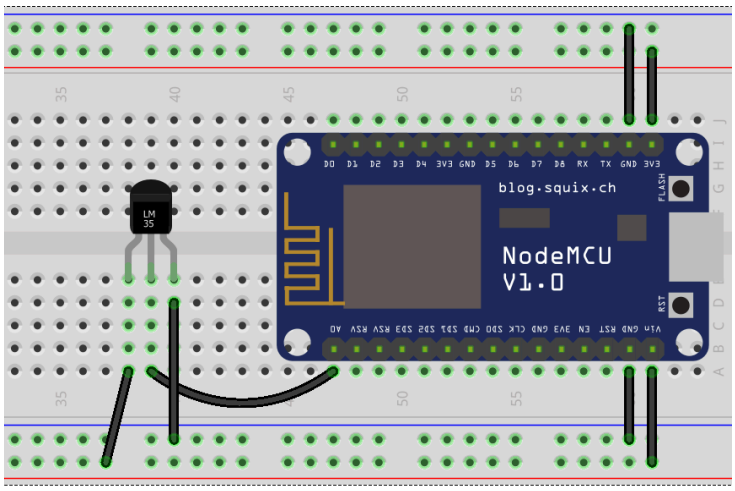
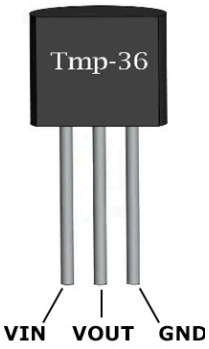
Zad.1. W środkowisku Arduino IDE należy dodać nastepujące biblioteki:

- `ESPAsyncTCP`
- `ESPAsyncWebServer`
- `ESPDash`

Zad.2. Połączyć układ jak na poniższym rysunku.



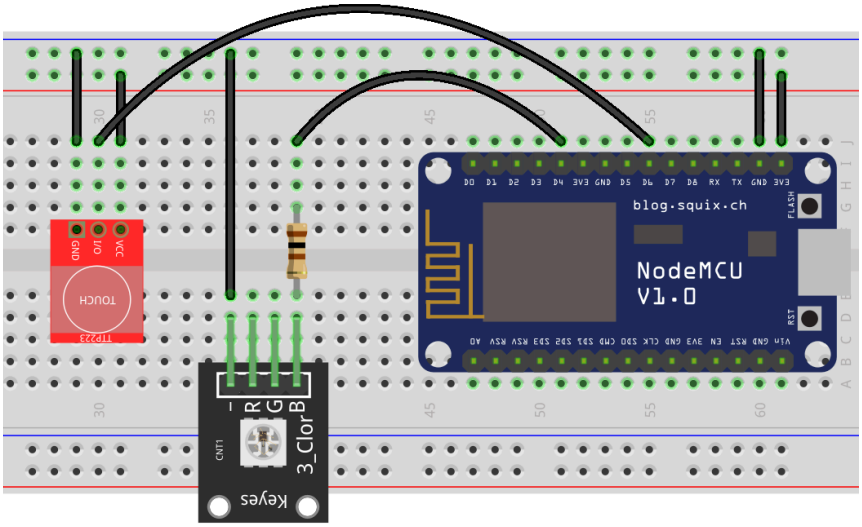


Po wykonaniu wszystkich połączeń należy zaprogramować moduł *ESP8266* za pomocą poniższego programu.

```
// DASH 3.0.2
#define BAUDRATE 115200
#define TMP36pin A0

#include <ESP8266WiFi.h>
#include <ESPAsyncTCP.h>
#include <ESPAsyncWebServer.h>
#include <ESPDash.h>

AsyncWebServer server(80);

ESPDash dashboard(&server);
Card title_card(&dashboard, GENERIC_CARD, "Title");
Card temperature_card(&dashboard, TEMPERATURE_CARD,
                              "Temperature", "°C");
```

```
Card my_button(&dashboard, BUTTON_CARD, "Fire");

double temperature;
long p_millis=0;

const char* ssid = "Laboratorium-IoT";
const char* pass = "";

void setup() {
 WiFi.begin(ssid,pass);
 Serial.begin(BAUDRATE);
 Serial.print("Connecting network ");
 while(WiFi.status()!=WL_CONNECTED) {
  Serial.print("."); delay(500); }
 Serial.println(" done");
 Serial.print("IP adres: ");
 Serial.print(WiFi.localIP());

 server.begin();
 delay(500);
 String s = "Web Thermometer";
 title_card.update(s);
 dashboard.sendUpdates();

 my_button.attachCallback([&](bool value){
  Serial.println("Button: " + String((value)?"true":"false"));
  digitalWrite(LED_BUILTIN,!value);
  my_button.update(value);
  dashboard.sendUpdates(); });

 pinMode(LED_BUILTIN,OUTPUT);
 }

#define MAIN_LOOP_DELAY 2000

void loop() {
if(millis()-p_millis>MAIN_LOOP_DELAY) {
 temperature = ((analogRead(TMP36pin)/1024.0)*3300-500)/10;
 Serial.print("Temperature[degC] = ");
 Serial.println(temperature);
 temperature_card.update(String(temperature));
 dashboard.sendUpdates();
 p_millis = millis();}
}
```

Zad.3. Połączyć układ jak na poniższym rysunku.



Po wykonaniu wszystkich połączeń należy zaprogramować moduł *ESP8266* za pomocą poniższego programu.

```
#define BAUDRATE 115200
#define BUTTON 12       // D6
#define LIGHT_OUTPUT 2  // D4

#include <ESP8266WiFi.h>
#include <ESPAsyncTCP.h>
#include <ESPAsyncWebServer.h>
#include <ESPDash.h>

AsyncWebServer server(80);

ESPDash dashboard(&server);

Card my_button(&dashboard, BUTTON_CARD, "Light!");
Card my_dimmer(&dashboard, SLIDER_CARD, "Dimmer_blue", "", 0, 1023);
Card my_dimmerR(&dashboard, SLIDER_CARD, "Dimmer_red", "", 0, 1023);

long p_millis=0;

const char* ssid = "Light_switch";    // SSID
```

```
const char* password = "";  //WiFi Password/Empty Password = Open AP

bool switch_state = false;
int light_intensity = 0;
int light_intensityR = 0;

void setup() {
 Serial.begin(BAUDRATE);
 WiFi.mode(WIFI_AP);
 WiFi.softAP(ssid, password);
 delay(1000);
 Serial.print("\nIP Address: ");
 Serial.println(WiFi.softAPIP());

 server.begin();
 delay(500);

 my_button.attachCallback([&](bool value){
  Serial.println("Button: " + String((value)?"true":"false"));
  switch_state = value;
  my_button.update(value);
  dashboard.sendUpdates(); });

 my_dimmer.attachCallback([&](int value){
  Serial.println("Light intensity: "+String(value));
  light_intensity = value;
  my_dimmer.update(value);
  dashboard.sendUpdates(); });

 my_dimmerR.attachCallback([&](int value){
  Serial.println("Light intensity: "+String(value));
  light_intensityR = value;
  my_dimmer.update(value);
  dashboard.sendUpdates(); });

  attachInterrupt(digitalPinToInterrupt(BUTTON),changeLight,RISING);
}

#define MAIN_LOOP_DELAY 100

void loop() {
  if(millis() - p_millis > MAIN_LOOP_DELAY)
   if(switch_state) { analogWrite(LIGHT_OUTPUT,light_intensity);
   analogWrite(LIGHT_OUTPUT,light_intensityR); }
```

```
    else { analogWrite(LIGHT_OUTPUT,0);
    analogWrite(LIGHT_OUTPUT,0);};
}

ICACHE_RAM_ATTR void changeLight() {
  switch_state = !switch_state;
  Serial.println(switch_state);
  my_button.update(switch_state);
  dashboard.sendUpdates();
}
```

Zad.4. Zmodyfikować program z zadania 2 pod kątem wykorzystanie czujnika BMP-280. Wyświetlić na wyświetlaczu wartość temperatury, ciśnienia. Te same wartości opublikować w sieci bezprzewodowej.

Dla zainteresowanych:

1. ESP-DASH:

   github.com/ayushsharma82/ESP-DASH

2. Dokumentacja biblioteki DASH:

   docs.espdash.pro