PROGRAMMING ESP8266 TO DISPLAY ALPHANUMERIC CHARACTERS ON SEVEN SEGMENT DISPLAY

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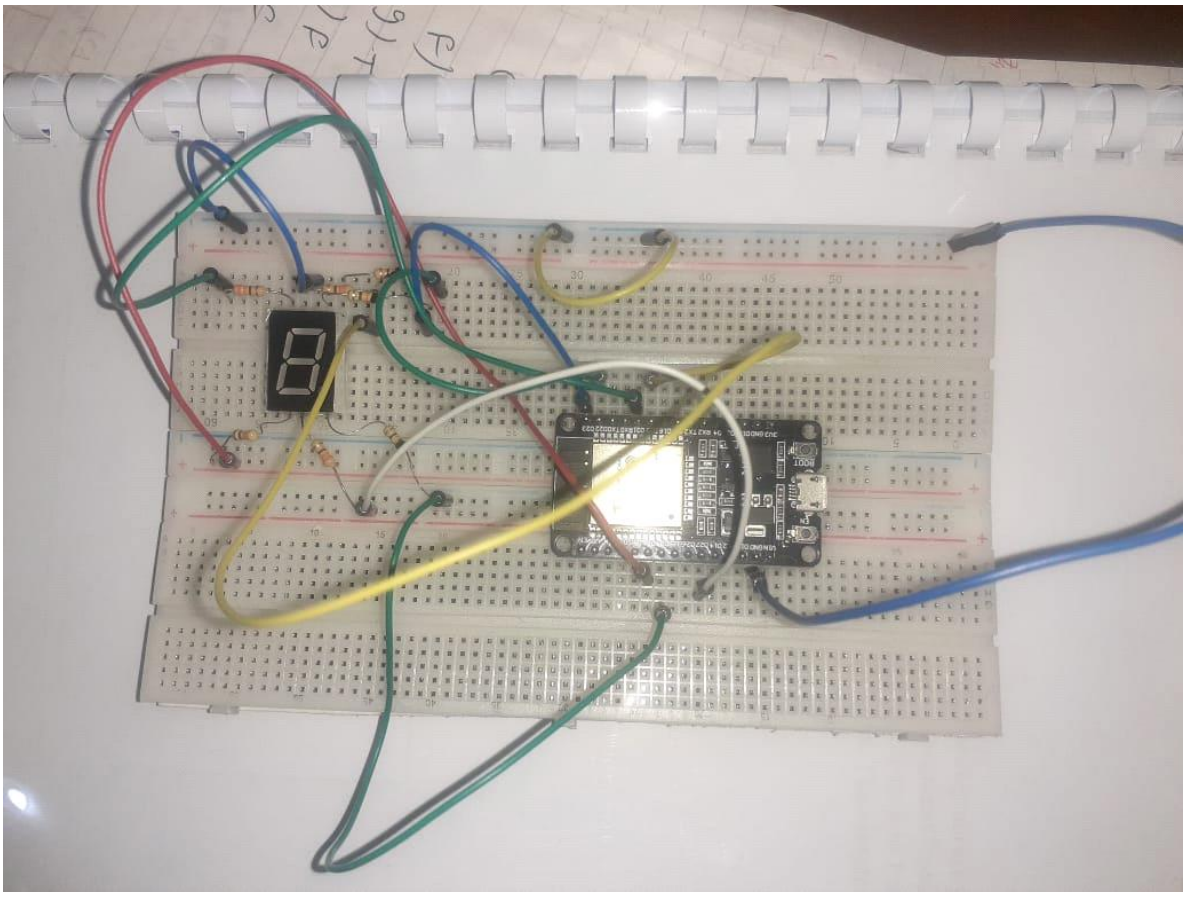
3-Aim of the hardware project.

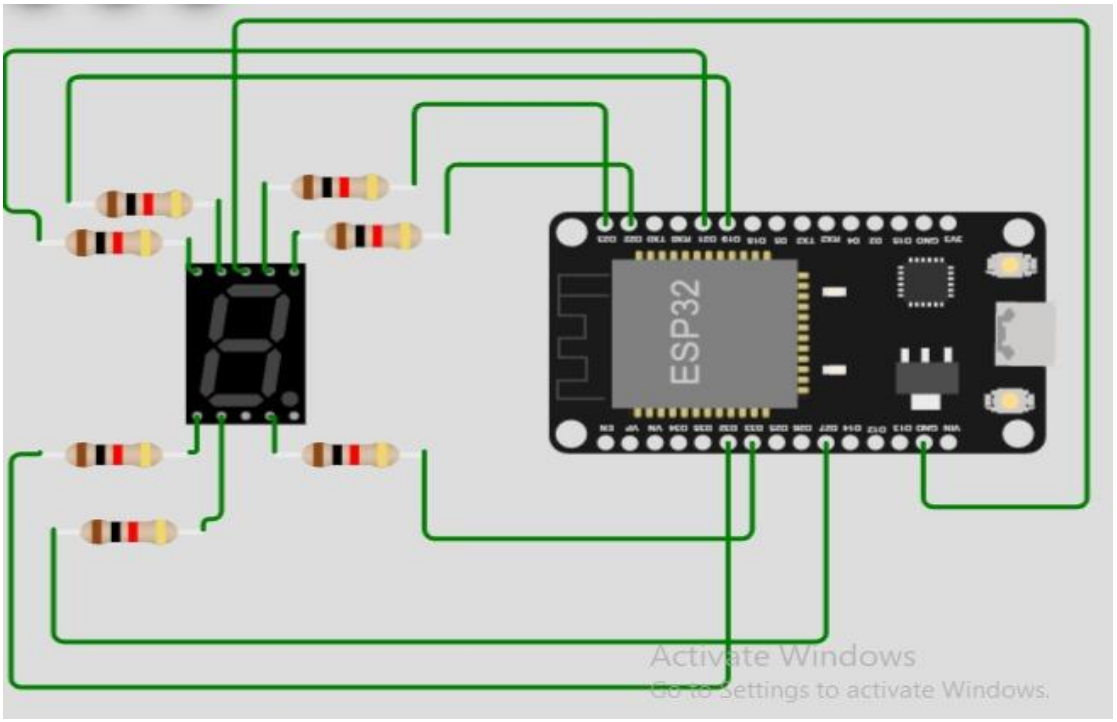
The purpose of the project is to display all the numbers and letters, whether capital or small, on seven segment display by esp32.

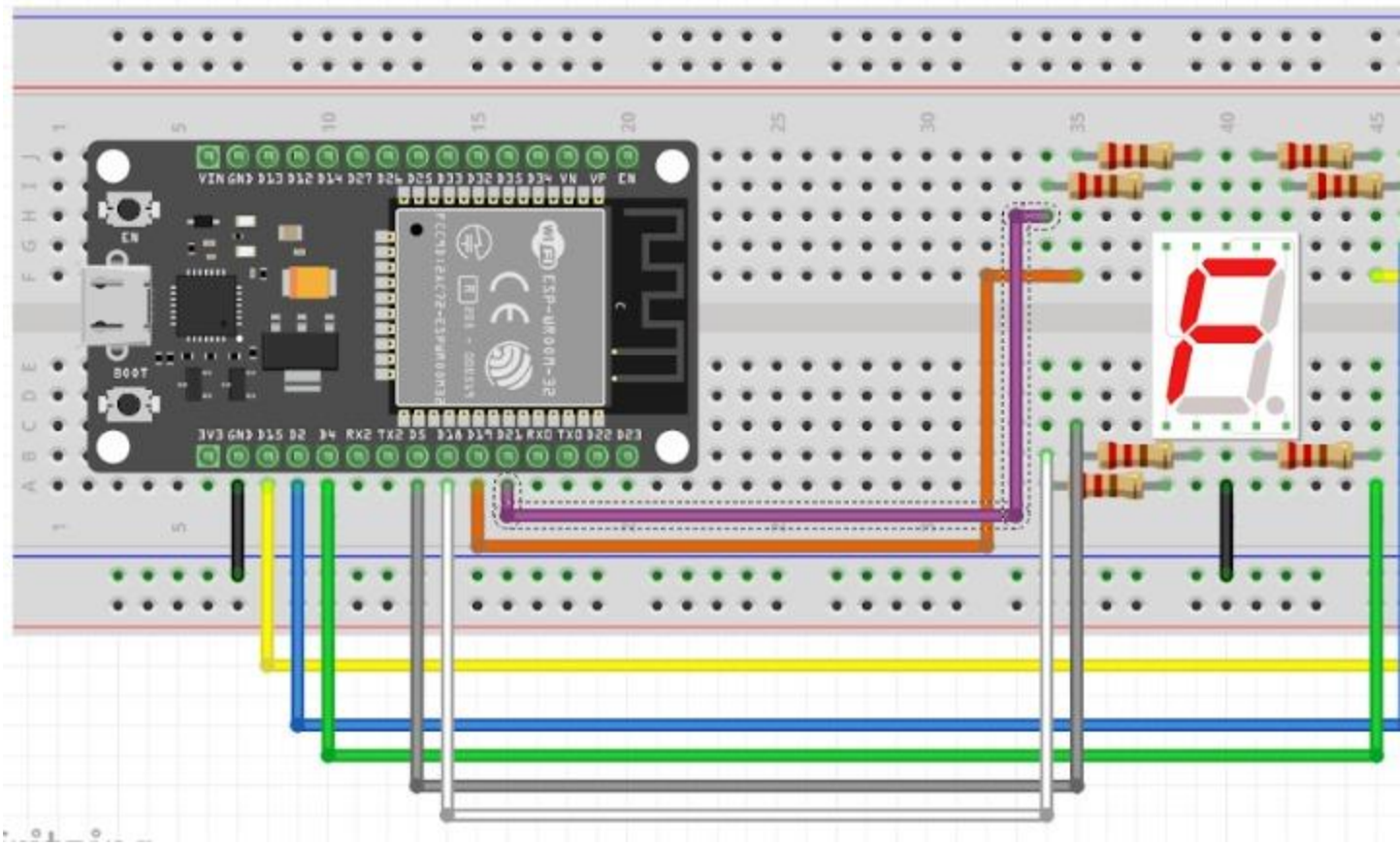
4-List of the used components and the budget of the project.

component	price
Esp32	220 LE
Seven segment display	4LE
2 bread boards and usb cable	80 LE
7 resistors 320 ohm	2 LE
jumpers	1 LE
Total budget = 307 LE	

5-Schematic of the circuit implemented.







6-Procedure to use the circuits

Step 1: connect the Esp32 and 7 segments display on the board.

Step 2: connect the pins of the kit with the 7-segment display as following:

The pin of the seven segments	The pin of ESP32
pin A	Pin 23
Pin B	Pin 22
Pin C	Pin 33
Pin D	Pin 27
Pin E	Pin 32
Pin F	Pin19
Pin G	Pin 21

Step 3: connect com to GND.

Step 4: connect 320-ohm resistor parallel with each pin.

Step 5: connect a usb cable with the Esp 32 to Laptop.

Step 6: upload the code to the kit using Arduino.

Then the seven-segment display is working to show the numbers, small and capital letters.

7-Challenges that face the team and how to overcome them.

Challenges	Solution
connecting the Esp32 with Arduino and upload the code to it.	Download Esp32 on the Arduino and through it choosing Esp_Dev module then choosing port Com7 then connecting the kit with a usb cable and upload the code
Showing 62 elements on the seven segments	We give each element a descriptive code on Arduino
At the beginning, on the seven segments display C, D and E weren't working	We rearranged the elements on the two bread boards to assure that every pin is connected the right way

8-Code

```
byte pin[8] = {23,22,33,27,32,19,21};   //   Seven segment pin is connected to Digital pin 23,22,33,35,18,19,21 to a,b,c,d,e,f,g

char counter[62]={'0','1','2','3','4','5','6','7','8','9',
'a','b','c','d','e','f','g','h','i','j','k','l','m','n','o','p','q','r','s','t','u','v','w','x','y','z',
'A','B','C','D','E','F','G','H','I','J','K','L','M','N','O','P','Q','R','S','T','U','V','W','X','Y','Z'};

const byte count[62] = {  // this is data code for Seven segment
  //GFEDCBA
  B00111111, //0
  B00000110, //1
  B01011011, //2
  B01001111, //3
  B01100110, //4
  B01101101, //5
  B01111101, //6
  B00000111, //7
  B01111111, //8
  B01101111, //9
```

```
B01011111, //a
B01111100, //b
B01011000, //c
B01011110, //d
B01111011, //e
B01110001, //f
B01101111, //g
B01110100, //h
B00000100, //i
B00001110, //j

B01110101, //k
B00110000, //l
B00010100, //m
B01010100, //n
B01011100, //o
B01110011, //p
B01100111, //q
B01010000, //r
B01101101, //s
B01111000, //t

B00011100, //u
B01100010, //v
```

```
B00101010, //w
B01110110, //x
B01101110, //y
B01011011, //z
B01110111, //A
B01111111, //B
B00111001, //C
B00111111, //D

B01111001, //E
B01110001, //F
B00111101, //G
B01110110, //H
B00000110, //I
B00011110, //J
B01111010, //K
B00111000, //L
B00010101, //M
B00110111, //N

B00111111, //O
B01110011, //P
B01101011, //Q
B00110011, //R
```

```
  B01101101, //S
  B00000111, //T
  B00111110, //U
  B01110010, //V
  B01111110, //W
  B01110110, //X

  B01101110, //Y
  B01011011, //Z
};
void setup() {
  pinMode(pin[0], OUTPUT);  // every pin is output
  pinMode(pin[1], OUTPUT);
  pinMode(pin[2], OUTPUT);
  pinMode(pin[3], OUTPUT);
  pinMode(pin[4], OUTPUT);
  pinMode(pin[5], OUTPUT);
  pinMode(pin[6], OUTPUT);
  Serial.begin(9600);
}
 void loop() {
   for(int i = 0; i<62; i++){ // printing the number on seven segment
     SevenSeg(count[i]);
     if (i<=9){
     Serial.print("counter = ");
     Serial.println(i);
     delay(1000);
     }else{
     Serial.print("counter = ");
     Serial.println(counter[i]);
     delay(1000);
   }
   }
 }
 void SevenSeg(byte Bit) { //  sending data on each pin
   for(int i=0; i<8; i++)
   digitalWrite(pin[i],bitRead(Bit,i));
 }
```

9-Output of code.

```
07:14:13.348 -> counter = 0
07:14:14.348 -> counter = 1
07:14:15.349 -> counter = 2
07:14:16.346 -> counter = 3
07:14:17.338 -> counter = 4
07:14:18.341 -> counter = 5
07:14:19.341 -> counter = 6
07:14:20.341 -> counter = 7
07:14:21.341 -> counter = 8
07:14:22.342 -> counter = 9
07:14:23.342 -> counter = a
07:14:24.342 -> counter = b
07:14:25.342 -> counter = c
07:14:26.343 -> counter = d
07:14:27.342 -> counter = e
07:14:28.348 -> counter = f
07:14:29.348 -> counter = g
07:14:30.349 -> counter = h
07:14:31.349 -> counter = i
07:14:32.349 -> counter = j
07:14:33.349 -> counter = k
07:14:34.339 -> counter = l
07:14:35.333 -> counter = m
07:14:36.333 -> counter = n
07:14:37.334 -> counter = o
07:14:38.334 -> counter = p
07:14:39.334 -> counter = q
07:14:40.334 -> counter = r
07:14:41.334 -> counter = s
07:14:42.335 -> counter = t
07:14:43.334 -> counter = u
07:14:44.336 -> counter = v
```

```
07:14:45.336 -> counter = w
07:14:46.346 -> counter = x
07:14:47.346 -> counter = y
07:14:48.336 -> counter = z
07:14:49.336 -> counter = A
07:14:50.337 -> counter = B
07:14:51.337 -> counter = C
07:14:52.337 -> counter = D
07:14:53.329 -> counter = E
07:14:54.329 -> counter = F
07:14:55.330 -> counter = G
07:14:56.330 -> counter = H
07:14:57.330 -> counter = I
07:14:58.330 -> counter = J
07:14:59.331 -> counter = K
07:15:00.331 -> counter = L
07:15:01.331 -> counter = M
07:15:02.331 -> counter = N
07:15:03.332 -> counter = O
07:15:04.332 -> counter = P
07:15:05.332 -> counter = Q
07:15:06.333 -> counter = R
07:15:07.333 -> counter = S
07:15:08.333 -> counter = T
07:15:09.333 -> counter = U
07:15:10.334 -> counter = V
07:15:11.334 -> counter = W
07:15:12.334 -> counter = X
07:15:13.334 -> counter = Y
07:15:14.335 -> counter = Z
```

10-References

- https://esp32io.com/tutorials/communication-between-two-esp32

- https://circuitdigest.com/microcontroller-projects/programming-esp8266-to-display-custom-characters-on-seven-segment-display
- https://drive.google.com/drive/folders/1etjR1SJUaPC4sipO_75fMEtpjy7GjlCr