Question :- 1.
To interface Seven segment with Arduino and write a program to display numbers form 0 to 9 in seven segment

```
#define segA 13
#define segB 12
#define segC 11
#define segD 10
#define segE 9
#define segF 8
#define segG 7

int COUNT=0;

void setup()
{
     for (int i=2;i<9;i++)
     {
         pinMode(i, OUTPUT);
     }
}

void loop()
{
    switch (COUNT)
    {
        case 0:
              digitalWrite(segA, HIGH);
              digitalWrite(segB, HIGH);
              digitalWrite(segC, HIGH);
              digitalWrite(segD, HIGH);
              digitalWrite(segE, HIGH);
              digitalWrite(segF, HIGH);
              digitalWrite(segG, LOW);
              break;

         case 1:
            digitalWrite(segA, LOW);
            digitalWrite(segB, HIGH);
            digitalWrite(segC, HIGH);
            digitalWrite(segD, LOW);
            digitalWrite(segE, LOW);
```

```
    digitalWrite(segF, LOW);
    digitalWrite(segG, LOW);
    break;

case 2:
    digitalWrite(segA, HIGH);
    digitalWrite(segB, HIGH);
    digitalWrite(segC, LOW);
    digitalWrite(segD, HIGH);
    digitalWrite(segE, HIGH);
    digitalWrite(segF, LOW);
    digitalWrite(segG, HIGH);
    break;

case 3:
    digitalWrite(segA, HIGH);
    digitalWrite(segB, HIGH);
    digitalWrite(segC, HIGH);
    digitalWrite(segD, HIGH);
    digitalWrite(segE, LOW);
    digitalWrite(segF, LOW);
    digitalWrite(segG, HIGH);
    break;

 case 4:
    digitalWrite(segA, LOW);
    digitalWrite(segB, HIGH);
    digitalWrite(segC, HIGH);
    digitalWrite(segD, LOW);
    digitalWrite(segE, LOW);
    digitalWrite(segF, HIGH);
    digitalWrite(segG, HIGH);
    break;

 case 5:
    digitalWrite(segA, HIGH);
    digitalWrite(segB, LOW);
    digitalWrite(segC, HIGH);
    digitalWrite(segD, HIGH);
    digitalWrite(segE, LOW);
    digitalWrite(segF, HIGH);
    digitalWrite(segG, HIGH);
```

```
    break;

case 6:
    digitalWrite(segA, HIGH);
    digitalWrite(segB, LOW);
    digitalWrite(segC, HIGH);
    digitalWrite(segD, HIGH);
    digitalWrite(segE, HIGH);
    digitalWrite(segF, HIGH);
    digitalWrite(segG, HIGH);
    break;

case 7:
    digitalWrite(segA, HIGH);
    digitalWrite(segB, HIGH);
    digitalWrite(segC, HIGH);
    digitalWrite(segD, LOW);
    digitalWrite(segE, LOW);
    digitalWrite(segF, LOW);
    digitalWrite(segG, LOW);
    break;

 case 8:
    digitalWrite(segA, HIGH);
    digitalWrite(segB, HIGH);
    digitalWrite(segC, HIGH);
    digitalWrite(segD, HIGH);
    digitalWrite(segE, HIGH);
    digitalWrite(segF, HIGH);
    digitalWrite(segG, HIGH);
    break;

case 9:
    digitalWrite(segA, HIGH);
    digitalWrite(segB, HIGH);
    digitalWrite(segC, HIGH);
    digitalWrite(segD, HIGH);
    digitalWrite(segE, LOW);
    digitalWrite(segF, HIGH);
    digitalWrite(segG, HIGH);
    break;
}
```

```
        if (COUNT<10)
        {
           COUNT++;
           delay(1000);
        }

        if (COUNT==10)
        {
           COUNT=0;
           delay(1000);
        }
}
```

Question :- 2
To interface LCD with Arduino and write a program to Display your name on LCD.

```
/*
 LiquidCrystal Library - Hello World

 Demonstrates the use a 16x2 LCD display.  The LiquidCrystal
 library works with all LCD displays that are compatible with the
 Hitachi HD44780 driver. There are many of them out there, and you
 can usually tell them by the 16-pin interface.

 This sketch prints "Hello World!" to the LCD
 and shows the time.

  The circuit:
 * LCD RS pin to digital pin 12
 * LCD Enable pin to digital pin 11
 * LCD D4 pin to digital pin 5
 * LCD D5 pin to digital pin 4
 * LCD D6 pin to digital pin 3
 * LCD D7 pin to digital pin 2
 * LCD R/W pin to ground
 * LCD VSS pin to ground
 * LCD VCC pin to 5V
 * 10K resistor:
 * ends to +5V and ground
 * wiper to LCD VO pin (pin 3)
*/
```

```
// include the library code:
#include <LiquidCrystal.h>

// initialize the library by associating any needed LCD interface pin
// with the arduino pin number it is connected to
const int rs = 13, en = 12, d4 = 11, d5 = 10, d6 = 9, d7 = 8;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

void setup() {
  // set up the LCD's number of columns and rows:
  lcd.begin(16, 2);
  // Print a message to the LCD.
  lcd.print("Ami");
}

void loop() {
  // set the cursor to column 0, line 1
  // (note: line 1 is the second row, since counting begins with 0):
  lcd.setCursor(0, 1);
  // print the number of seconds since reset:
  lcd.print(millis() / 1000);
}
```

Question :- 3

write a program display your name on LCD and to perform marquee/scroll left and right effect on LCD.

```
// include the library code:
#include <LiquidCrystal.h>

// initialize the library by associating any needed LCD interface pin
// with the arduino pin number it is connected to
const int rs = 13, en = 12, d4 = 11, d5 = 10, d6 = 9, d7 = 8;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

void setup() {
  // set up the LCD's number of columns and rows:
  lcd.begin(16, 2);
  lcd.print("@Ami_Padsala");
  delay(1000);
}
```

```
void loop() {
   for (int positionCounter = 0; positionCounter < 6; positionCounter++) {
   lcd.scrollDisplayLeft();
   delay(150);
  }

  for (int positionCounter = 0; positionCounter < 6; positionCounter++) {
   lcd.scrollDisplayRight();
   delay(150);
  }
  }
  delay(1000);
}
```

Question :- 4

Take only 3 readings of ultrasonic sensor (after trigger) at the intervals of 2 seconds then stop taking further readings. Average the readings and find out if that number // is palindrome number or not. And display the output in LCD.

```
#include <LiquidCrystal.h>

// initialize the library by associating any needed LCD interface pin
// with the arduino pin number it is connected to
#define echoPin 8 // attach pin D2 Arduino to pin Echo of HC-SR04
#define trigPin 7
long duration; // variable for the duration of sound wave travel
int distance;
const int rs = 13, en = 12, d4 = 11, d5 = 10, d6 = 9, d7 = 8;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

void setup() {
  // set up the LCD's number of columns and rows:
  pinMode(trigPin, OUTPUT); // Sets the trigPin as an OUTPUT
  pinMode(echoPin, INPUT); // Sets the echoPin as an INPUT
  Serial.begin(9600); // // Serial Communication is starting with 9600 of baudrate speed
  Serial.println("Ultrasonic Sensor HC-SR04 Test"); // print some text in Serial Monitor
  Serial.println("with Arduino UNO R3");
  lcd.begin(16, 2);
  // Print a message to the LCD.
  lcd.print("Ami Padsala");
  delay(1000);
  ultra();
```

```
}
void ultra(){
  int i=0,sum=0,avg=0,temp,rem,tot=0;
   for(i=0;i<3;i++){
  digitalWrite(trigPin, LOW);
  delay(2000);
  // Sets the trigPin HIGH (ACTIVE) for 10 microseconds
  digitalWrite(trigPin, HIGH);
  delay(2000);
  digitalWrite(trigPin, LOW);
  // Reads the echoPin, returns the sound wave travel time in microseconds
  duration = pulseIn(echoPin, HIGH);
  // Calculating the distance
  distance = duration * 0.034 / 2; // Speed of sound wave divided by 2 (go and back)
  // Displays the distance on the Serial Monitor
  Serial.print("Distance: ");
  Serial.print(distance);
  Serial.println(" cm");
  tot=tot+distance;
}
  avg=tot/3;
  Serial.println(avg);
  int n=avg;
  temp=avg;
  while(n>0)
  {
    rem=n%10;
    sum=(sum*10)+rem;
    n=n/10;
  }
  if(temp==sum)
  {
    Serial.println("palindrome number ");
    lcd.print("palindrome number");
  }
  else
  {
    Serial.println("not palindrome");
    lcd.print("not palindrome number");
  }
}
```

Que:5 Connect ESP with Wifi and print the IP and MAC address of the device.

```
#include <WiFi.h>

const char* WIFI_NAME= "ami";
const char* WIFI_PASSWORD = "ami70692";

//WiFiServer server;
void setup() {
  // put your setup code here, to run once:
Serial.begin(9600);
Serial.println("Connecting to... ");
Serial.println(WIFI_NAME);
WiFi.begin(WIFI_NAME, WIFI_PASSWORD);
while (WiFi.status() != WL_CONNECTED)
 {
  delay(1000);
  Serial.print("Trying to connect to Wifi Network");
}
Serial.println("");
Serial.println("Successfully connected to WiFi network");
Serial.println("IP address: ");
Serial.println(WiFi.localIP());
Serial.println("MAC address: ");
Serial.println(WiFi.macAddress());

//server.begin();
}

void loop() {
  // put your main code here, to run repeatedly:

}
```

Question :- 6

Write a program to communicate client and server through API. Fetch the led status value from database through php API and ON/OFF the LED or ON/OFF the Buzzer as // per status value in a Database.

```
/**
 * BasicHTTPClient.ino
```

```
 *
 *  Created on: 24.05.2015
 *
 */

#include <Arduino.h>

#include <WiFi.h>
#include <WiFiMulti.h>

#include <HTTPClient.h>

//#define Serial Serial

WiFiMulti wifiMulti;
WiFiServer server;
/*
const char* ca = \
"-----BEGIN CERTIFICATE-----\n" \
"MIIEkjCCA3qgAwIBAgIQCgFBQgAAAVOFc2oLheynCDANBgkqhkiG9w0BAQsFADA/\n" \
"MSQwIgYDVQQKExtEaWdpdGFsIFNpZ25hdHVyZSBUcnVzdCBDby4xFzAVBgNVBAMT\n" \
"DkRTVCBSb290IENBIFgzMB4XDTE2MDMxNzE2NDA0NloXDTIxMDMxNzE2NDA0Nlow\n" \
"SjELMAkGA1UEBhMCVVMxFjAUBgNVBAoTDUxldCdzIEVuY3J5cHQxIzAhBgNVBAMT\n" \
"GkxldCdzIEVuY3J5cHQgQXV0aG9yaXR5IFgzMIIBIjANBgkqhkiG9w0BAQEFAAOC\n" \
"AQ8AMIIBCgKCAQEAnNMM8FrlLke3cl03g7NoYzDq1zUmGSXhvb418XCSL7e4S0EF\n" \
"q6meNQhY7LEqxGiHC6PjdeTm86dicbp5gWAf15Gan/PQeGdxyGkOlZHP/uaZ6WA8\n" \
"SMx+yk13EiSdRxta67nsHjcAHJyse6cF6s5K671B5TaYucv9bTyWaN8jKkKQDIZ0\n" \
"Z8h/pZq4UmEUEz9l6YKHy9v6Dlb2honzhT+Xhq+w3Brvaw2VFn3EK6BlspkENnWA\n" \
"a6xK8xuQSXgvopZPKiAlKQTGdMDQMc2PMTiVFrqoM7hD8bEfwzB/onkxEz0tNvjj\n" \
"/PIzark5McWvxI0NHWQWM6r6hCm21AvA2H3DkwIDAQABo4IBfTCCAXkwEgYDVR0T\n" \
"AQH/BAgwBgEB/wIBADAOBgNVHQ8BAf8EBAMCAYYwfwYIKwYBBQUHAQEEczBxMDIG\n" \
"CCsGAQUFBzABhiZodHRwOi8vaXNyZy50cnVzdGlkLm9jc3AuaWRlbnRydXN0LmNv\n" \
"bTA7BggrBgEFBQcwAoYvaHR0cDovL2FwcHMuaWRlbnRydXN0LmNvbS9yb290cy9k\n" \
"c3Ryb290Y2F4My5wN2MwHwYDVR0jBBgwFoAUxKexpHsscfrb4UuQdf/EFWCFiRAw\n" \
"VAYDVR0gBE0wSzAIBgZngQwBAgEwPwYLKwYBBAGC3xMBAQEwMDAuBggrBgEFBQcC\n" \
"ARYiaHR0cDovL2Nwcy5yb290LXgxLmxldHNlbmNyeXB0Lm9yZzA8BgNVHR8ENTAz\n" \
"MDGgL6AthitodHRwOi8vY3JsLmlkZW50cnVzdC5jb20vRFNUUk9PVENBWDNDUkwu\n" \
"Y3JsMB0GA1UdDgQWBBSoSmpjBH3duubRObemRWXv86jsoTANBgkqhkiG9w0BAQsF\n" \
"AAOCAQEA3TPXEfNjWDjdGBX7CVW+dla5cEilaUcne8IkCJLxWh9KEik3JHRRHGJo\n" \
"uM2VcGfl96S8TihRzZvoroed6ti6WqEBmtzw3Wodatg+VyOeph4EYpr/1wXKtx8/\n" \
"wApIvJSwtmVi4MFU5aMqrSDE6ea73Mj2tcMyo5jMd6jmeWUHK8so/joWUoHOUgwu\n" \
"X4Po1QYz+3dszkDqMp4fklxBwXRsW10KXzPMTZ+sOPAveyxindmjkW8lGy+QsRlG\n" \
```

```
"PfZ+G6Z6h7mjem0Y+iWlkYcV4PIWL1iwBi8saCbGS5jN2p8M+X+Q7UNKEkROb3N6\n" \
"KOqkqm57TH2H3eDJAkSnh6/DNFu0Qg==\n" \
"-----END CERTIFICATE-----\n";
*/

void setup() {

   pinMode(2, OUTPUT);

   Serial.begin(9600);

   Serial.println();
   Serial.println();
   Serial.println();

   for(uint8_t t = 4; t > 0; t--) {
      Serial.printf("[SETUP] WAIT %d...\n", t);
      Serial.flush();
      delay(1000);
   }

   wifiMulti.addAP("sagar", "8460863212");
   wifiMulti.run();
    if(wifiMulti.run() == WL_CONNECTED) {
      Serial.println("");
      Serial.println("WiFi connected");
      Serial.println("IP address: ");
      Serial.println(WiFi.localIP());
   }
    server.begin();
}

void loop() {
   // wait for WiFi connection
   if((wifiMulti.run() == WL_CONNECTED)) {

      HTTPClient http;

      Serial.print("[HTTP] begin...\n");

     //HTTP // configure traged server and url
      http.begin("https://mansi0699.000webhostapp.com/public_html/fetch.php?name=led");
```

```
    Serial.print("[HTTP] GET...\n");
    // start connection and send HTTP header
    int httpCode = http.GET();
    Serial.println("httpcode"+ httpCode);
    // httpCode will be negative on error
    if(httpCode > 0) {
      // HTTP header has been send and Server response header has been handled
      Serial.printf("[HTTP] GET... code: %d\n", httpCode);

      // file found at server
      if(httpCode == HTTP_CODE_OK) {
        String payload = http.getString();
        Serial.println(payload);
        if (payload == "1") {
          digitalWrite(2, HIGH);
          Serial.println("LED/Buzzer ON");
        } else if (payload == "0") {
          digitalWrite(2, LOW);
          Serial.println("LED/Buzzer OFF");
        }
      }
```

Question :- 7
Write a program to communicate client and server through API.
Update the led /buzzer status value to database through php API as per LED/Buzzer's ON/OFF state.

```
#include <Arduino.h>
#include <WiFi.h>
#include <WiFiMulti.h>
#include <HTTPClient.h>

#define USE_SERIAL Serial
#define INPUT_PIN 2
#define LED_PIN 4

WiFiMulti wifiMulti;

String lastValue;

void setup() {
```

```
  Serial.begin(115200);

  pinMode(INPUT_PIN,INPUT_PULLUP);
pinMode(LED_PIN,OUTPUT);
  for(uint8_t t = 4; t > 0; t--) {
    Serial.printf("[SETUP] WAIT %d...\n", t);
    Serial.flush();
    delay(1000);
  }

 wifiMulti.addAP("ami", "ami70692");
  wifiMulti.run();
   if(wifiMulti.run() == WL_CONNECTED) {
    Serial.println("");
    Serial.println("WiFi connected");
    Serial.println("IP address: ");
    Serial.println(WiFi.localIP());
  }
  // server.begin();
  lastValue = "0";
}

void loop() {
  // wait for WiFi connection
  if((wifiMulti.run() == WL_CONNECTED)) {
    String webUrl;
    if(digitalRead(INPUT_PIN)==LOW)
    {
     digitalWrite(LED_PIN,HIGH);
     //digitalWrite(BUZZ_PIN,HIGH);
    }
    else
    {
     digitalWrite(LED_PIN,LOW);
    // digitalWrite(BUZZ_PIN,LOW);

    }

    if (digitalRead(LED_PIN) == HIGH) {
     if (lastValue == "0") {
            webUrl =
"https://ami0699.000webhostapp.com/public_html/update.php?name=led&status=1";
```

```
          updateServer(webUrl);
          lastValue = "1";
         }
        } else {
         if (lastValue == "1") {
          webUrl = "https://ami0699.000webhostapp.com/public_html/update.php?name=led&status=0";
          updateServer(webUrl);
          lastValue = "0";
         }
        }
    }
    delay(100);
}


void updateServer(String webUrl) {
  HTTPClient http;
  Serial.print("[HTTP] begin...\n");
  // configure traged server and url
  http.begin(webUrl); //HTTP

  Serial.print("[HTTP] GET...\n");
  // start connection and send HTTP header
  int httpCode = http.GET();

  // httpCode will be negative on error
  if(httpCode > 0) {
     // HTTP header has been send and Server response header has been handled
     Serial.printf("[HTTP] GET... code: %d\n", httpCode);

     // file found at server
     if(httpCode == HTTP_CODE_OK) {
        String payload = http.getString();
        Serial.println(payload);
     }
  } else {
     Serial.printf("[HTTP] GET... failed, error: %s\n", http.errorToString(httpCode).c_str());
  }

  http.end();
}
```