Microcontrollers Mini project

Dam Gate Control System

NAME:	SANCHIT PATIL AND ANKIT PRASAD
UID:	2021200089 & 2021200097
CLASS:	SY BTECH EXTC-B

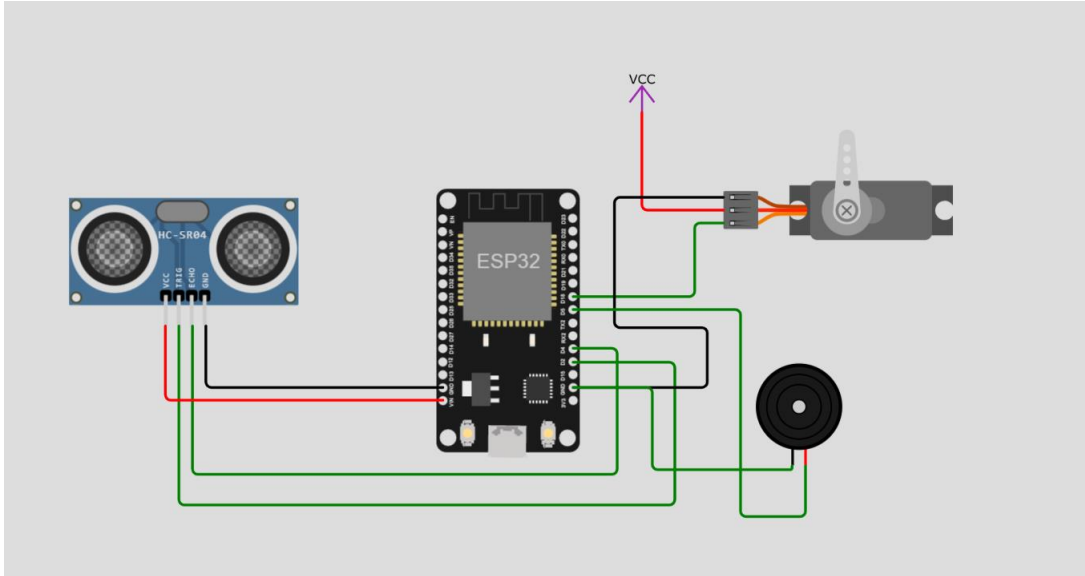| **AIM:**	To interface Ultrasonic sensor and control the dam gate using servo motor
SOFTWARE USED:	Arduino IDE
CIRCUIT DIAGRAM:	

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PROCEDURE:	1) Have all the hardware plus software requirements ready. 2) Make the circuit as given above 3) Connect the PC with ESP-32 using USB cable 4) Open Arduino IDE 5) Select the port and device (microcontroller properly) 6) Select the baud rate as 9600 7) Start writing code 8) Make pin 2 and pin 4 as trig and echo pin respectively 9) Write code to take readings from ultrasonic sensor 10) Do calculation based on ultrasonic sensor to find the distance 11) If distance<25 cm then turn motor by 120 degrees and turn on buzzer 12) If distance<50 but >25 the turn by 90 degrees 13) If distance<75 but >50 the turn by 60 degrees 14) If distance<100 but >75 the turn by 30 degrees 15) Else turn by 0 degrees 16) Now, compile the code and click on the upload 17) Use serial monitor to find
CODE :	(see code below)

```cpp
#include <ESP32Servo.h>

const int buzzer = 5;
const int triggerPin = 2;
const int echoPin = 4;
int safe_lim = 100;
int danger_limit1 = 75;
int danger_limit2 = 50;
int danger_limit3 = 25;
int flag = 2;
long duration, distance;

Servo myservo;

void setup()
{
  Serial.begin(9600);
  pinMode(triggerPin, OUTPUT);
  pinMode(buzzer, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(LED_BUILTIN, OUTPUT);
  myservo.attach(18); // attach servo to pin 18
}

void loop()
```

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```cpp
{
  digitalWrite(buzzer, LOW);
  digitalWrite(triggerPin, LOW);
  delayMicroseconds(2);
  digitalWrite(triggerPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(triggerPin, LOW);

  duration = pulseIn(echoPin, HIGH);

  distance = duration / 58.2;

  if(distance>safe_lim)
  {
    myservo.write(0);
  }
  else if(distance<safe_lim && distance>danger_limit1)
  {
    myservo.write(30);
  }
  else if(distance<danger_limit1 && distance>danger_limit2)
  {
    myservo.write(60);
  }
  else if(distance<danger_limit2 && distance>danger_limit3)
  {
    myservo.write(90);
  }
  else
  {
    myservo.write(120);
    digitalWrite(LED_BUILTIN, HIGH);
    digitalWrite(buzzer, HIGH);
  }
  Serial.print("Distance: ");
  Serial.print(distance);
  Serial.print(" cm \n");
  delay(2000);
  digitalWrite(buzzer, LOW);

}
```
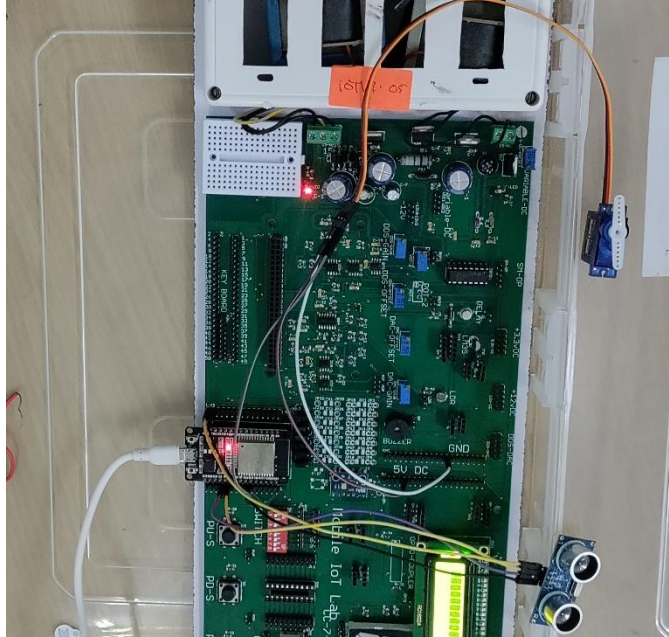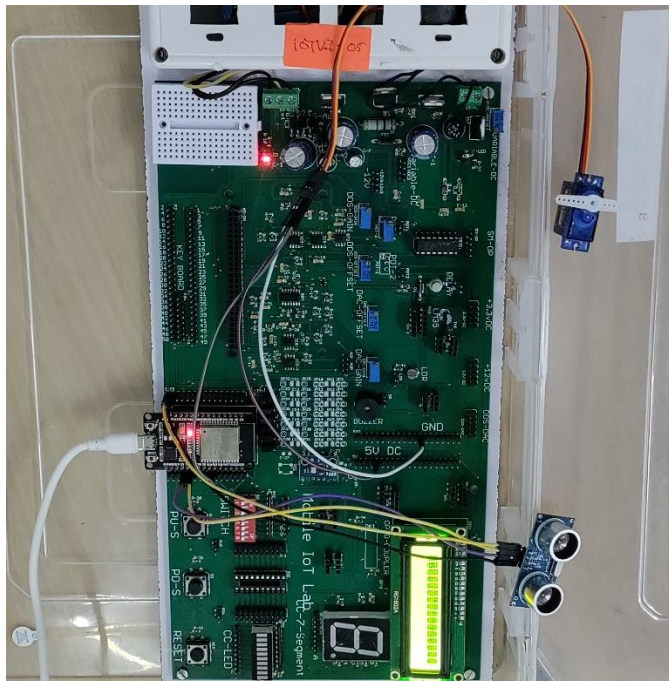
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RESULT:	1) Motor turning of 0 degrees : 2) Motor turning of 90 degrees

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CONCLUSION:	1) The project of "Dam Gate Control System" was successful in controlling the dam gate according to the water level measured using ultrasonic sensor. 2) To Control Dam gate I have used servo motor to show its working. 3) We have used 5 angles : 0, 30, 60, 90 and 120 degrees to control the gate opening or closing according to the calculated water level. 4) We also got to learn features of ESP 32 and learned to write code using Arduino IDE 5) ESP 32 is a very convenient to use and cheap micro controller 6) Arduino IDE is also convenient to use controller
REFERENCES :	1. Steve, Dave, A. Basel, R. McCleery, S. Santos, Riley, Alvaro, martinius96, J. Dietrich, D. Craig, Purps, M. Suyi, Morgan, E. Peña, W. Sobczak, and Mathéo, "ESP32 with HC-SR04 ultrasonic sensor with Arduino Ide," *Random Nerd Tutorials*, 27-Jul-2021. [Online]. Available: https://randomnerdtutorials.com/esp32-hc-sr04-ultrasonic-arduino/. [Accessed: 29-Apr-2023]. 2. F. D'monte, Usashirou, R. Santos, Mohamed, Jamal, Alan, S. Santos, R. D. Marbury, MHz000, Antonio, F. Guzman, Swanandi, N. S, Reza, J. Oksanen, Brian, Don, Francisco, V. Velasco, J. Alvarez, R. kh, Ashrin, Winston, Steve, Richard, V. P, Sergiu, James, Rubén, Malcolm, S. Ludwig, T. M., nerd32, Cb, G. S. Rathore, S. B, Sam, Gavin, Ibrahim, George, Gucce, Gucce, Chisom, Shams, Chisom, A. O, V. Medeiros, Andreas, J. Claassen, Jarosław, A. Kerwer, Nuno, and S. SJ, "ESP32 servo motor web server with Arduino Ide," *Random Nerd Tutorials*, 02-Apr-2019. [Online]. Available: https://randomnerdtutorials.com/esp32-servo-motor-web-server-arduino-ide/. [Accessed: 29-Apr-2023]. 3. "Microcontroller based DAM Gate Control System - ijsdr.org." [Online]. Available: https://www.ijsdr.org/papers/IJSDR1605121.pdf. [Accessed: 29-Apr-2023].