**Shri G. S. Institute of Technology & Science, Indore**

**Department of Computer Engineering**

**Lab Assignment**

**Subject**: Internet of Things

**Class:** BTech III Year

**Session:** Jan-June 2021

***Important Instructions:***

*1. Execute these programs on ESP32 board or any other online simulator like Tinkercad with available boards.*

*2. Write the answer of these questions in the sessional pages, to display the output you can include the screenshots of your experiment.*

1. Write a detailed description of ESP32 board including Pin Diagram, Processor & Memory description, Information about the inbuilt sensors etc.
2. Write a program for inbuilt LED blinking, try it at different delays. Also write the detailed description of the inbuilt functions you have used in this program.
3. Write a program to read the value of inbuilt temperature sensor, check the temperature in different environment, if the temperature is same in different environment, then why it is so? Also write the detailed description of the inbuilt functions you have used in this program.
4. Write a program to read the value of the hall effect sensor, and display it at serial monitor and show the variations in the value of hall effect sensor when a magnet comes into its magnetic field on the serial plotter. Also write the detailed description of the inbuilt functions you have used in this program.
5. Write a program to read the value of all the touch pins, connect a jumper wire on the specified pin and when one end of the jumper wire is touched, the inbuilt led should be ON otherwise it should be OFF. Also write the detailed description of the inbuilt functions you have used in this program.
6. Connect an external LED to the board which is available, Write a program to blink this LED in Red, Green, Blue order with some delay in between and then vice versa. Draw the PIN connections and also write the detailed description of the inbuilt functions you have used in this program.
7. Connect the LCD display unit with the ESP32 board and Write a program to display your name as a text on the LCD display unit and also on the serial monitor. After this move the text in backward and forward direction.
8. Connect the Servo Motor with the ESP32 board, and write a program to move the shaft of the servo motor from 0 to 180 and vice versa.
9. Connect the DC Motor with the ESP32 board, and write a program to spin the DC motor. Also write the program to control the speed of the DC and to control the direction of the spin of DC motor.
10. Connect the temperature sensor with the ESP32 board and display the value of temperature on the serial monitor.
11. Connect the PIR sensor with the ESP32 board. Write a program to Turn ON the inbuilt LED when a motion is detected by the PIR sensor and Turn OFF the inbuilt LED in case of No motion.
12. Connect the Ultra sonic sensor and Piezo with the ESP32 board. Write a program to detect the object using this sensor, when an object is detected in a certain area, the Piezo alarm should rings.
13. Connect the temperature sensor and Piezo with the ESP32 board and ON the buzzer when the temperature increases by a certain threshold.
14. Connect the LDR sensor with the ESP32 board and On/OFF the LED by measuring the light intensity. i.e. if the light density is low the LED should be ON and vice versa.
15. Interface the LCD, 4 X 4 Keypad and ESP board. When a key is pressed its value should be displayed on LCD.
16. Write a program to connect the ESP32 board to your smartphone using Bluetooth, and turn the inbuilt LED ON and OFF using Bluetooth Terminal App.
17. Write a program to connect the ESP32 board with the Wi-Fi network. Display the connection information on the serial monitor.
18. Connect the ESP32 board with the available Wi-Fi or hotspot. Download and install the Blynk App in your smartphone and create the project of LED On and OFF using the Blynk app.
19. Create the account on ThingSpeak Cloud Platform and send the readings of temperature sensor to the ThingSpeak Cloud Platform and display the reading in the form of graph.
20. Interface the LDR, LED & ESP and connect the ESP with available wi-fi connection. Transfer the value of the LDR to the cloud if the value of the LDR is crossed to a certain threshold then ON the LED using the Blynk app.