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Aim :- Design and implement basic embedded circuits.

- i) Automatic Alarm System - Alarm should get trigger by sensor.
- ii) Timer based buzzer
- iii) Sensor Based Counting device.

Background Information :-

A) Automatic Alarm System :-

- 1. Alarm Sensors are devices that detect events that are not part of the normal working environment and that send signals to the alarm panel for processing.
- 2. In a closed-circuit system, the electric circuit is closed when the door is shut.
This means that as long as the door is closed electricity can flow from one end of the circuit to the other.
- 3. But if somebody opens the door, the circuit is opened, and electricity can't flow. This triggers an alarm.

B) Time Based Buzzer :-

- 1. Time based buzzers are usually used in alarms. An audio signaling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type.
- 2. The main function of this is to convert the signal



From audio to sound.

3. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc.

c) Sensor Based Counting Device :

1. In order to count anything, we need to detect it first.
2. This usually means some kind of sensor.
The sensor used will typically provide a signal that our counter can read.
3. Most such sensors actually functions as a type of switch because their output terminals are closing a circuit on the counter electronics that causes a count to increment.

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Aim :- Demonstrate communication between two embedded devices using UART port.

Background Information :-

1. Embedded Systems, microcontrollers, and computers mostly use UART as a form of device-to-device hardware communication protocol.
2. Among the available communication protocols, UART uses only two wires for its transmitting and receiving ends.
3. UART is a hardware communication protocol that uses asynchronous serial communication with configurable speed.
4. Asynchronous means there is no clock signal to synchronize the output bits from the transmitting devices going to the receiving end.

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Aim :- Built an IOT System to send ticket before entering the bus.

Background Information :-

1. A Ticketing System based on RFID (Radio-Frequency Identification) technology which is far better than traditional ticketing system.
2. It works on RFID technology in which passenger have a RFID tag when passenger gets in.
3. RFID contains unique ID and related Data, RFID readers placed in the vehicle to detect that tag.
4. Reader collects the data from the RFID tag and pass it to the computing Device.
5. This computing device with the help of GPS module record the location and with the help of GISM module accesses the database.
6. After the passenger gets off the vehicle the computing device calculates the fare as per the distance travelled by the passenger and deduct the corresponding amount from the account.

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Aim :- Demonstrate an IoT based game which can be played between two player who are physically at a considerable distance.

Background Information :-

- How IoT gaming works - We can connect your gaming device, say a console, desktop, laptop, smartphone or tablet to a friend's gaming device via IoT and continue to play games with him/her at any time and from anywhere.
1. The devices have chips and sensors that are used to connect to other devices via the internet.
 2. The sensors in the devices collect data and transmit it to the cloud platform through a secure gateway.
 3. The collected data of users' experiences is then analyzed to help developers and manufacturers keep track of the online gaming activities, make improvement to the games, and also penetrate other aspects of a gamer's life to bring about a wholesome effect.

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Aim :- Develop a IOT application which will record the movement and orientation of your phone and give the data back to the PC.

Background Information :-

1. IOT devices share the sensor data they collect by connecting to an IOT gateway or other edge device where data is either sent to the cloud to be analyzed or analyzed locally.
2. Sometimes, these devices communicate with other related devices and act on the information they get from one another.

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Aim :- Develop an IOT application that will raise an alarm whenever it is going to rain outside based on the weather prediction data.

Background Information :-

1. System uses sensors to monitor and adjust environmental parameters such as temperature, CO levels, and relative humidity.
2. Then, it sends the data to a web page to plot the sensor data, shown as graphical statistics.
3. To detect pressure, modern weather stations use either a piezoelectric sensor or a diaphragm sensor.
4. In the piezoelectric sensor model, a change in pressure against piezoelectric material generates a small voltage.
5. This voltage calibrated against pressure for the measurement.

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Aim :- Deploy an IOT application which will alert you by beeping or vibrating your phone whenever you get someone call your name.

Background Information :-

1. An IOT Vibration Sensor is designed to read vibration data and send it to a Cloud, user Interface , or Local Server(s) for analysis.
2. Vibration Sensors are also capable of local processing and then sending process data to a cloud Services.
3. This vibration data can be used for daily monitoring and also to send automatic alerts, and notify for early fault detection.
4. Generally, IoT sensors are battery powered, but they can be powered with an external power supply as well.
5. In order to make sound, you basically have to vibrate a surface.
6. Artificial sounds are typically produced using one of two devices - a cone and magnetic coil speaker, which amplifies the sound from a magnetic or a piezoelectric speaker, made with spatial material that change shape when exposed to an electric current.

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Aim :- Develop an IOT application for monitoring water levels in tanks and automatically start the motor to fill the tank if the level goes below the critical level.

Background Information :-

1. IOT -based water level monitoring provides automatic detection of liquid levels from differently sized tanks or storage containers.
2. It is a state-of-the-art system specially designed to inform the users about the real status of the liquid levels.
3. It is meticulously designed to benefit the industrialists with IOT technology and improve the overall business productivity.
4. IOT-based water level monitoring provides real-time autonomous detection of water levels and takes appropriate action based on the levels including overfilling, water depletion, and water provides an effective solution to water-related challenges.

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Aim :- Develop an IoT module to which measure the intensity of light and send the same to your PC / Phone.

Background Information :-

Smart devices was developed to measure Intensity of Light and Temperature using LDR and LM₃₅ IC Sensor.

- 1. The principle is when light fall on the sensor, it changes the resistance of sensor changes which is then converted to change in voltage.
- 2. The ADC pins on Bolt Wi-fi module convert this analog voltage levels to digital values.
- 3. LM₃₅ is the sensor which senses the temperature of environment and based on its value it generated analog output voltage.
- 4. This analog voltage by the LM₃₅ is then given as input to Bolt A0 pin.
- 5. The Bolt then converts the analog value to a 10 bit digital value that varies from 0 to 1023.
- 6. This digital data is sent to the cloud through Bolt device.



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Aim :- Develop an IOT application for Motion detection.

Background Information :-

1. A motion sensor (or motion detector) is an electronic device that is designed to detect and measure movement.
2. Motion sensors are used primarily in home, office and business security system, but they can also be found in phones, paper towel dispensers, game consoles and virtual reality system.
3. Active ultrasonic sensors and passive infrared sensors are the two most common motion sensor technologies, both of which are known for their accuracy and reliability.