Assignment 10

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Make a presentation and explain these concepts

1. Master/slave receiver
2. Explain the two use cases of IOT

[Data Sharing Between Two Arduino Boards: In this use case, two Arduino boards are programmed to communicate with each other in a Master Writer/Slave Receiver configuration via the I2C synchronous serial protocol1](https://wiki-content.arduino.cc/en/Tutorial/LibraryExamples/MasterWriter/). [The Master Arduino is programmed to send 6 bytes of data every half second to a uniquely addressed Slave1](https://wiki-content.arduino.cc/en/Tutorial/LibraryExamples/MasterWriter/). Once that message is received, it can then be viewed in the Slave board’s serial monitor window opened on the USB-connected computer running the Arduino Software.

[Controlling Multiple Devices: This configuration can also be used to control multiple devices using just two pins of your microcontroller1](https://wiki-content.arduino.cc/en/Tutorial/LibraryExamples/MasterWriter/). Each device has its own unique address and both master and slave devices need to take turns communicating over the same data line1. [This allows your Arduino boards to communicate with many devices or other boards](https://wiki-content.arduino.cc/en/Tutorial/LibraryExamples/MasterWriter/)

* Smart Homes
  + Thermostats that adjust the temperature automatically
  + Lights that turn on/off based on occupancy or time

The master Arduino in this use case is connected to various sensors and actuators around the house, such as motion sensors, temperature sensors, and lights. The master Arduino collects data from these sensors and sends commands to the slave Arduino, which controls the actuators accordingly. For example, if the motion sensor detects movement, the master Arduino can send a command to the slave Arduino to turn on the lights in that room. This setup allows for a smart and automated home environment.

* Industrial Automation
  + Machines that monitor and optimize production processes
  + Sensors that detect equipment failures and trigger maintenance alerts

The master Arduino collects data from these sensors in real-time.

The master Arduino analyzes this data to monitor and optimize production processes. For example, it can adjust machine settings based on the sensor readings to improve efficiency and reduce downtime.

If any sensor detects an equipment failure or anomaly, the master Arduino sends a signal to the slave Arduino, which is connected to an alert system.

The slave Arduino triggers maintenance alerts such as sounding an alarm, sending notifications to operators, or even shutting down the equipment to prevent further damage.

Maintenance personnel can then respond promptly to the alerts, addressing the issue before it leads to a breakdown or disruption in the production process.

1. Explain the Arduino family
2. Explain briefly 10 elements that can be used and their functionality
3. Microcontroller: Acts as the brain of the system, controlling all the components and processes.
4. Sensors: Detect physical parameters such as temperature, humidity, light, motion, etc.
5. Actuators: Convert electrical signals into physical actions, such as motors, solenoids, or relays.
6. Relays: Used to switch high voltage or high current devices on and off.
7. LCD Display: Provides visual feedback on the system's status and data.
8. Keypad: Allows users to input data or commands into the system.
9. Encoder: Measures the position or rotation of a mechanical component.
10. RTC(Real−TimeClock): Keeps track of time for scheduling tasks or events.
11. EthernetModule: Enables communication with other devices or networks.
12. WirelessModule: Allows for wireless communication with other devices or systems.