Write an Arduino Program of a LED light blinking

```
const int LED = 13; // LED connected to digital pin 13


void setup()
{
pinMode(LED, OUTPUT); // sets the digital pin as output
}


void loop()
{
digitalWrite(LED, HIGH); // turns the LED on
delay(1000); // waits for a second
digitalWrite(LED, LOW); // turns the LED off
delay(1000); // waits for a second
}
```

Program explanation:

- Turns pin 13 into an output (just once at the beginning)
- Enters a loop
- Switches on the LED connected to pin 13
- Waits for a second
- Switches off the LED connected to pin 13
- Waits for a second
- Goes back to beginning of the loop

What are the different types of sensors and actuators?

Sensors:

A sensor is a device that detects physical phenomena in its environment, such as temperature, pressure, or motion, and converts this information into an electrical signal.

Sensors are essential components in electronic systems and play a key role in monitoring, controlling, and providing data for various applications.

Sensor Classification:

1. Passive vs. Active Sensors:
   - o Passive Sensors: Do not require an external power source to measure. Example: A light sensor.
   - o Active Sensors: Require external power to work, and they emit signals and measure the response. Example: An ultrasonic sensor.
2. Analog vs. Digital Sensors:
   - o Analog Sensors: Produce continuous signals that are proportional to the measured phenomenon.
   - o Digital Sensors: Produce discrete binary signals (0s and 1s) based on the measurement.

Common Types of Sensors:

1. Temperature Sensors: Measure heat energy to detect temperature changes.
2. Humidity Sensors: Measure the amount of water vapor in the air.
3. Pressure Sensors: Detect changes in the pressure of gases or liquids.
4. Proximity Sensors: Detect objects near the sensor without physical contact (e.g., used in parking sensors).
5. Level Sensors: Detect the level of substances like liquids or powders.
6. Gyroscopes: Measure rotational speed and angular velocity.

7. Gas Sensors: Detect the presence of gases (e.g., CO2 or hazardous gases).
8. Optical Sensors: Convert light into electrical signals for use in various applications like automotive or medical devices.

Actuators:
An actuator is a device that converts control signals (often from sensors) into mechanical movement or action. Actuators are essential in systems where physical movement or control is required, and they respond to input signals generated by sensors or controllers.
Working Principle:
 Sensors detect environmental changes and send data to a controller.
 The controller processes the data and sends commands to the actuator.
 The actuator uses energy to perform a mechanical action (linear, rotary, etc.).
Types of Actuators:
1. Hydraulic Actuators: Use pressurized fluid to create motion (linear or rotary). They are often used in heavy machinery, such as construction equipment, due to their ability to generate significant force.
2. Pneumatic Actuators: Use compressed air or vacuum to generate motion. They are common in robotics and automotive systems (e.g., pneumatic brakes).
3. Electrical Actuators: Convert electrical energy into mechanical motion using motors. An example is an electric motor used in solenoid valves to control fluid flow.
4. Thermal/Magnetic Actuators: Respond to temperature changes or magnetic fields to generate movement, such as in temperature-sensitive applications.
5. Mechanical Actuators: Use mechanical devices like gears and pulleys to convert rotary motion into linear motion, often seen in traditional machinery.