**Project-2: Artificial Plant Growing System**

**Introduction**

The **Artificial Plant Growing System** is an automated system for monitoring soil moisture and ambient light levels in controlled plant growth environments like greenhouses etc., It utilizes sensors to detect environmental conditions and controls a water pump and grow light accordingly. The system provides real-time feedback through an LCD display, informing users of the current status and actions being taken.

**Components Required**

* Arduino Uno
* **Sensors**:

Soil Moisture Sensor (Analog Input - A1)

Light Sensor (Analog Input - A0)

* **Output Devices (Actuators)**:

Water Pump (Digital Output - Pin 2)

Grow Light (Digital Output - Pin 3)

* **Display**

LCD 16x2 with I2C Module

* **Other**:

Wires and Breadboard

**System Functionality:**

The system operates by continuously monitoring the soil moisture and ambient light levels. Based on the sensor readings, it takes necessary actions to maintain optimal conditions for plant growth. The functionality is divided into four primary conditions:

**1 Low Water & Low Sunlight**

* The LCD displays a warning: "LESS WATER..." and "LESS SUNLIGHT...".
* The water pump is activated to irrigate the soil.
* The grow light is turned on to compensate for low sunlight.
* Once the soil moisture level reaches an optimal value (above 400), the water pump is turned off.
* If ambient light improves (above 300), the grow light is turned off.

**2 Low Water but Sufficient Sunlight**

* The LCD displays "LESS WATER..." and "OPTIMUM SUNLIGHT".
* The system activates the water pump to irrigate the soil.
* The grow light remains off since natural sunlight is adequate.
* Once the soil moisture reaches optimal levels, the pump is turned off.

**3 Sufficient Water but Low Sunlight**

* The LCD displays "OPTIMUM WATER.." and "LESS SUNLIGHT...".
* The system turns on the grow light to provide artificial light.
* The water pump remains off since the soil moisture is sufficient.
* If sunlight improves, the grow light is turned off automatically.

**4 Optimal Conditions**

* The LCD displays "Conditions OK" and "No Action Needed".
* The system keeps both the water pump and grow light turned off.
* No further action is taken until conditions change.

**Conclusion:**

TheArtificial Plant Growing Systemprovides an automated, real-time solution for maintaining plant health. By integrating simple sensors and actuators with an Arduino, users can ensure optimal growth conditions with minimal effort. Future enhancements could include remote monitoring and more advanced data analytics for improved plant care.