Assignment-3

**Basic Structure of an Arduino Program**

Arduino programming involves writing code to control or interact with external hardware using an Arduino microcontroller. The programming language used is based on C/C++. The structure of an Arduino program is straightforward and consists of two essential functions: setup() and loop().

* **setup() Function**:
  + **Purpose**: This function is executed once when the Arduino board is powered on or reset. It is used to initialize settings and prepare the board to run the main program.
  + **Typical Uses**:
    - **Setting pinMode**: Specifies whether a pin will be used as an input (to read data) or an output (to send data). For example, if you have an LED connected to pin 13, you would configure pin 13 as an output.
    - **Initializing Serial Communication**: Opens a communication channel between the Arduino and a computer or another device, allowing data to be sent and received.
* **loop() Function**:
  + **Purpose**: After the setup() function has run, the loop() function is called repeatedly, forming the main part of the program. It contains the logic that the Arduino will execute over and over.
  + **Typical Uses**:
    - **Reading sensor data**: Continuously monitor sensors and process the data.
    - **Controlling actuators**: Turn LEDs on/off, control motors, or activate relays.
    - **Decision-making**: Implementing conditions and actions based on input (e.g., if a button is pressed, then turn on an LED).

**Example Structure of an Arduino Program**

void setup() {

// Initialization code, runs once

pinMode(13, OUTPUT); // Set pin 13 as an output

Serial.begin(9600); // Start serial communication at 9600 baud

}

void loop() {

// Main code, runs repeatedly

digitalWrite (13, HIGH); // Turn on the LED

delay (1000); // Wait for 1 second

digitalWrite (13, LOW); // Turn off the LED

delay (1000) ; // Wait for 1 second

}

**Key Points**

* **setup() is for preparation**: Runs once to set up the hardware and initialize settings.
* **loop() is for execution**: Runs continuously, carrying out the core functionality of the program.
* Both functions are mandatory for the Arduino program to work correctly.

This structure simplifies the process of programming microcontrollers and allows you to focus on the logic and functionality of your project.

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