LAB TASKS

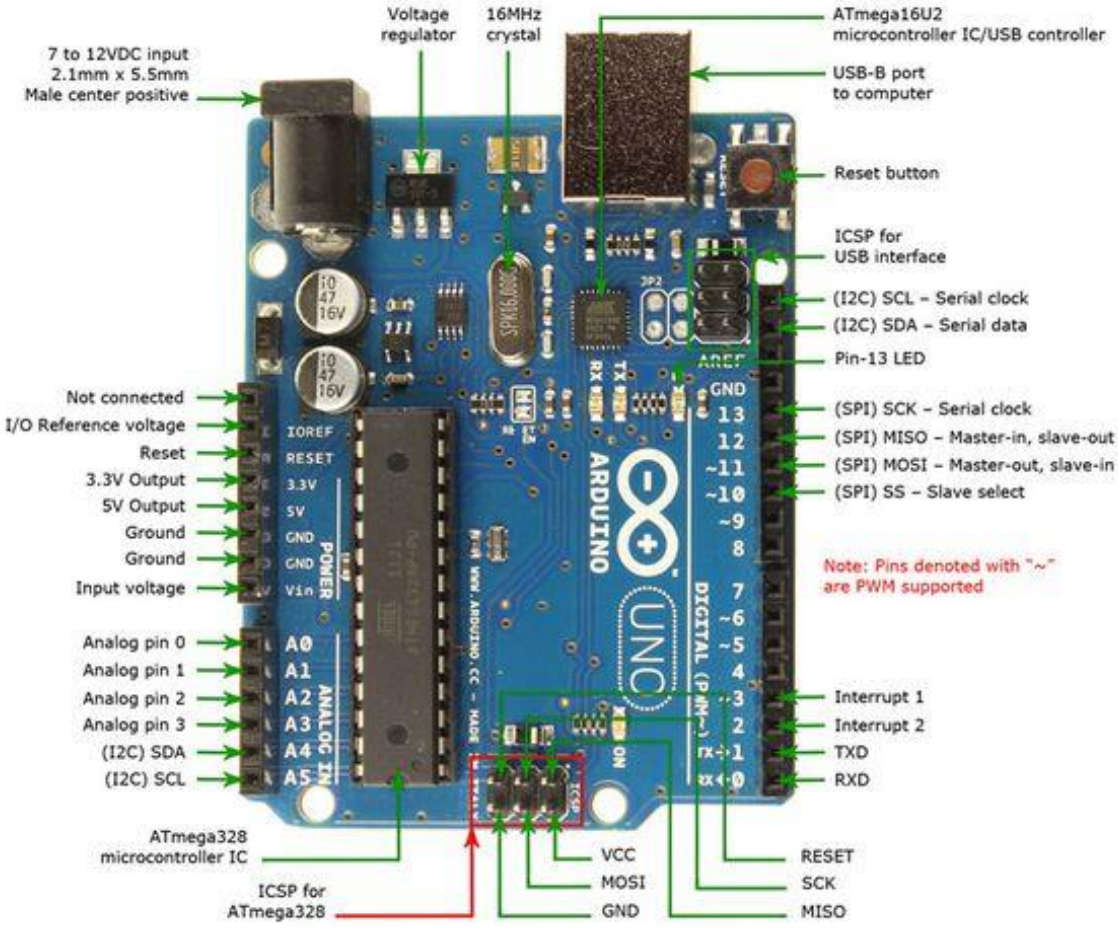
Q1: What is the difference between microcontroller and development board?

A microcontroller is a compact IC responsible for controlling functions within a system. Whereas, a development board, like the Arduino UNO, is a complete platform that includes a microcontroller and additional components such as input/output ports, voltage regulators, and other electronics.

Q2: List different ports of Arduino UNO and explain their usage.

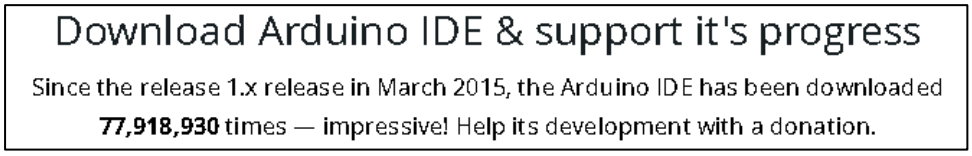
The Arduino UNO provides a range of ports and connectors for connecting sensors, actuators, and other various devices. Here's a summary of some key ports and their typical uses:

1. USB-B Port: It is used to upload code onto your Arduino UNO development board. It also provides power to the board when it's connected to your computer.
2. Power Ports: These ports provide regulated 3.3V and 5V output that can be used to power external components and sensors. There are 2 Ground (GND) ports and an Input Voltage (Vin) port also included.
3. Analog In Pins (A0-A5): These pins are used to read analog outputs in the form of voltages from various sensors.
4. Digital I/O Pins (D2-D13): These pins are used for digital input and output to connect various digital devices/actuators/sensors/LEDs.
5. 7 to 12V DC Input Port: Used to provide power to the board when using without the computer.
6. ICSP for USB Interface and ATmega328 Port: ICSP headers are provided to program an Arduino via external programmer.



Q3: What is Arduino IDE? How many times is it already downloaded?

The Arduino Integrated Development Environment (IDE) is an open-source software application that enables users to write, compile, and upload code to Arduino development boards. It provides a user-friendly interface for writing and editing code, as well as tools for verifying and uploading codes to the Arduino board. It has been downloaded approximately 77.9 million times.



Q4: What are the two default functions when you open the IDE?

The two initial steps to take after launching the Arduino IDE are selecting the appropriate Arduino board and choosing the port to which the board is connected.

POST LAB TASKS

Q1: Write a brief summary of today's lecture.

In our recent lab session, we discussed the lab schedule and the required report layout. We began with an overview of microcontrollers and their development, highlighting the differences between them, particularly focusing on the popular Arduino UNO and clarifying differences between Arduino and Raspberry Pi.

We also introduced various instruments such as the Sonar Sensor, LDR, Actuator, Hall Effect Sensor, LCD Screen, Push and Switch Button, and Pressure Sensor that we will work with this semester. We then covered microcontroller pin configurations and Arduino UNO ports, along with their functions and names. Additionally, we explored into the different types of Arduino boards and their unique features, as well as the compatible shields for extending Arduino board functions.

During the session, we briefly explored downloading the Arduino UNO software, noting the impressive real-time download statistics. We touched upon the basics of the Arduino Integrated Development Environment (IDE) and discussed supported data types and different operators (Arithmetic, Comparison, Boolean, and Compound) for defining commands. Additionally, we briefly covered some fundamental Arduino language commands, which we put into practice during Lab 2, where we constructed a LED dancing light system.

Q2: List the data types and their ranges supported by Arduino.

Here's a list of common data types in Arduino along with their respective memory sizes:

1. Boolean (8 bit)
2. Byte (8 bit)
3. Char (8 bit)
4. Unsigned char (8 bit)
5. Word (16 bit)
6. Unsigned int (16 bit)
7. Int (16 bit)
8. Unsigned long (32 bit)
9. Long (32 bit)
10. Float (32 bit)

Q3: How can you add a comment in your code?

In the Arduino IDE, comments can be added using the "//" command (without the quotation marks).