EX.NO : 01

DATE :

PRE-LAB QUESTIONS:

1) What is Arduino?

Arduino is an open source platform used for building electronics projects. It consists of both physical programmable circuit board (microcontroller) and a piece of software (IDE) that runs on the computer, used to write and upload computer code to the physical board.

2) In brief, discuss the family of Arduino.

The UNO: It is the most popular configuration. It is used as a prototyping board, featuring ATMega328 micro controller chip, 14 digital I/O pins, 6 analog input pins and USB interface.

The Mega: Provides more digital and analog pins compared to The Uno, equipped with ATMega2560 microcontroller chip.

The Nano: Compact in size. Its similar to functionality to The Uno, but it has more number of I/O pins.

The Micro: It is even smaller than the Nano. It makes it easy to snap into a solderless breadboard. It uses 18 Mega32 processor.

The Gemma: Based on ATtiny85, it is a very tiny microcontroller. It is used with wearable computing products and is built on a circular circuit board.

The Due: It runs on a 32-bit ARM Cortex-M3 processor, providing more power and capabilities than the earlier boards.

3) Does Arduino use a microcontroller or a microprocessor? Justify.

It uses a microcontroller. A microcontroller is a compact IC that includes a processor, memory and I/O peripherals on a single chip. They are built on microcontrollers like the ATMega series or ARM processors.

4) In what way Arduino is better than 8051 microcontroller

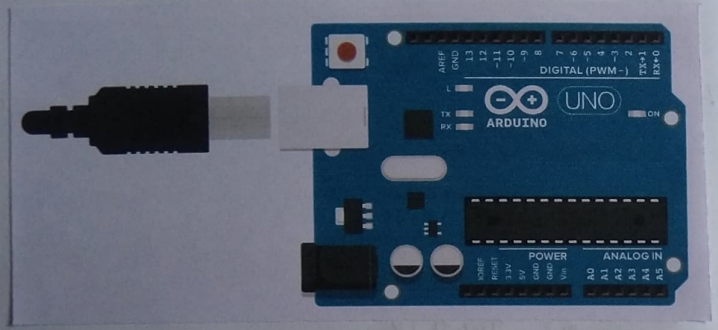
Ease of use: User-friendly IDE and simplified programming language make it easier for beginners to learn and use.

Abundance of resources: It has vast user community, extensive documentation and numerous libraries, simplifying development and troubleshooting.

Richer I/O options: It generally provides more varied and easily accessible I/O options.

Expandability: It supports easy hardware expansion through various shields, adding functionalities without extensive hardware knowledge.

CIRCUIT DIAGRAM:



PROGRAM:

```
#define LED 13
void setup() {
   pinMode (LED, OUTPUT);
}
void loop() {
   digitalWrite (LED, HIGH);
   delay (1000);
   digitalWrite (LED, LOW);
   delay (1000);
}
```


5) List the various uses of Arduino.

Robotics: Arduinos are excellent for beginner and intermediate robotics projects due to its ease of use and quick development cycle.

IoT: Enables the creation of connected devices that interact with the internet for data collection, monitoring and control.

Home Automation: Controls and monitors various home appliances and systems.

Education: To teach electronics, programming and robotics due to its accessibility and ease of learning.

EXERCISE:

Blink an inbuilt LED that is connected to the 13th pin of the Arduino board.

AIM:

To blink an inbuilt LED that is connected to the 13th pin of the Arduino board.

COMPONENTS REQUIRED:

Arduino UNO, USB-B cable

CONCLUSION:

Thus implemented an inbuilt LED blinking in an Arduino.

POST LAB QUESTIONS:

1) Explain about the program structure used in Arduino.

void setup(): This function runs once when Arduino board is powered-up or reset. It is used for initializing variables, pin modes and other hardware settings

void loop(): After setup() completes, it runs continuously in a loop until the board loses power. This is where the main code logic or operations are written.

2) How will you compile a program using Arduino IDE?

There are two (three), ways to compile a program.

1. Click the tick-mark button at the top-left. That will begin the compilation.
2. Navigate to 'Sketch'. Then navigate to Verify / Compile.
3. Click 'Ctrl+R'.

3) How will you load a program using Arduino IDE?

There are three ways to load a program.

1. Click the right arrow icon at the top-left.
2. Navigate to 'Sketch'. Then navigate to 'Upload'.
3. Click 'Ctrl+U'.

4) List out the PWM pins in Arduino board. Why are they used?

In Arduino UNO, these pins are marked with a "~" symbol and are used for providing analog output using digital pins. The pins 3, 5, 6, 9, 10 and 11 are the PWM pins. PWM allows for varying the output voltage by changing the width of the pulses sent to the pin, enabling control over devices like LEDs, servos and motor speed.

5) List out the ways in which the Arduino board can be powered up.

- USB connector
- Onboard barrel jack connector
- Onboard battery connector
- VIN pin