

## Laboratory 8

Title of the Laboratory Exercise: Introduction to Arduino UNO

### 1. Introduction and Purpose of Experiment

Students will be able to perform basic programming on Arduino UNO board

### 2. Aim and Objectives

Aim

To understand Arduino programming language and to develop basic programs using Arduino programming language.

Objectives

At the end of this lab, the student will be able to

- Explain analog and digital pins in Arduino
- Basic hardware programming language
- Interface sensors and read values from sensors
- Drive actuators

### 3. Experimental Procedure

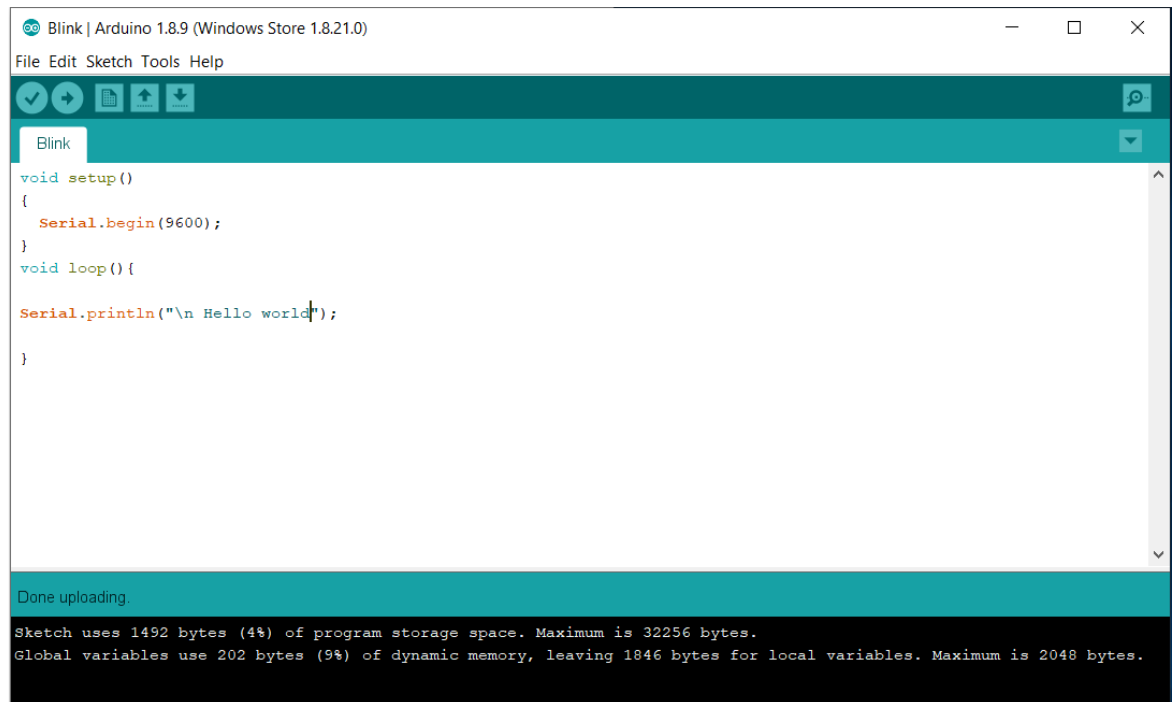
1. Write algorithm to solve the given problem
2. Translate the algorithm to Arduino programming language
3. Execute it in Arduino IDE
4. Create a laboratory report documenting the work

### 4. Questions

Perform the following:

1. Print hello world in Arduino
2. Set High and LOW value to digital pin and print its output in serial monitor
3. Read Analog values and print it in serial monitor

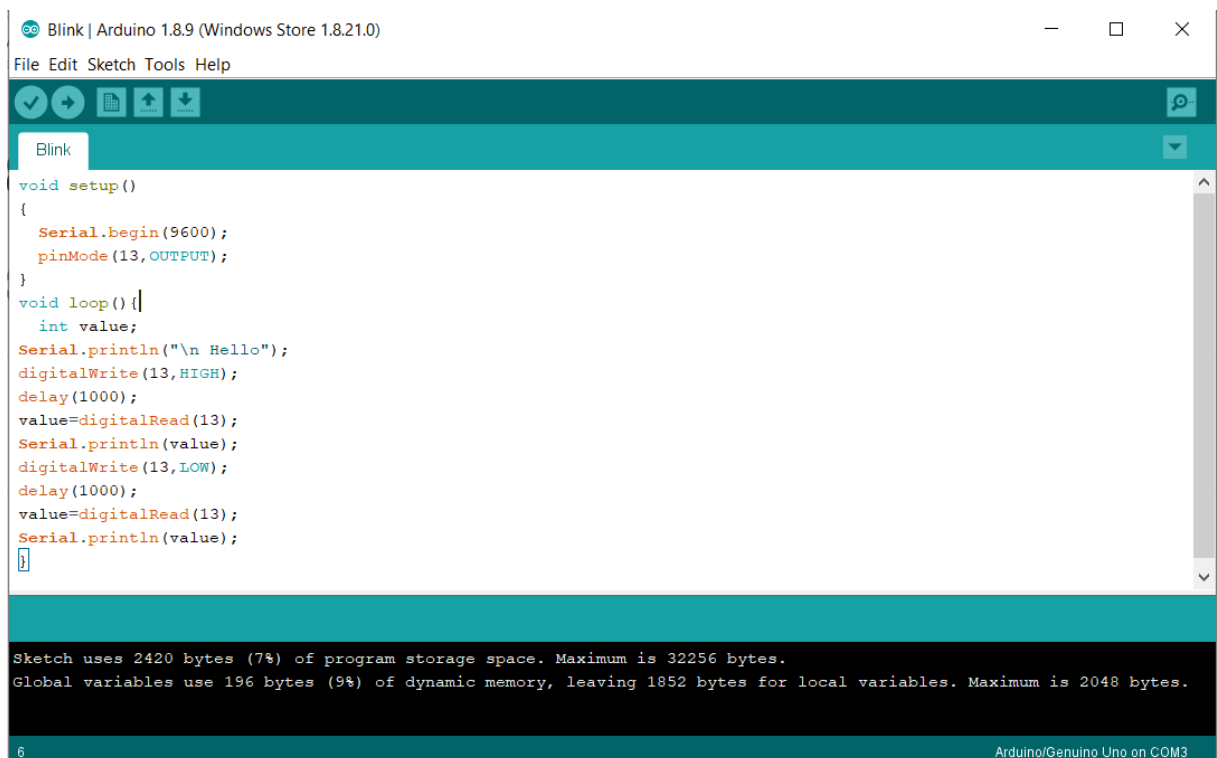
## 5. Calculations/Computations/Algorithms



The screenshot shows the Arduino IDE interface with a sketch named "Blink". The code in the sketch is as follows:

```
void setup()
{
  Serial.begin(9600);
}
void loop() {
  Serial.println("\n Hello world");
}
```

Below the code editor, the status bar indicates "Done uploading." and provides memory usage information: "Sketch uses 1492 bytes (4%) of program storage space. Maximum is 32256 bytes. Global variables use 202 bytes (9%) of dynamic memory, leaving 1846 bytes for local variables. Maximum is 2048 bytes."

*Fig 1. 1 Print hello world code.*

The screenshot shows the Arduino IDE interface with a sketch named "Blink". The code in the sketch is as follows:

```
void setup()
{
  Serial.begin(9600);
  pinMode(13, OUTPUT);
}
void loop() {
  int value;
  Serial.println("\n Hello");
  digitalWrite(13, HIGH);
  delay(1000);
  value=digitalRead(13);
  Serial.println(value);
  digitalWrite(13, LOW);
  delay(1000);
  value=digitalRead(13);
  Serial.println(value);
}
```

Below the code editor, the status bar indicates "Done uploading." and provides memory usage information: "Sketch uses 2420 bytes (7%) of program storage space. Maximum is 32256 bytes. Global variables use 196 bytes (9%) of dynamic memory, leaving 1852 bytes for local variables. Maximum is 2048 bytes."

At the bottom of the IDE, the text "6" and "Arduino/Genuino Uno on COM3" are visible.

*Fig 1. 2 High low code*

## 6. Presentation of Results

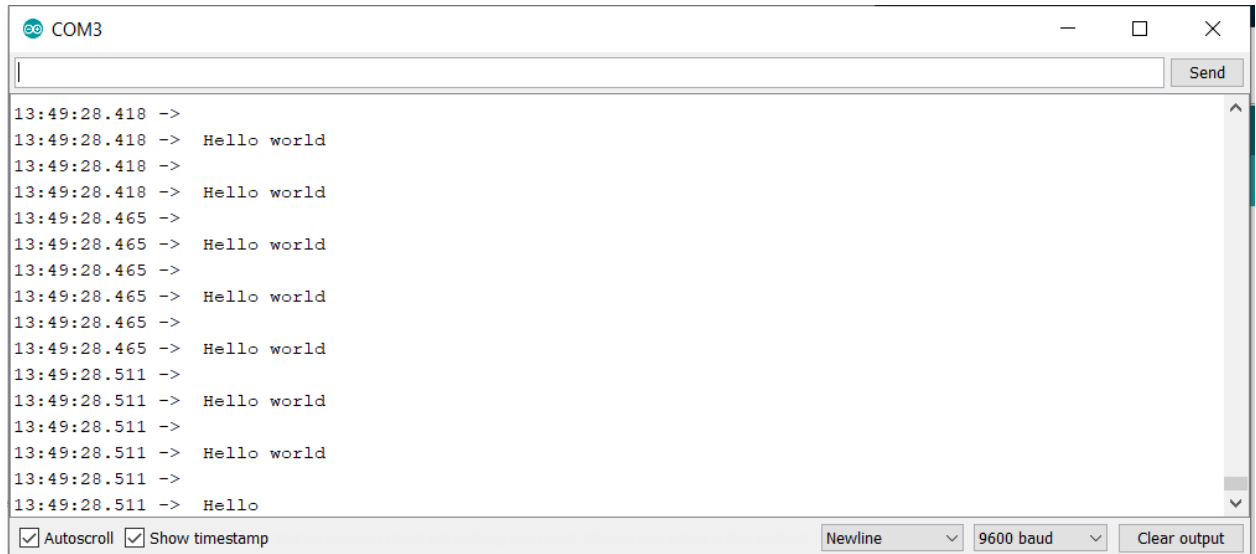


Fig 1. 3 serial monitor for code 1

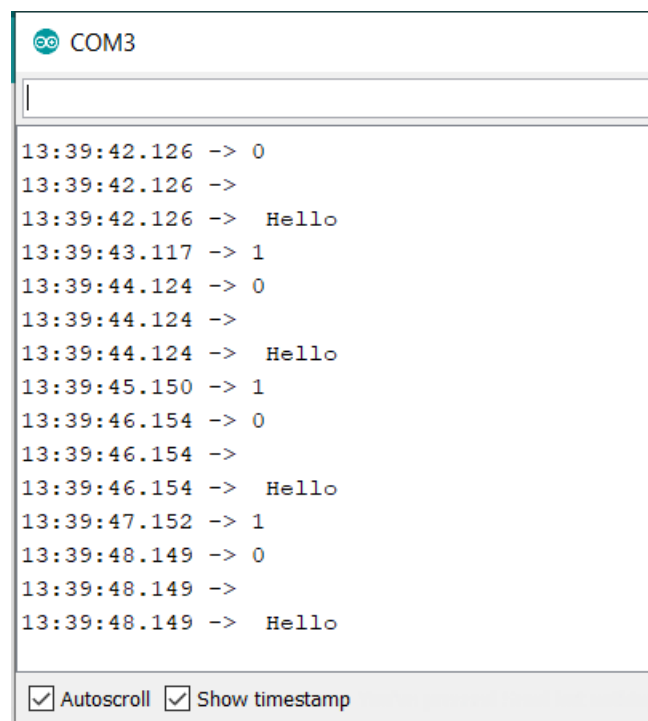


Fig 1. 4 serial monitor for code 2

## 7. Analysis and Discussions

In the sketch shown above, we can see some lines in grey colour in the top of the sketch and some colourful lines in the bottom of the sketch.

## 8. Conclusions

Generally, comments are ignored by compilers. Hence, do not take up any space while compiling. Comments are again divided in to block comments and line comments.

## 9. Comments

### 1. Limitations of Experiments

To power the Arduino, you either plug it in to a USB port, or you input a voltage source to it either its 2.1 mm x 5.5 mm DC power jack via jumpers going to its “VIN” and “GND” pins.

### 2. Learning happened

In this lab we have learnt how to explain analog and digital pins in Arduino, hardware programming, interfacing sensors and read values from sensors.

Signature and date

Marks

