EXPERIMENT NO: 01

Introduction to the microcontroller and its programming language

1.1 OBJECTIVE

The objective of this experiment is to know about basic programming language of Arduino Uno and Arduino Uno itself. Also know about how simple circuit works with Arduino Uno.

1.2 Pre- lab Preparation

- What is variable in programming language?
- What is different between global variable and local variable?
- Write (and run it in your house) a program that will add any two number and it will show the result using C programming language(Compiler or IDE: Code block or any other compiler)

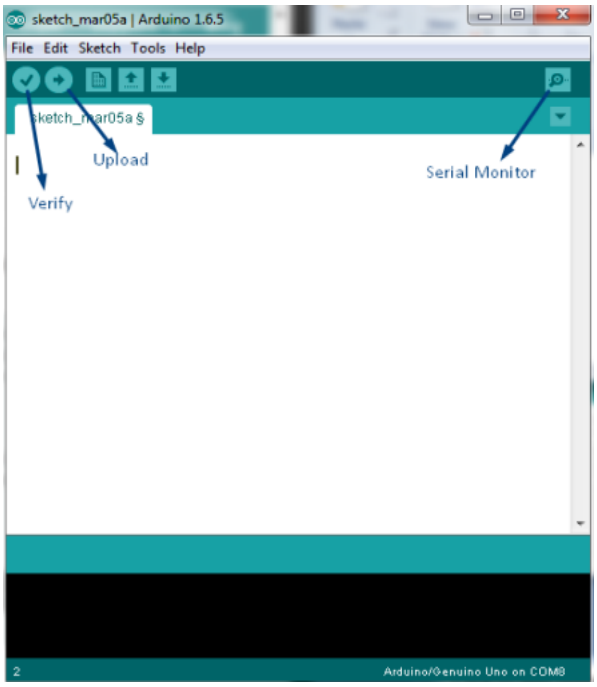
1.3 Equipment

- Arduino Uno(Atmega 328 microcontroller)
- Breadboard
- 220 ohm resistor
- LEDs
- Wires

1.4 Theoretical background:

This is the main component of the Arduino Uno board is ATmega 328P microcontroller. It operate at 5V. Input voltage of Arduino Uno can be very from 6V-12V.Arduno itself can supply 5V and 3.3V.

- Total 20 GPIO(or input/output) pins, 14 digital pins and 6 analog pins
- Output voltage is 0V or 5V(logic 0 or 1)
- Analog pins can read analog data and digital data
- Digital pins can read only digital data
- It's an 8-bit microcontroller
- It has 32 kB of flash memory
- It has 2kB of SRAM
- It's capable of reaching thorough-puts of 1 MIPS per MHz.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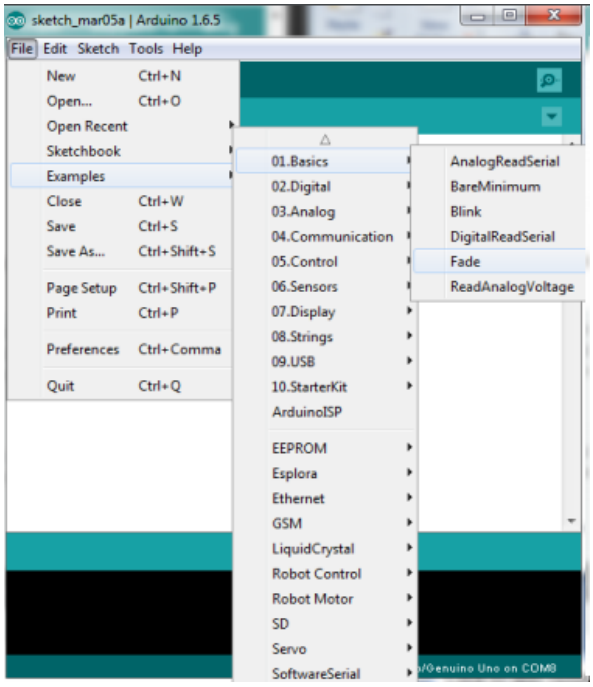
Upload
Verify
Serial Monitor
Arduino/Genuino Uno on COM8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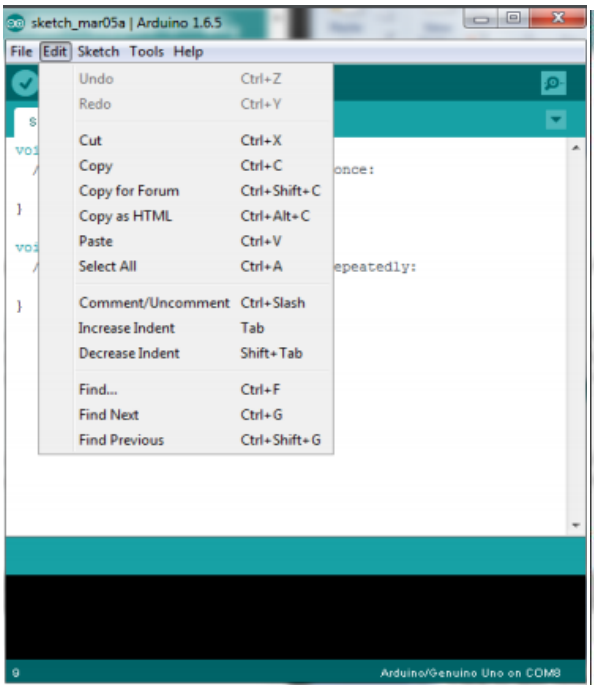
01.Basics
02.Digital
03.Analog
04.Communication
05.Control
06.Sensors
07.Display
08.Strings
09.USB
10.StarterKit
ArduinoISP
EEPROM
Esplora
Ethernet
GSM
LiquidCrystal
Robot Control
Robot Motor
SD
Servo
SoftwareSerial
AnalogReadSerial
BareMinimum
Blink
DigitalReadSerial
Fade
ReadAnalogVoltage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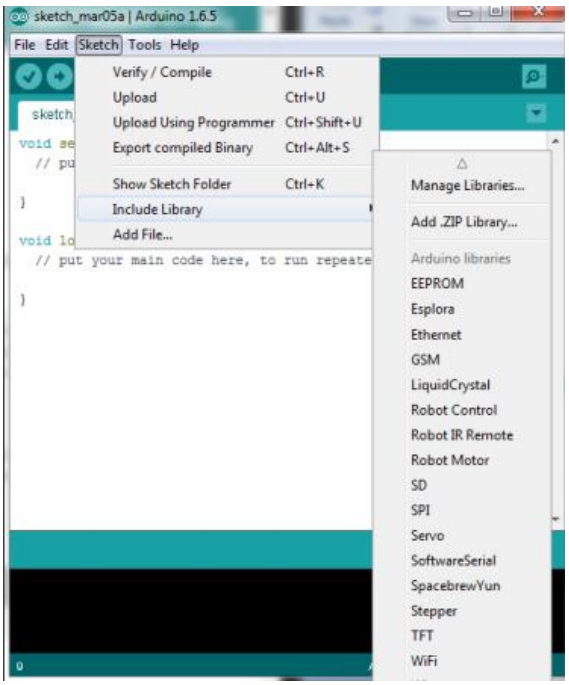
Arduino/Genuino Uno on COM8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Include Library
Add File...
Manage Libraries...
Add .ZIP Library...
Arduino libraries
EEPROM
Esplora
Ethernet
GSM
LiquidCrystal
Robot Control
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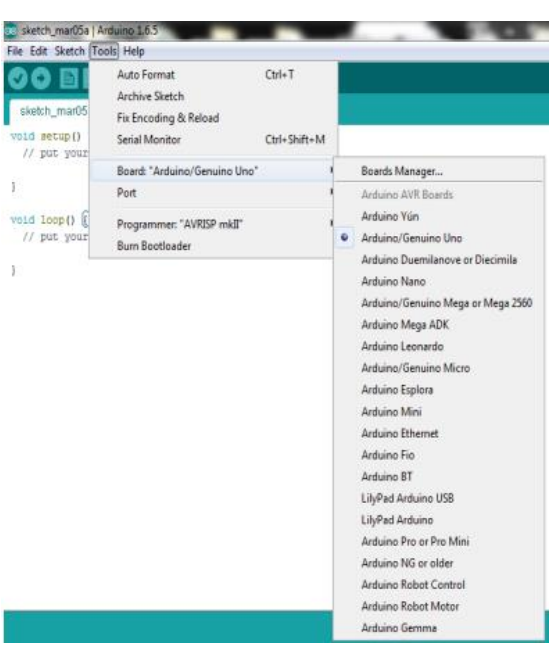
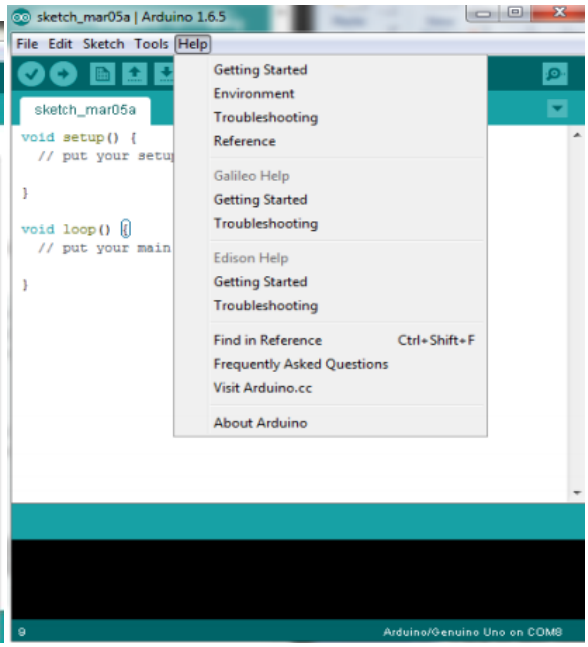
SPI
Servo
SoftwareSerial
SpacebrewYun
Stepper
TFT
WiFi






```c
#include <stdio.h>

main()

{
   printf("hello, world\n");
}
```

```c
#include<stdio.h>

void main(){

float number1=5.05;

printf("Number is %f",number1);

}
```

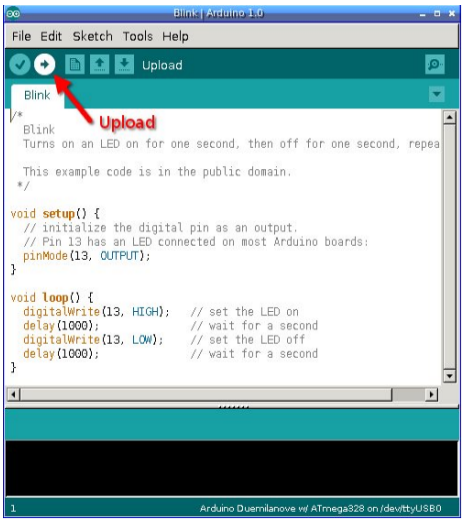
The functions we are going to use are:
1.pinMode(pin, mode)
pin: the number of the pin whose mode you wish to set
mode: INPUT, OUTPUT
2. digitalWrite(pin, value)
pin: the pin number
value: HIGH or LOW
3. delay(ms)
ms: the number of milliseconds to pause

To understand more, please search on internet about “Arduino”, “Atmega328” or “Atmega328P” and so on.

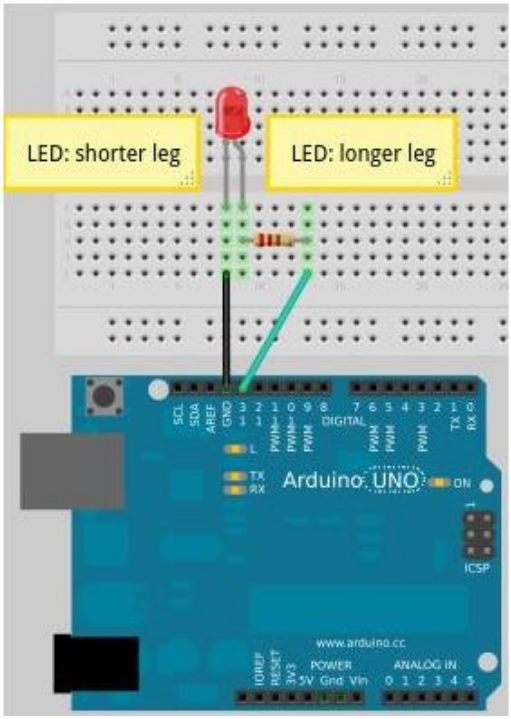
1.5 Procedure:

Step1: Open your Arduino Uno IDE.

Step 2: Go To File→ Example→Basic→Blink and click it. You will see code like below.



Step 3: Now built this circuit.



Step 4: Verify and upload this code and observe it. And ask yourself why this is acting like this!!!!!

Step 5: In the program write “LED_BUILTIN” delete this line only and write here only 13

Step 6: Verify and upload the code and observed it.Now, ask yourself why this is acting like this!!!!!

Step 7: In the code increase the delay time like:

```
delay(2000);
```

or

```
delay(5000);
```

and so on

Step 8: Verify and upload the code and observed it.Now, ask yourself why this is acting like this!!!!!

Step 9: In the code decrease the delay time like:

```
delay(200);
```

or

```
delay(500);
```

and so on

Step 10: Verify and upload the code and observed it.Now, ask yourself why this is acting like this!!!!!

Step 11: Delete all the "delay()" and delete "digitalWrite(LED_BUILTIN, LOW);" line

Step 12: Verify and upload the code and observed it. Now, ask yourself why this is acting like this!!!!!

Step 13: Delete all the "delay()" and delete "digitalWrite(LED_BUILTIN, HIGH);" line

Step 14: Verify and upload the code and observed it. Now, ask yourself why this is acting like this!!!!!

1.6 Post Lab Work:

- In the task-1 why this led is blinking
- If we increase the delay time of the task-1 program what will happen?
- If we decrease the delay time what will be happen?
- If we want to "ON" the led nonstop what will have to do or the will be the change of the program?
- If we want to "OFF" the led nonstop what will have to do or the will be the change of the program?