



*Alexandria University*  
*Faculty of Engineering*  
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*Department*  
*CSE 233: Computer Organization*

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## Microcontrollers: Lab 5

### Team Members

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## Part One

### First: Problem Statement

Use the serial monitor in Arduino to add two numbers (up to 4 digits).  
Entering a new line character signals the end of input.  
Every time a number is entered, the Arduino must print it on the screen.

### Second: Code snippets

```
1  int x;  
2  int y;  
3  int idx;
```

**x:** the first number to be added  
**y:** the second number to be added  
**idx:** indexing variable used to take input

```
5  void setup() {  
6      Serial.begin(9600);  
7  }
```

**Setup function sets up a serial with a baud rate of 9600 bps**

```
9  void loop() {  
10     Serial.println("Please enter first number: ");  
11     x = getNumber();  
12     Serial.println(x);  
13     Serial.println("Please enter second number: ");  
14     y = getNumber();  
15     Serial.println(y);  
16     Serial.println("The result is:");  
17     Serial.println(x + y);  
18     Serial.println("\n-----");  
19 }
```

**Loop function prompts the user to enter the numbers and displays the result**  
**Calls the getNumber function to take the user inputs**

```

21  ✓ int getNumber(){
22      char strValue[6];
23      idx = 0;
24  ✓  while(idx < 6){
25  ✓      if(Serial.available()){
26          char ch = Serial.read();
27          strValue[idx++] = ch;
28  ✓      if(idx == 6)
29          return atoi(strValue);
30  ✓      if(ch == '\n')
31          return atoi(strValue);
32      }
33  }
34  }

```

The `getNumber` function takes the user input as an array of characters and returns its Integer value when a new line character input is detected

### Third: Sample runs

```

Please enter first number:
1245
Please enter second number:
5421
The result is:
6666

```

```

Please enter first number:
9999
Please enter second number:
9999
The result is:
19998

```

```

Please enter first number:
3
Please enter second number:
6
The result is:
9

```

```

Please enter first number:
817
Please enter second number:
2890
The result is:
3707

```

```

Please enter first number:
7263
Please enter second number:
7
The result is:
7270

```

## Part Two

### First: Problem Statement

Plotting a sine wave using Arduino serial plotter.

### Second: Code snippets

```
1 double x = 0.0, y;
```

x: the angle  
y: the sin of the angle

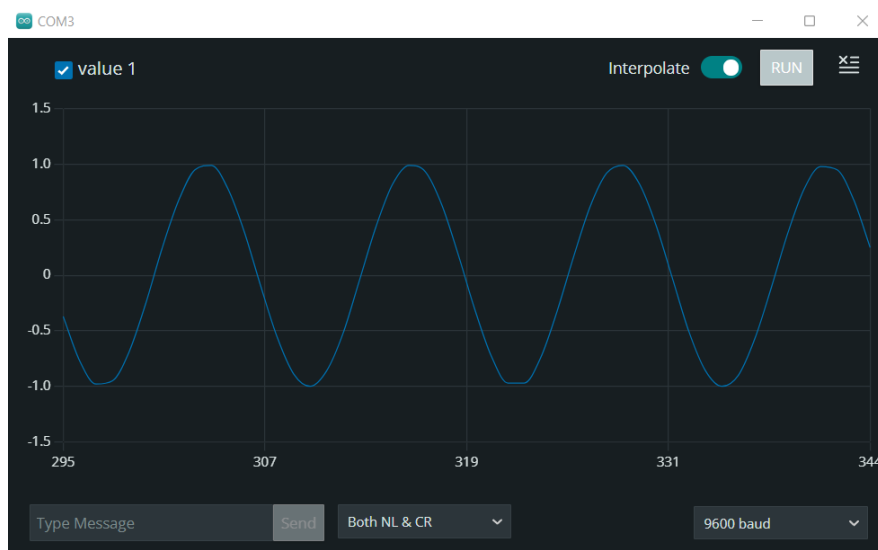
```
3 void setup() {  
4   Serial.begin(9600);  
5 }
```

Setup function sets up a serial with a baud rate of 9600 bps

```
7 void loop() {  
8   y = sin(x);  
9   x += 0.5;  
10  Serial.println(y);  
11  
12  delay(30);  
13 }
```

Loop function computes the sin of the angle, then increases the angle by 0.5 to find the next point on the plot

### Third: Sample run



#### Fourth: observation

The value of the increment and the duration of the delay strongly affect the shape of the plot, so to make it as clear as possible we tried different values for the increment and the delay duration, until we reached an increment of 0.5 and a delay of 30 ms, which gave us a clear plot as shown above.

The plot is not perfectly accurate, with some minor distortions that can be seen on some parts of it, but these distortions can be fixed if we made the value of the increment on the angle very small, but then the plot would be unreadable because the serial plotter is limited to specific ranges on both the x and y axes.

For small increment values, the plot would look like this:

