Arduino C++ Programming

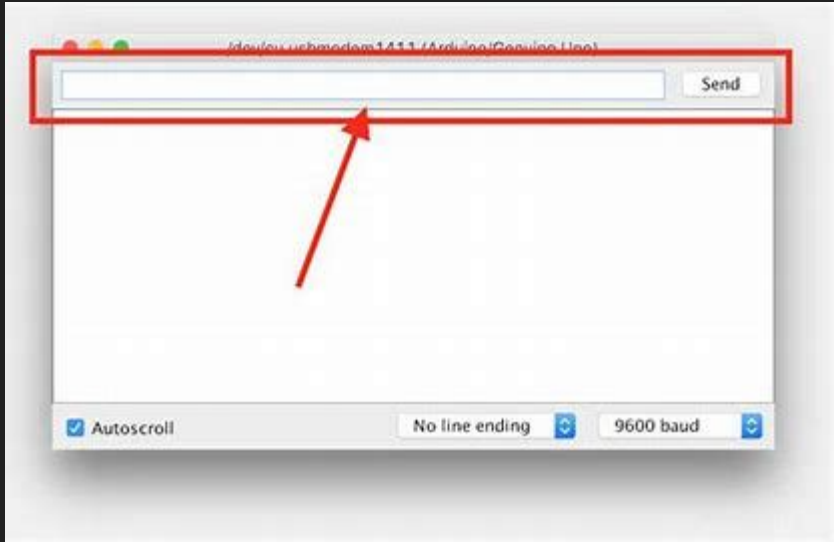
Advanced Concepts

Reading From the Serial Monitor

-Data can be sent through the Serial Monitor to the microcontroller

-In the Serial Monitor there is a text box to enter the data to be sent

-You can send it by pressing the Enter key or by clicking the Send button



Serial.available()

-To see if there is data in the Serial port to be read, use the available() function

-It returns the number of bytes available to be read

```
void loop() {
  // reply only when you receive data:
  if (Serial.available() > 0) {

  }
}
```

```
void loop() {
//wait until there is data to be re
while (Serial.available() == 0){}
}
```

Parsing the Data Read from the Serial Monitor

-If there is data in the Serial Port then we need to convert it to the correct type

-parseInt() converts it to an integer

-parseFloat() converts it to a decimal

-readString() converts it to a string

-You need to know what the type of data entered will be

```
int integerVariable = Serial.parseInt();
```

```
float floatVariable = Serial.parseFloat();
```

```
String stringVariable = Serial.readString();
```

Sample Code

```
int value=0;
void setup()
{
  Serial.begin(9600);
}

void loop()
{

   if (Serial.available() > 0) {
     value=Serial.parseInt();
     Serial.println(value);
  }

}
```

```
String value="";
void setup()
{
  Serial.begin(9600);
}

void loop()
{

   if (Serial.available() > 0) {
     value=Serial.readString();
     Serial.println(value);
  }

}
```

```
float value=0.0;
void setup()
{
  Serial.begin(9600);
}

void loop()
{

   if (Serial.available() > 0) {
     value=Serial.parseFloat();
     Serial.println(value);
  }

}
```

Arithmetic Operators-Remainder

Example Code

```
int x = 0;
x = 7 % 5;  // x now contains 2
x = 9 % 5;  // x now contains 4
x = 5 % 5;  // x now contains 0
x = 4 % 5;  // x now contains 4
x = -4 % 5; // x now contains -4
x = 4 % -5; // x now contains 4
```

Multiplication and Division

Example Code

```
int a = 5;
int b = 10;
int c = 0;
c = a * b;  // the variable 'c' gets a value of 50 after this statement is executed
```

```
float a = 5.5;
float b = 6.6;
int c = 0;
c = a * b;  // the variable 'c' stores a value of 36 only as opposed to the expected product of 36.3
```

```
int a = 50;
int b = 10;
int c = 0;
c = a / b;  // the variable 'c' gets a value of 5 after this statement is executed
```

```
float a = 55.5;
float b = 6.6;
int c = 0;
c = a / b;  // the variable 'c' stores a value of 8 only as opposed to the expected result of 8.409
```

Addition and Subtraction

```
int a = 5;
int b = 10;
int c = 0;
c = a + b;  // the variable 'c' gets a value of 15 after this statement is executed
```

```
float a = 5.5;
float b = 6.6;
int c = 0;
c = a + b;  // the variable 'c' stores a value of 12 only as opposed to the expected sum of 12.1
```

```
int a = 5;
int b = 10;
int c = 0;
c = a - b;  // the variable 'c' gets a value of -5 after this statement is executed
```

```
float a = 5.5;
float b = 6.6;
int c = 0;
c = a - b;  // the variable 'c' stores a value of -1 only as opposed to the expected difference of -1.1
```

Questions and Exercises

1. Write a program that asks the user to enter their name and you respond by saying “Hello {user}”.
2. Write a program to enter a whole number and then displays the square of that number.
3. Write a program to asks a user for the diameter of a circle and then displays its area (including decimals).
4. Write a program to ask a user for the marks to their 4 courses and computes/displays their average (including decimals).
5. Write a program to ask a user for a weight in kilograms and then displays it in pounds(including decimals).

1. Write a program that asks the user to enter their name and you respond by saying “Hello {user}”.

```
String _name;
Serial.begin(9600);
Serial.println("Enter your name: ");
  while (Serial.available()==0){}
  _name = Serial.readString();
  Serial.println("Hello "+_name);
```

2. Write a program to enter a whole number and then displays the square of that number.

```
Serial.begin(9600);
  Serial.println("Enter number: ");
  while(Serial.available()==0){}
  int num = Serial.parseInt();
  Serial.println(num*num);
```

3. Write a program to asks a user for the diameter of a circle and then displays its area (including decimals).

```
Serial.begin(9600);
  Serial.println("Enter number: ");
  while(Serial.available()==0){}
  int dia = Serial.parseInt();
  Serial.println(3.14*dia);
```

4. Write a program to ask a user for the marks to their 4 courses and computes/displays their average (including decimals).

```
void setup()
{
  Serial.begin(9600);
  Serial.println("Enter mark1: ");
  while(Serial.available()==0){}
  float mark1 = Serial.parseFloat();

  Serial.println("Enter mark2: ");
  while(Serial.available()==0){}
  float mark2 = Serial.parseFloat();

  Serial.println("Enter mark3: ");
  while(Serial.available()==0){}
  float mark3 = Serial.parseFloat();

  Serial.println("Enter mark4: ");
  while(Serial.available()==0){}
  float mark4 = Serial.parseFloat();

  Serial.println((mark1+mark2+mark3+mark4)/4);
}
```

5. Write a program to ask a user for a weight in kilograms and then displays it in pounds(including decimals).

```
Serial.begin(9600);
Serial.println("Enter your weight(kg): ");
while(Serial.available()==0){}
float weightKG = Serial.parseFloat();

float weightLBs = weightKG*2.2;
Serial.println("Your weight in lbs: "+String(weightLBs));
```