

*Week 2*

# EMT 101 – Engineering Programming

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# C++ Library

- To be able to use 'things' already available for programming
- Math library
- Input/output library
- String library
- Memory management, stack, many more..

# Data type

- char
- int signed: -2147483648 to 2147483647  
unsigned: 0 to 4294967295 (4 bytes)
- String (depends on the machine and library implementations)
- Float +/- 3.4e +/- 38 (4 bytes)
- double (?????)

# Identifier

- Names that you have assigned to represent 'something'
- Cannot be identical to standard define identifiers in C++
- Example cout, for, if, else, main, class, double, float, etc

# Generic Approach

- Including C++ library & header files
- Declare global variables & main function
- Initialization process: define variables, identifiers, memory allocation for variables
- Algorithm
- Plot, output, close program

# A Sample C++ Math

```
#include <iostream>
#include <cmath>           //to include math library
using namespace std;     //to be able to use all the standard classes, objects and functions in C++

int main ()               // start of program body, main is a function with no parameters
{
    int coefficient;      // define an integer identifier coefficient
    float X;
    float Y;

    cout << "This is a simple math program." << endl;
    cout << "Please enter an integer value: " << endl;           //computer asking an INTEGER value
    cin >> coefficient;
    cout << "Please enter any number: " << endl;                 // program asking any number
    cin >> X;

    Y= coefficient*X;
    cout << "The product of coefficient and X is: " << Y << endl;
    return 0;
} // end of program body
```

# How to define a vector?

- F1 and F2
- Use standard variables
- Use array
- What about defining a matrix?

# Exercises

- Write a program to estimate the slope of the function  $F = \sin x \log x$  between  $[2, 5]$
- *Write a program to find the resultant force of two input forces*

$$\vec{F}_1 = 0.5\hat{i} + 1.5\hat{j}$$

$$\vec{F}_2 = -0.5\hat{i} + 1.5\hat{j}$$