	FACULTY OF ENGINEERING UNIVERSITY OF MORATUWA		
Module	CS2882 - Object Oriented Programming using C++		
Practical No	05	Practical Title	Classes Fundamentals
Learning Objectives	To familiarize with classes		

1. **Duration** - 2 hours

2. **Task:**
   i. It is required to write a program to perform basic vector operations such as vector addition, vector subtraction and dot product on 3 dimensional vectors (Eg. $A = xi + yj + zk$) . Define a class named "vector" with following features.

- Direct access to vector elements should be prohibited.
- Provision must be made to the user to enter element values. Define a member function named "GetVector" to get values from user and assign them to individual elements.
- A member function named "ShowVector" prints the vector on screen in the usual notation (*i.e. vector* $A = ai + bj + ck$)
- A member function named "AddVector" with two vector type input parameters adds the given two vectors together. This function does not return any value, but the result vector is assigned to the called vector.
- A member function named "SubtractVector" with two vector type input parameters subtracts the given first vector from the second. This function does not return any value, but the result vector is assigned to the called vector.
- A member function named "DotProduct" with two vector type input parameters calculates the dot product of the given two vectors and returns the answer as a floating point number.
- A member function named "Magnitude" with one vector type input parameters calculates the magnitude of the given vector and returns the answer as a floating point number.

- No printing codes should be written inside any member function. Printing of vectors should be done only by the "ShowVector" function. Printing the results of the dot product and magnitude may be done outside the class.
- All the data members or member function which does not need external access must be made private for the sake of the safety.

ii. Write an executable program using the above class, which fulfils the following requirements

- User must be asked to enter element values of two vectors.
- Once the user finishes entering values, he/ she should be given following five choices
    1. ADD two vectors
    2. Subtract vector 1 from vector 2
    3. Get the magnitude of the vector 1
    4. Get the magnitude of the vector 2
    5. Get the dot product of the two vector

✓ Providing of above options must be repeated until user wishes to exit the program

A sample screen shot: (Anything written in brackets should not be printed on screen. Those are just guides to the student)

Vector calculation
Enter the element "x" of first vector:
Enter the element "y" of first vector:
Enter the element "z" of first vector:

Enter the element "x" of second vector:
Enter the element "y" of second vector:
Enter the element "z" of second vector:

1. ADD two vectors
2. Subtract vector 1 from vector 2
3. Get the magnitude of the vector 1
4. Get the magnitude of the vector 2
5. Get the dot product of the two vector

What do you want to do? Enter the number of the option

(*Just Consider the user has entered 1, and then output should like follows*)

Elements of the result vector :
X =
Y =
X =
Do you want to continue? (Y/N)
(*If the user presses Y, the four choices must be given and rest of the things must be repeated accordingly. Program should repeat until user choose to leave the program by pressing "N" key*)