1. Write a complete program that does the following:

- Declare a structure called employee with two elements:
    - name: type string
    - salary: type float
- Prompt user to enter number of employees
- Create a dynamic array of structure employee (array size equals number of employees)
- Prompt user to enter employee name and salary

```
#include <iostream>
using namespace std;

struct employee {
    string name;
    float salary;

};

int main ()
{
    int numEmployees;

    cout << "Enter number of employees: ";
    cin >> numEmployees;

    //create dynamic array

    employee* employees = new employee[numEmployees

    //loop

    for (int i=0; i <numEmployees; i++)
    {
        cout << "\nEmployee " << i+1 << endl;
        cout << "\tEnter name : ";
        cin >> employees[i].name;

        cout << "Enter Salary: ";
        cin >> employees[i].salary;

    }
```

```
    //print out the list of emplpyees
    cout << endl << "Employees List: "<<endl;
    for (int i = 0; i <numEmployees; i++)
    {
        cout << "Name : " << employees[i].name<<endl;
        cout << "Salary : " << employees[i].salary << endl;
    }

delete [] employees;

return 0;

}
```

```
Enter number of employees: 2

Employee 1
        Enter name : Amy
Enter Salary: 2520

Employee 2
        Enter name : Brian
Enter Salary: 3500

Employees List:
Name : Amy
Salary : 2520
Name : Brian
Salary : 3500

--------------------------------
Process exited after 11.41 seconds with return value 0
Press any key to continue . . .
```

Write a program that calculates volume of two boxes, Box 1 and Box 2. Construct class Box. The class has public members : length, breadth, height.

Initialize the following values accordingly.

Box 1 : Length = 5.0 , Breadth = 6.0 , Height = 7.0

Box 2 : Length = 10.0 , Breadth = 12.0, Height = 13.0

```
#include <iostream>
using namespace std;

class Box {
    public:
        float length;
        float breadth;
        float height;

        float getVolume ()
        {
            return length*breadth*height;
        }
};

int main ()
{
    Box box1;
    box1.length = 5.0;
    box1.breadth = 6.0;
    box1.height = 7.0;

    Box box2;
    box2.length = 10.0;
    box2.breadth = 12.0;
    box2.height = 13.0;

    cout << "volume of Box 1: "<<box1.getVolume()<<endl;
    cout << "volume of Box 2: "<<box2.getVolume()<<endl;

    return 0;
}
```

```
C:\Users\muhda\Desktop\Lab 2\Q3.exe
This program will calculate your body mass index.
Enter your height in meter (m) unit : 1.63
Enter your weight in kilogram (kg) unit : 45
Your bmi is : 16.937
You are underweight

--------------------------------
Process exited after 8.593 seconds with return value 0
Press any key to continue . . .
```

Write a program that calculates body mass index. Construct class BMI. The class has private members:

float height, float weight, float bmi and public members :

- BMI() – initialize the height and weight to 1.0.
- void set(float, float) – set the value to height and weight
- void calculate()- calculate the BMI where bmi = weight(kg)/(height(m)*height(m))
- void display() – display the weight status.

The program will ask user to enter his/her weight and height to get the bmi. After the programs calculate the bmi, the program will display message to user according to their weight categories.

```
#include <iostream>
using namespace std;

class BMI {
    private :
    float height;
    float weight;
    float bmi;

    public:
    BMI ()
    {
    height = 1.0;
    weight = 1.0;
     }

    void set (float h, float w)
    {
        height = h;
        weight = w;
    }

    void calculate ()
    {
        bmi = weight / (height * height);
    }

    void display ()
    {
        cout << "Your bmi is : "<< bmi << endl;
        //if else

        if (bmi < 18.5)
        {
            cout << "You are underweight "<<endl;
        }
        else if (bmi >=18.5 && bmi <= 24.9)
```

```
        if (bmi < 18.5)
        {
            cout << "You are underweight "<<endl;
        }
        else if (bmi >=18.5 && bmi <= 24.9)
        {
            cout << "You are Normal" << endl;
        }

        else if (bmi >=25.0 && bmi <= 29.9)
        {
            cout << "You are  Overweight" <<endl;
        }
        else {
            cout << "You are obese" <<endl;
        }
    }

};

int main ()
{
    float height;
    float weight;

    cout << "This program will calculate your body mass index."<<endl;
    cout << "Enter your height in meter (m) unit : ";
    cin >> height;

    cout << "Enter your weight in kilogram (kg) unit : ";
    cin >> weight;

    BMI bmi;
    bmi.set(height,weight);
    bmi.calculate();
    bmi.display();
}
```

4. Write a simple program that will show the effect of passing an integer by reference and passing an integer by value.

```
#include <iostream>
using namespace std;

void passByReference (int& num){
num +=5;
}

void passByValue (int num){
num +=5;
}

int main ()
{
int value1;
int value2;

cout << "Enter value 1 :";
cin >> value1;

cout << "Enter value 2 :";
cin >> value2;

passByReference (value1);
cout << "The effect of passing value1 by reference is: "<<value1 <<endl;



passByValue (value2);
cout << "The effect of passing value2 by value is: "<<value2 <<endl;

return 0;

}
```

```
Enter value 1 :2
Enter value 2 :5
The effect of passing value1 by reference is: 7
The effect of passing value2 by value is: 5

--------------------------------
Process exited after 3.161 seconds with return value 0
Press any key to continue . . .
```

5. Write a program that asks user to insert marks and calculate sum and average of the marks entered. Numbers of marks entered will depend on the user. Use dynamic array. new to dynamically assigns space to store elements entered by user.

```
#include <iostream>
using namespace std;

int main ()
{
    int i;
    int n;
    float sum, avg;
    float *p;

cout << "How many marks would you like to enter: ";
cin >> i;

p = new float [i];
for (n=0; n<i; n++)
{
    cout << "Enter marks "<< n+1 << ": ";
    cin >> p[n];
    sum += p[n];
}

cout << "You have entered: ";
for (n=0; n <i; n++)
{
    cout << p[n];
    if (n != i-1)
    {
```

```
    cout << "Enter marks "<< n+1 << ": ";
    cin >> p[n];
    sum += p[n];
}

cout << "You have entered: ";
for (n=0; n <i; n++)
{
    cout << p[n];
    if (n != i-1)
    {

    cout << ", ";
}
}


avg = sum / i;

cout << "\nSum of marks is: "<<sum <<endl;
cout << "Average marks is: "<<avg <<endl;

delete [] p;
return 0;

}
```

```
How many marks would you like to enter: 4
Enter marks 1: 60
Enter marks 2: 50
Enter marks 3: 70
Enter marks 4: 90
You have entered: 60, 50, 70, 90
Sum of marks is: 270
Average marks is: 67.5

--------------------------------
Process exited after 9.534 seconds with return value 0
Press any key to continue . . .
```