Lab 7

Task 1:

Momentum is defined as the product of an item's mass and its velocity. Mass is a scalar value, whereas velocity is generally expressed as a vector quantity with three components. The product of the scalar mass and the velocity yields momentum as a vector quantity.

Define a class momentum

```
double *velocity;
double *momentum_;
double mass;
```

and a defualt constructor to set all values to zero

Write a function named momentumCalculate that will accept as arguments the three values for 3d vector

```
void momentumCalculate (double a, double b, double c);
```

and multiplies mass with velocity to update values of momentum array.

Write getter/setter

Write a copy constructor.

Create a function called copyMomentumShallow that creates a shallow copy of momentumArray (then demonstrate that both objects share a common memory i.e. modifying one object in fact modifies the other) and a function called copyMomentumDeep to create a deep copy of momentumArray

Note the momentum is determined by multiplying the scalar mass by each element of the vector array.

Test your momentum function by constructing a short main program that will ask the user to input values for the velocity and mass from the console, and then display the momentum

Task 2:

Lamborghini is an international luxury sports car developer stationed in Italy. The company has a reputation for producing cars that are extremely expensive, powerful and rare. Lamborghini has developed a brand new model called the Diablo. The company produces a very limited number of Diablo's each year. The company is producing
the Diablo in only one colour called the "Hot Red".

When the company has produced a Diablo, the car has a number of attributes like colour, cubic capacity, number of seats, year of manufacture, engine number, frame number and owner name. Out of these attributes the attributes that remain the same for all Diablo's being produced are colour, cubic capacity and number of seats.

Suppose you are working on a system specially designed for the Lamborghini Diablo. Follow the instructions below for creating the class and objects:

- Store the owners name as a dynamic array data member.
- Create an object named "obj1" and initialize the object.
- Create a copy constructor that can copy all those attributes that remain the same for all cars.

- Generate another object named “obj2” that is created by copying only those attributes that are the same from “obj1”.
- Initialize the remaining attributes with values of your own

Task 3:

Define a class TV representing a television and a friend class Remote representing a remotecontrol.

TV has following private data members

- bool status (ON/OFF)
- int channel (current channel number) [maximum 250 minimum 0]
- int volume (current volume) [maximum 100 minimum 0]
- string TV_input (AV/cable)
- string tuning_mode (digital/analog)

Create default and parametrized constructors of class TV

A remote control should duplicate the controls built in to the television. To turn TV on or off, to increase and decrease volume, to navigate channels, change input from AV to cable and vice versa, and set tuning mode to digital or analog.

The channel chnage function (*int change_channel (int))* gets input as parameter the channel number you directly want to jump to , and returns the channel number after changing channel channels.

Write a main() to show all the functionality.