Lab 5 (Classes I)

Task 1:

Create a class *IntArray*. Create two constructors.

- Nullary constructor create an array of size 10 and initiazes all values to 0.
- Parametrized constructor has signature *IntArray(int num, int s)*. This creates an array of size *s* and initializes all values to *num*.

Write a member function *print()* to print the array.

Task 2:

Declare a class *Box*. A box as you all know is something a cubical container. It has following attributes

- *Length*
- *Width*
- *Height*

In addition to these, a box can be made of different *materials* e.g. wood, card, metal etc. Further, more a box can have different *colors*. Declare them also as member variables of class.

Provide a default Constructor, a parameterized Constructor *for* the Box that takes all necessary values as arguments with the material as optional (if it is omitted the Box is considered to be made of Card – default value for the material.

Provide getters for all attributes and setters for each too except for the material (material of box cannot be changed after when it has been created!!!).

Provide a function *getVolume()* that calculates and returns the value of the volume of the Box.

Also provide another function *getSurfaceArea*(),that calculates and returns the surface area of a Box.

Provide a print function that Prints the following about the Box

Length:
Width:
Height:
Material:
Color:
Volume:
Surface Area:

Inside main, allocate a block of memory for 5 objects (using array). Read the necessary values from the user to populate array.

Call functions *Print*() and Volume to display the data of boxes you just have saved in array.

Read the index and the new height from the user, ask the user to provide index of the box to change its height by creating a function *update(Box b[], int size, int index, double height)*. Update the height of the Box present on the index provided by user, save the updated height right there, and print it again.

Task 3:

Create a class *'Date'*, with three private variables *'day'*, *'month'*, *'year'*. Write a no argument constructor to iniatilize date to *01/01/1900*. Also write a three argument constructor *Date (int day, int month, int year)* to show constructor overloading. Also create a destructor.

Create two functions with following signatures:

- *bool LeapYear (Date obj)*
    - Checking if the date is within a leap year
- *int SubstractDate (Date obj1, Date obj2)*
    - Subtracting two dates to give a number of days

Task 4:

Create a class *Polygon*.

```
class Polygon{
    int sides;
    int * PointArray;
}
```

Implement following constructors

- Default constructor with no arguments, and creates a square with default values {0,0,4,0,0,4,4,4}
- A constructor with two arguments:
    - number of sides called *num*.
    - an array of Points called *PointArray* e.g {0,0,4,0,0,4,4,4}=(0,0)(4,0)(0,4)(4,4) (get user input for all values)

Also write getters and setters for both variables.

Create a function *print()* to print all the coordinates of the polygon

Task 5:

Build a class *Sale* with private member variables

double itemCost; // Cost of the item
double taxRate; // Sales tax rate

and functionality mentioned below:

- Write a default constructor to set the member variable itemCost to 0 and taxRate to 0.
- Write a parameterized constructor that accepts the parameter for each member

    Sale(double cost, double rate)

- Generate only accessors for *itemCost* and *taxRate*
- Write a function *double getTax( )* to calculate tax i.e take a product of itemCost and itemRate.
- Write a function *double getTotal( )* to calculate the total price of item i.e. take a sum of itemCost and getTax( ) (calling getTax() will return the calculated tax on item).