Object Oriented Programming through C++
Lab Assignment

1. Design a class TIME which stores hour, minute and second. The class should have the methods to support the following:
   - User may give the time value in 24-hour format.
   - User may give the time value in AM/PM format
   - Display the time in 24-hour format.
   - Display the time in AM/PM format.
   - User may like to add minute with a time value.

2. Design a COMPLEX class, which will behave like normal integer with respect to
   - addition,
   - subtraction,
   - accepting the value and
   - displaying the value.

3. Design a TOLLTAX class to store the number of cars that crossed the bridge and total amount collected. It must support the following activities.
   - Receiving toll.
   - Display number of cars that crossed the bridge.
   - Display the amount of toll collected.

4. Design a class for the following scenario:
   - An item list contains item code, name, rate, and quantity for several items.
   - Whenever a new item is added in the list uniqueness of item code is to be checked.
   - Time to time rate of the items may change.
   - Whenever an item is issued or received existence of the item is checked and quantity is updated.
   - In case of issue, availability of quantity is also to be checked.
   - User may also like to know price/quantity available for an item.

5. Design a STUDENT class to store roll, name, course, admission date and marks in 5 subjects. Provide methods corresponding to admission date and receiving marks, preparing mark sheet. Support must be there to show the number of students who have taken admission.

6. Design an ARRAY class with the following features:
   a. Array object may be declared for a specific size and a value for initializing all the elements. If this it is to be assumed as a 0.

b. An array object may be declared and initialized with another object.
c. An array object may be declared and initialized with another array (not the object, standard array as in C language).

Let a and b are two objects:

i. a+b will add corresponding elements.
ii. a=b will do the assignment.
iii. a[I] will return the ith element of the object.
iv. a*5 or 5*a will multiply the element with 5.

7. Design a STRING class, which will have the initialization facility similar to array class. Provide support for
   - Assigning one object for another,
   - Two string can be concatenated using + operator,
   - Two strings can be compared using the relational operators.

8. Modify the STRING class so that assigning/initializing a string by another will not copy it physically but will keep a reference count, which will be incremented. Reference value 0 means the space can be released.

9. In a library, books, and journals are kept. Journals are issued to faculty members only. A student member can have 2 books issued at a time. For faculty members it is 10. For late return student members are charged Rs. 1 per day. Faculties are not charge. For journals additional information like issue no., date of publish, volume no., etc., are to be stored. For any transaction, members are supposed to place transactions slip. After necessary validations, transaction is carried out. Each transaction is to be noted into a register. Implement the system described above after designing the necessary classes.

10. Design a BALANCE class with account number, balance and date of last updation. Consider a TRANSACTION class with account number, date of transaction, amount and transaction type. If it is a withdrawal check whether the amount is available or not. Transaction object will make necessary updation in the BALANCE class.

11. In a bank two types of accounts are there *savings* and *current*. For savings account a minimum deposit of Rs. 500 are to be kept. In current account overdraft upto Rs. 20,000 is allowed. Each transaction is noted. Design and implement the necessary classes.