Computer Science Lab Manual

Month : MARCH
Topic: CLASSES AND OBJECTS

1) A class **student** has three data members and few member functions:
- Name
- Rollno
- Percentage
- Stream
- Input( )
- Display( )

Write a menu driven program:
- To create an array of object of 5 students
- To print the stream according to the percentage of the student:
  - 96 or more Computer Sc.
  - 91 – 95 Electronics
  - 86 – 90 Mechanical
  - 81 – 85 Electrical

2) Declare a class **cricket** with the following description:

Private Members:
- Target_score of type integer
- Overs_bowled of type integer
- Extra_time of type integer
- Penalty of type integer
- Cal_penalty( ), a member function to calculate the penalty as follows:
  - If extra_time<=10, penalty =1
  - If extra_time>10 but <=20, penalty =2
  - Otherwise penalty=3

Public Members:
- To create an array of 5 objects.
- A function extradata( ) to allow user to enter values for target_score, overs_bowled, extra_time. Also invoke function cal_penalty( ).
- A function dispdata( ) to follow user to view the contents of all data members.

3) Define a class to represent a bank account which includes following members:

Data Members:
- Name of the customer
- Account number

- Type of account (S for Savings and C for Current)
- Balance amt

Member functions:

- To assign initial value to all the data members
- To deposit into account
- To withdraw from account (minimum balance is Rs. 1000/-)
- To display name, account number and balance
- To release the allocated memory using destructor

Month: APRIL-MAY **Topic: DATA FILE HANDLING**

4) Write a program that reads characters from the keyboard one by one. All lower case characters get stored inside the file LOWER.TXT, all upper case letters get stored inside the file UPPER.TXT and all other character get stored inside the file OTHERS.TXT.

5) Write a menu driven program which will use a User Defined Function:

- to count the number of vowels, digits and words in a text file
- to create another file using the original which will contain the text after replacing all the blank spaces with #

6) Write a program which will use a User Defined Function to count and print the number of the string "is" in the given text file. Suppose the file has the input "This is his book. Is this book good" then the output should be 2.

7) Polina Raj has used a text editing software to type some text in an article. After saving the article as MYNOTES.TXT, she realised that she has wrongly typed alphabet K in place of alphabet C everywhere in the article. Write a function definition for PURETEXT() in C++ that would display the corrected version of the entire article of the file MYNOTES.TXT with all the alphabets "K" to be displayed as an alphabet "C" on screen.

Note: Assuming that MYNOTES.TXT does not contain any C alphabet otherwise.

Example:

If Polina has stored the following content in the file MYNOTES.TXT:
I OWN A KUTE LITTLE KAR.
I KARE FOR IT AS MY KHILD.
The function PURETEXT() should display the following content:
I OWN A CUTE LITTLE CAR.
I CARE FOR IT AS MY CHILD

8) A blood bank maintains the record of Donor: name, address, blood group. Write a menu-driven program:

- To create file of donors
- To print the name of all the donors having given blood group
- To print the tabular list of donors

9) Declare a class containing:

- Pno
- Pname
- Price
- And required functions

Write a menu driven program:

- To add record in a file
- To modify the price of the given Pno

10) Consider the following class declarations:

```
class employee {
    int code;
    char name[20];
```

```
    float salary;
public:
        void input( ){cin>>code>>name>>salary;}
        void show( ){cout<< code << name << salary<< endl;}
        void retsal( );{ return salary;}
}
```

Give the user defined function definition to do the following

i) Write the object of employee to a binary file

ii) To show the details of those employees whose salary is between 10000 & 20000 after reading from the file.

Write main( ) to call these functions.

Month : June **Topic: POINTERS**

11) Write a program that will dynamically create a one dimensional integer array to store salaries of employees and calculate the total salary given by a company to its employees using class.

12) Write a program that will free the space which is dynamically created for storing CGPA for n number of students.

13) Write a program to compare the area of two rectangles using this pointer.

Month : July **Topic: DATA STRUCTURE I**

14) Write a menu driven program to sort „n" number of elements using selection sort and insertion sort.

15) Write a user defined function to replace the repeating elements in an array by 0. The zeros should be shifted to the end. Also, the order of the array should not change.

16) Write a function ADDUP(int arr[ ], int N) in which all even positions (i.e., 0, 2, 4, ……) of the array should be added with the content of the element in the next position and odd positions (i.e., 1,3, 5,…) elements should be incremented by 10.

For example : If an array ARR contains

23	30	45	10	15	25

Then the array should become

53	40	55	20	40	35

17) Write a function which accepts an integer array and its size as parameters and exchanges the values of first half side elements with the second half side of the array.

For example :

i) If an array of 8 elements initially contains elements as 2, 4, 1, 6, 17, 18, 23, 43

Then the function should rearrange the contents of the array as 17, 18, 23, 43, 2, 4, 1, 6

ii) If an array of 9 elements initially contains elements as 2, 4, 1, 6, 7, 9, 23, 10, 5

Then the function should rearrange the contents of the array as 9, 23, 10, 5, 7, 2, 4, 1, 6

18) Write a function void CHANGEOVER(int p[ ]), int N), which re-positions all the elements of the array by shifting each of them to the next position and by shifting the last element to the first position.

For example : If the content of the array is

0	1	2	3	4
12	15	17	13	21

The changed content will be:

0	1	2	3	4
21	12	15	17	13

19) Write a function to merge the contents of two sorted arrays A and B into third array C. Assuming array A is sorted in ascending order, B is sorted in descending order the resultant array is required to be in Ascending order.

20) Write a menu driven program that accepts an array and its size as arguments and transfers the second with the second last row elements of a M X N (two dimensional) array and second column with the second last column elements.

21) Write a function in C++ that accepts an integer array and its size as arguments and then assigns the elements into a two dimensional array of integers in the following format:

If the array is 6, 5, 4, 3, 2, 1

The resultant 2D array should be as given below:

0	0	0	0	0	1
0	0	0	0	2	1
0	0	0	3	2	1
0	0	4	3	2	1
0	5	4	3	2	1
6	5	4	3	2	1

22) Write a function REVROW(int P[ ][5], int N, int M) to display the content of a two dimensional array, with each row content in reverse order.

Example:

The original array

1	2	5	8
2	8	6	1
6	7	4	9
4	9	12	2

Resultant array

8	5	2	1
1	2	8	2
9	4	7	6
2	12	9	4

Month : August **Topic: STRUCTURED QUERY LANGUAGE**

23). Consider the following table given below and answer the questions that follow:

Table: SchoolBus

Rtno	Area covered	Capacity	No. of students	Distance	Transporter	Charges (in Rs.)
1	Vasant Kunj	100	120	10	Shivam Travels	100000
2	Hauz Khas	80	80	10	Anand Travels	85000
3	Pitampura	60	55	30	Anand Travels	60000
4	Rohini	100	90	35	Anand Travels	100000
5	Yamuna Vihar	50	60	20	Bhalla Co.	55000
6	Krishna Nagar	70	80	30	Yadav Co.	80000
7	Vasundhara	100	110	20	Yadav Co.	100000
8	Paschim Vihar	40	40	20	Speed Travels	55000
9	Saket	120	120	10	Speed Travels	100000
10	Janakpuri	100	100	20	Kisan Tours	95000

(i) To show all information of students where capacity is more than the no. of students in order of rtno.

(ii) To show area_covered for buses covering more than 20 km., but charges less than Rs. 80000.

(iii) To show transporter-wise total no. of students travelling.

(iv) To show rtno, area_covered and average cost per student for all routes where average cost per student is – charges/no. of students.

(v) Add a new record with the following data:
(11, “Moti Bagh”, 35, 32, 10, “Kisan Tours”, 35000)

(vi) Give the output of the following queries:

a) SELECT SUM(DISTANCE) FROM SCHOOLBUS WHERE TRANSPORTER = „YADAV CO.”;

b) SELECT MIN(NOOFSTUDENTS) FROM SCHOOLBUS;

c) SELECT AVG(CHARGES) FROM SCHOOLBUS WHERE TRANSPORTER = “ANAND CO.”;

d) SELECT DISTINCT TRANSPORTER FROM SCHOOLBUS;

24). Consider the following tables STORES and SUPPLIERS. Write SQL commands for the statements (i) to (viii) and give output for SQL queries (ix)

Table : STORES

ItemNo	Item	Scode	Qty	Rate	LastBuy
2005	Sharpener Classic	23	60	8	31-Jun-09
2003	Ball Pen	0.25	50	25	01-Feb-10

2002	Gel Pen Premium	21	150	12	21-Feb-10
2006	Gel Pen Classic	21	250	20	11_mar-09
2001	Eraser Small	22	220	6	19-Jan-09
2004	Eraser Big	22	110	8	02-Dec-09
2009	Ball Pen 0.5	21	180	18	03-Nov-09

Table : SUPPLIERS

Scode	Sname
21	Premium Stationery
23	Soft Plastics
22	Tetra Suppliers

(i) To display details all the items in the Stores table in ascending order of LastBuy.
(ii) To display Itemno and Itemname of those items from stores table whose rate is more than 15 rupees.
(iii) To display the details of those items whose supplier code is 22 or Quantity in store is more than 110 from the table Stores.
(iv) To display minimum rate of Items whose Supplier individually as per Scode from the table Stores.
(v) To display the details of all the items in ascending order of LastBuy.
(vi) To display the details of the supplier TETRA SUPPLIERS from both the tables.
(vii) To depreciate the rate of items by 2%.
(viii) To display the details of the items whose last purchase date was before November 2009.
(ix) Write the output of the following queries:
a) SELECT COUNT(DISTINCT SCODE) FROM STORE.
b) SELECT RATE * QTY FROM STORE WHERE ITEMNO = 2004;
c) SELECT ITEM, SNAME FROM STORE S, SUPPLIER P WHERE S.SCODE = P.SCODE AND ITEMNO = 2006;
d) SELECT MAX(LASTBUY) FROM STORE;

Month : October **Topic: Linked Lists and Data structures**

25) Each node of QUEUE contains:
- Eno, Salary, Pointer field

Front is the first node of QUEUE and REAR is the last node. Write a menu-driven program:
- To add an element in the queue
- To delete an element from the queue

26) Each node of STACK contains:
- Rollno
- Age
- Pointer field

TOP is the first node of STACK. Write a menu-driven program:
- To push
- To pop

27) Write a function to perform insert operation in a static circular queue containing book information.

```
struct book
{
  long accno;
  char title[20];
};
```