Boys' High School & College

Class XI

Computer Science

Arrays- Objects passed as parameters

Question 1

Two matrices are said to be equal if they have the same dimension and their corresponding elements are equal. [10]

For example, the two matrices A and B is given below are equal:

Matrix A

1	2	3
2	4	5
3	5	6

Matrix B

1	2	3
2	4	5
3	5	6

Design a class EqMat to check if two matrices are equal or not. Assume that the two matrices have the same dimension.

Some of the members of the class are given below :

Class name: EqMat

Data members/instance variables:

a[][] : to store integer elements

m: to store the number of rows

n: to store the number of columns

Member functions/methods:

EqMat: parameterized constructor to initialise the data members m = mm and n = nn

void readArray(): to enter elements in the array

int check(EqMat P, EqMat Q): checks if the parameterized objects P and Q are equal and returns 1 if true, otherwise returns 0

void print(): displays the array elements

Define the class EqMat giving details of the constructor), void readarray( ), int check(EqMat, EqMat) and void print( ). Define the main( ) function to create objects and call the functions accordingly to enable the task.

Question 2

A class Adder has been defined to add any two accepted time. [10]

Example:

Time A – 6 hours 35 minutes

Time B – 7 hours 45 minutes

Their sum is – 14 hours 20 minutes (where 60 minutes = 1 hour)

The details of the members of the class are given below:

Class name: Adder

Data member/instance variable:

a[ ]: integer array to hold two elements (hours and minutes)

Member functions/methods:
Adder (): constructor to assign 0 to the array elements
void readtime (): to enter the elements of the array
void addtime (Adder X, Adder Y): adds the time of the two parameterized objects X and Y and stores the sum in the current calling object
void disptime(): displays the array elements with an appropriate message (i.e., hours= and minutes=)
Specify the class Adder giving details of the constructor( ), void readtime( ), void addtime(Adder, Adder) and void disptime(). Define the main() function to create objects and call the functions accordingly to enable the task.

Question 3
A class Shift contains a two-dimensional integer array of order (m×n) where the maximum values of both m and n are 5. Design the class Shift to shuffle the matrix (i.e. the first row becomes the last, the second row becomes the first and so on). The details of the members of the class are given below: [10]
Class name: Shift
Data member/instance variable:
mat[][]: stores the array element
m: integer to store the number of rows
n: integer to store the number of columns
Member functions/methods:
Shift(int mm, int nn): parameterized constructor to initialize the data members m=mm and n=nn
void input(): enters the elements of the array
void cyclic(Shift p): enables the matrix of the object (P) to shift each row upwards in a cyclic manner and store the resultant matrix in the current object
void display(): displays the matrix elements
Specify the class Shift giving details of the constructor(), void input(), void cyclic(Shift) and void display(). Define the main() function to create an object and call the methods accordingly to enable the task of shifting the array elements.

Question 4
A class Merger concatenates two positive integers that are greater than 0 and produces a newly merged integer. [10]
Example: If the first number is 23 and the second is 764, then the concatenated number will be 23764.
Some of the members of the class are given below:
Class name: Merger
Data members/instance variables:
n1: long integer to store the first number
n2: long integer to store the second number
mergNum: long integer to store the merged number
Member functions:
Merger(): constructor to initialize the data members
void readNum(): to accept the values of the data members n1 and n2
voidjoinNum(): to concatenate the numbers n1 and n2 and store it in

mergNum
void show(): to display the original numbers and the merged number with appropriate messages
Specify the class Merger giving the details of the constructor, void readNum(), void joinNum() and void show(). Define the main() function to create an object and call the functions accordingly to enable the task.

Question 5
A class Mixer has been defined to merge two sorted integer arrays in ascending order. Some of the members of the class are given below: [10]
Class name: Mixer
Data members/instance variables:
int arr[ ]: to store the elements of an array
int n: to store the size of the array
Member functions:
Mixer(int nn): constructor to assign n=nn
void accept(): to accept the elements of the array in ascending order without any duplicates
Mixer mix (Mixer A): to merge the current object array elements with the parameterized array elements and return the resultant object
void display(): to display the elements of the array
Specify the class Mixer, giving details of the constructor(int), void accept(), Mixer mix(Mixer) and void display(). Define the main( ) function to create an object and call the function accordingly to enable the task.

Question 6
A class Matrix contains a two-dimensional integer array of an order [m * n]. The maximum value possible for both 'm' and 'n' is 25. Design a class Matrix to find the difference between the two matrices. The details of the members of the class are given below: [10]
Class name: Matrix
Data members/instance variables:
arr[][]: stores the matrix element
m: integer to store the number of rows
n: integer to store the number of columns
Member functions:
Matrix (int mm, int nn): to initialize the size of the matrix m = mm and n = nn
void fillarray(): to enter the elements of the matrix
Matrix SubMat(Matrix A): subtract the current object from the matrix of the parameterized object and return the resulting object
void display(): display the matrix elements
Specify the class Matrix giving details of the constructor(int, int), void fillarray(), Matrix SubMat

(Matrix) and void display (). Define the main ( ) function to create objects and call the methods accordingly to enable the task.

Question 7

A class Combine contains an array of integers which combines two arrays into a single array including the duplicate elements, if any, and sorts the combined array. Some of the members of the class are given below: [10]

Class name: Combine

Data Members/instance variables:

com[]: integer array

size: size of the array

Member functions/methods:

Combine(nt nn): parameterized constructor to assign size = nn

void inputarray(): accepts the array elements.

void sort(): sorts the elements of the combined array in ascending order using the selection sort technique.

void mix(Combine A, Combine B): combines the parameterized object arrays and stores the result in the current object array along with duplicate elements, if any.

void display(): displays the array elements

Specify the class Combine giving details of the constructor (int), void inputarray(), void sort(), void mix (Combine, Combine) and void display (). Also, define the main() function to create an object and call the methods accordingly to enable the task.