Question 1

Design a class WordWise to separate words from a sentence and find the frequency of the vowels in each word. Some of the members of the class are given below:

Class name :	**WordWise**
Data members/instance variables:	
str :	to store a sentence
Member functions/methods:	
WordWise( ) :	default constructor
void readsent( ) :	to accept a sentence
int freq_vowel(String w) :	returns the frequency of vowels in the parameterized string w
void arrange( ) :	displays each word of the sentence in a separate line along with the frequency of vowels for each word by invoking the function freq_vowel( )

Define the class WordWise giving details of the constructor( ), void readsent(), int freq_vowel(String) and void arrange(). Define the main( ) function to create an object and call the functions accordingly to enable the task

Question 2

Design a class PrimePalinGen to generate prime palindrome numbers. [A number is said to be prime palindrome if the number is a prime as well as a palindrome number] [Prime number: A number having only two factors i.e. 1 and itself] [Palindrome number: A number which is same as its reverse] Example: 11(where 11 is a prime number and a palindrome number) Some of the members of the class are given below:

Class name :	**PrimePalinGen**
Data members/instance variables:	
start :	to store the start of range
end :	to store the end of range
Methods/Member functions:	
PrimePalinGen (int a, int b) :	parameterized constructor to initialize the data members start=a and end=b
int isPrime(int i) :	returns 1 if the number is prime otherwise returns 0
int isPalin(int i) :	returns 1 if the number is a palindrome otherwise returns 0
void generate( ) :	generates all prime palindrome numbers between start and end by invoking the functions isPrime() and isPalin().

Specify the class PrimePalinGen giving details of the constructor( ),int isPrime(int), int isPalin(int) and void generate( ). Define a main( ) function to create an object and call the functions accordingly to enable the task.

Question 3

Design a class Sort which to e arranged an array in ascending order. The details of the members of the class are given below :

Class name :	**Sort**
Data members /instance variables:	
arr[] :	stores integers
len :	to store the length of the array
Member functions :	
void read(int n) :	assign len =n , create the array of size n and input array from user
void arrange ( ) :	to arrange array using Selection Sorting technique.
void display( ) :	displays the array

Specify the class Sort giving details of the void read( ), void arrange( ), and void display( ). Define the main( ) function to create an object and call the functions accordingly to enable the task.

Question 4

A class ArrayMax contains a square matrix which finds the largest element in each row. Some of the members of the class are given below:

Class name : **ArrayMax**

Data member/instance variable:

arr[ ][ ] :	array to store integer elements
m :	to store the order of the matrix

Member functions/methods:

ArrayMax(int mm) :	parameterized constructor to initialize the data member m=mm and to declare the array
void readarray() :	to accept the array elements
void large( ) :	finds and displays the largest element in each row with an appropriate message
void display() :	displays the array elements in matrix form

Specify the class ArrayMax, giving the details of the constructor( ), void readarray( ), void large( ) and void display( ). Define the main( ) function to create an object and call the functions accordingly to enable the task.

Question 5

The class Rotate contains the following members:

Instance Variables

int [][]a is used to store numbers.
int [][]b is used to store numbers.
int r is used to store number of rows of matrix a.
int c is used to store number of columns of matrix a.

Methods

Roate(int x, int y) parameterized constructor to assign r=x and c=y and declare the arrays a[][] and b[][]
public void fillArray() accepts numbers in matrix a and displays it.
public void rotate90DegClock() reads the elements of the matrix a row-wise and stores them in matrix b in such a way that the element of matrix a gets rotated 90 degree clockwise in matrix b and display it.
public void rotate90DegAntiClock() reads the elements of the matrix a row-wise and stores them in matrix b in such a way that the element of matrix a gets rotated 90 degree clockwise in matrix b and display it.
void displayOriginalArray() displays matrix a.
void displayRotatedArray() displays matrix b.
Write a program that declares and defines the members of class Rotate.

Question 6

The class **Counter** contains the following members:

Data members:

char guest[] is used to store the guest list.

int noe is used to store number of guest.

int count is used to store the count.

Methods

public void acceptGuestList( ) accepts list of guests, which consists of character 'l' for lady, character 'g' for gentleman and character 'c' for child.

private void incCount( ) increments count by 1.

private int giveCount( ) returns the value of count.

private void displayCount( ) displays the number of ladies, gentlemen and children in the format given below.

Number of ladies :

Number of gentlemen :

Number of children :

Write a program that declares and defines the members of class Counter.

Question 7

A square matrix is the matrix in which the number of rows is equal to the number of columns. Thus, a matrix of order nxn is called square matrix. Write a program in Java to fill the numbers in a circular fashion (clockwise) with natural numbers from 1 to n^2, taking n as input.

For example, if n=5, then n^2=25, then the array filled is

1	2	3	4	5
16	17	18	19	6
15	24	25	20	7
14	23	22	21	8
13	12	11	10	9

Question 8

Write a Java program to accept 16 number in a 4x4 integer array and perform the following tasks:

(a) Print the array in the form of a matrix
(b) Print the sum of diagonal elements
(c) Print upper diagonal elements
(d) Print lower diagonal elements
(e) Print row wise sum of the elements
(f) Print column wise sum of the elements

Question 9

A class Composite contains a two-dimensional array of order [m x n]. The maximum values possible for both 'm' and 'n' is 20. Design a class Composite to fill the array with the first (m x n) composite numbers in column wise. [Composite numbers have more than two factors] The details of the members of the class are given below:

Class name :	**Composite**
Data members /instance variables :	
arr[ ][ ] :	stores the composite numbers column wise
m :	integer to store the number of rows
n :	integer to store the number of columns
Member functions :	
Composite(int mm, int nn) :	to initialize the size of the matrix m=mm and n=nn
int isComposite(int p) :	returns 1 if number is composite otherwise returns 0.
void fill ( ) :	to fill the elements of the array with the first (m × n)composite numbers in column wise
void display( ) :	displays the array in a matrix form.

Specify the class Composite giving details of the constructor(int,int), int isComposite(int), void fill( ) and void display( ). Define a main( ) function to create an object and call the functions accordingly to enable the task.

Question 10

A Special number is a number in which the sum of the factorial of its digits is equal to the number. Example: 145 (1! + 4! + 5! = 145). Thus, 145 is a special number. Design a class Special to check if the given number is a Special number or not. Some of the members of the class are given below:

Class name :	**Special**
Data members /instance variables :	
n:	integer to store the number
Member functions :	
Special( ) :	default constructor
void read( ) :	to accept the number
int factorial(int x) :	return the factorial of a number using recursion technique.
boolean isSpecial( ) :	checks for the special number by invoking the function factorial( ) and returns true if Special, otherwise returns false
void display( ) :	to show the result with an appropriate message.

Specify the class Special, giving details of the Constructor, void read( ), int factorial(int), boolean isSpecial( ) and void display( ). Define the main() function to create an object and call the member function according to enable the task.

Question 11

Design a class Perfect to check if a given number is a perfect number or not. [A number is said to be perfect if sum of the factors of the number excluding itself is equal to the original number]

Example : 6 = 1 + 2 + 3 (where 1, 2 and 3 are factors of 6, excluding itself). Some of the members of the class are given below:

Class name :	**Perfect**
Data members/instance variables:	
num :	to store the number
Methods/Member functions:	
Perfect (int nn) :	parameterized constructor to initialize the data member num=nn
int sum_of_factors(int i) :	returns the sum of the factors of the number(num), excluding itself, using recursive technique
void check( ) :	checks whether the given number is perfect by invoking the function sum_of_factors( ) and displays the result with an appropriate message

Specify the class Perfect giving details of the constructor( ), int sum_of_factors(int) and void check( ). Define a main( ) function to create an object and call the functions accordingly to enable the task.

Question 12

Define a class Marks to calculate the maximum and average marks with the following description.

Class name: **Marks**

Data member/instance variables:

name: to store name of the student

m1, m2 , m3, m4, m5: to store marks in five different subjects

max: to store maximum marks

avg: to store average marks

Member functions/methods:

Marks(): default constructor

void accept(): to accept name and marks in 5 different subjects

void compute(): to calculate average marks and maximum marks

void display(): to display the name, marks, average marks, maximum marks

Define the main() function to create an object and call the functions accordingly to enable the task.

Questions 13

Given a time in the format of hh:mm (12-hour format) 0 < hh < 12, 0 <= mm < 60. The task is to convert it into words as shown:

Input : h = 5, m = 0
Output : five o' clock

Input : h = 6, m = 24
Output : twenty four minutes past six

Cases:
6:00 six o'clock
6:10 ten minutes past six
6:15 quarter past six
6:30 half past six
6:45 quarter to seven
6:47 thirteen minutes to seven

Question 14

The result of a quiz competition is to be prepared as follows:

- The quiz has 5 questions with multiple choices (a,b,c,d) with each question carrying 1 mark for correct answer.

Design a program to accept the number of participants 'N' such that N>3 and N<11. Create a double dimensional array of size Nx5 to store the answer of each participant row-wise. Calculate the marks of each participant by matching the correct answer stored in a single dimensional array of size 5. Display the score of each participant and the participant having highest score.

Input:

N=4

Participant	Q1	Q2	Q3	Q4	Q5
1	A	B	B	C	A
2	D	A	D	C	B
3	A	A	B	A	C
4	D	C	C	A	B

Answer key:

Q1	Q2	Q3	Q4	Q5
D	C	C	A	B

Output:

Participant 1 = 0
Participant 2 = 2
Participant 3 = 1
Participant 4 = 5
Highest Score: Participant-4