Sections Covered :

 [Loops , Arrays, Sorting, Searching, Java class & objects , practical scenarios in projects]

Note :   This assignment is structured in the way to test the Logical thinking in programming ,

        So we strongly expected to use the fundamental technical aspects of programming

Please complete this assignment before 24th August 2019 , Saturday.

Q1 . Given a number , write program using while loop to reverse the digits of the number.

        Example 12345 should be written as 54321

(Hint : Use modulus operator to extract the last digit and the integer division by 10 to get the n-1 digit number from the n digit number)

Q2 . The factorial of an integer m is the product of consecutive integers from I to m. That is factorial m = m! =m*(m-1)*……….*1

Write a program that computes and prints a table of factorials for any given m.

Q3 . The number in the sequence 1 1 2 3 5 8 13 21 …………..

Are called Fibonacci numbers . Write a program using a do…. While loop to calculate and print the first m Fibonacci numbers.

(Hint : After the first two numbers in the series , each number is the sum of the two preceding numbers)

Q4 . Generate Multiplication Table for numbers from 1 to 10

        1.by using for loop

        2. by using while loop

Q5 . Find the Factors of a given Positive Integer using loop

            Eg : Factors of 60 are: 1 2 3 4 5 6 10 12 15 20 30 60

Q6 . Check whether an alphabet is vowel or consonant (vowels are "A,E,I,O,U")

        1 . by using if.,else statement

        2. by using switch case statements

Q7 . Given a word for you , you need to count the number of vowels and consonants in the given word

Eg :- given word : ALPHABET

   No of Vowels : 3 & consonants : 5

Q8 . You have give a comma separated words of " apple , orange , strawberry , banana , ……" ,

Part 1 : you have to separate the words by comma and assign those words to string array , and display the words one by one (Note : don't use java inbuild string function to do this)

Part2 : Do this by using java inbuild string functions , and share your experience in working with the pure codes and using library

Q9 . write a program to Remove all white spaces from a string

e.g : (some   extra   space) ------------- > (someextraspace)

P1) **without using** any inbuild java functionality

P2) **using** String functions in java

Q10 . Write a program to Sort Elements in Dictionary Order

Part 1 **: without using** any java inbuild functionality

Part 2 : **by using** java inbuild functionality

Q11 .Write a program to calculate the difference between **two time intervals**

A) Do this task with out any java inbuild functionality

B) use java **Time class** to achieve this

C) **e**xplain little about the java time class

Q12 .Write a program to calculate the number of days **between two Given Dates ,**

A) Do this task with out any java inbuild functionality

B) use java Date class to achieve this

C) **e**xplain little about the java **Date class**

Q13 . Write a program to compute the standard deviation

Steps :

   1.Create the array with 10 numbers

   2. calculate the average of the 10 numbers

   3. from the average value , subtract and square each value and sum all

Note : Don't use any maths inbuild function in java

Q14 . The standard form of a quadratic equation is:

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ax² + bx + c = 0, where
a, b and c are real numbers and
a ≠ 0
```

The term b^2-4ac is known as the determinant of a quadratic equation. The determinant tells the nature of the roots.
- If determinant is greater than 0, the roots are real and different.
- If determinant is equal to 0, the roots are real and equal.
- If determinant is less than 0, the roots are complex and different.

Write a program to find the roots of quadratic equation

Q15. Write a program to evaluate the following investment equation

$V=P(1+r)^n$ and print the tables which would give the value of V for various combination of the following values of P, r and n.

P : 1000 , 2000 , 3000 , ….. , 10 ,0000

R :0.10 , 0.11 , 0.12 , …… ,0.20

N : 1,2,3,………. 10

(Hint : P is the principal amount and V is the value of money at the end of n years. This equation can be recursively written as)

$V=P(1+r)$

$P=V$

That is , the value of money at the end of first year becomes the principal amount for the next year and so on

Q16 . Explain the difference between Linear Search and Binary Search

1. Write a program to search a number in an array **using linear search**

2. Write a program to search a number in an array **using binary search**

Q17. This Question is based on the sorting algorithms

1. Explain the **Bubble sort** ? Write a program to sort an Integer array using **Bubble sort**

2. Explain the **Selection sort** ? Write a program to sort an Integer array using **Selection sort**

3. Explain the **Insertion sort** ? Write a program to sort an Integer array using **Insertion sort**

4. Explain the **Merge sort** ? Write a program to sort an Integer array using **Merge sort**

5. Explain the **Quick sort** ? Write a program to sort an Integer array using **Quick sort**

Q18 . By defining a 2D array create a program to **add two matrix** and display the out put in matrix form

Q19 . By defining a 2D array create a program to **multiply two matrix** and display the out put in matrix form

Q20 . Define a **5 x 5 2D array** and create 'L' shape out of it, by using suitable **rotation matrix** , rotate the image by 90 degrees.

Q21 . Define a **400 X 400 2D** array space and plot the graph area in the console screen .

After that you need to provide straight line equation in **y=mx+c** form and plot the graph

Q22 . An election is contested by 5 candidates. The candidates are numbered 1 to 5 and the voting is done by marking the candidate number on the ballot paper. Write a program to read the ballots and count the votes cast for each candidate using an array variable count . In case , a number read is outside the range 1 to 5 , the ballot should be considered as a 'spoilt ballot' and the program should also count the number of spoilt ballots.

Q23. Prepare the daily maximum temperatures recorded in 10 cities during the certain month

In the form of a 2D array

1. Tabulate the data in the form of table in a console screen
2. Find the city and day corresponding to (a) the highest temperature (b) the lowest temperature

Q24 .   Write a program to read a 5 students 3 subjects marks by a console application and store the **data appropriately in a suitable array**

a) From that find the total marks obtained by each student
b) The highest marks in each subject and the Roll No . of the student who secured it.
c) The student who obtained the highest total marks

After this modify the program using appropriate **object structure to store in a Student array**, then

a) From that find the total marks obtained by each student
b) The highest marks in each subject and the Roll No . of the student who secured it.
c) The student who obtained the highest total marks

Q25 . Scenario from Time Tracker system for employees

• Users have to Enter there worked time in a 30 min , or 1 hr , 1 hr 30 mins , 2hrs with the parameter of what they task they have done.
• Task and appropriate times are stored in the Array in Date wise
• The total time for the work is not exceed 8 hrs and the task cannot be allowed to add to that array.
• You have to search the task which had done in previous days by searching date
• You cannot add the task and time for the next days and previous days

Q26 . Leave Allocation policy for a certain company is given here

Employee Joining in the company is consider for a Temporary employees for the First year ,

In the next year of their work there Annual leave allocation is as follows , according to their joining date

Leave Rule for Annual Leave Allocation

Jan 1 – March 31 ====== > Annual Days Allocation 10

April 1 – June 30 ====== > Annual Days Allocation 7

July 1 – September 30 ====== > Annual Days Allocation 3

October 1 – December 30 ====== > No allocation

You have to design a console application such that it should ask the User to

- Enter the Date in which they joined
- By Analysing the joined date with the Annual leave Allocation rules there annul leave should be displayed to them

Q27 . Read the following Instructions about **Leave work flow configuration** and design a console program

1. Make an option to select the type of user such as, HR , Director , Manager , Staff
2. If you choose HR then you can permitted to choice one of the following options
   A. make leave configuration

   B .View All leave Configurations

   C ..Modify leave Configuration

   D .Remove a leave configuration
3. For others the leave work flow appropriate to them is shown.

   (Hints :

   Make leave Configuration : you need to ask in steps to input the order of person involve steps)

Q28 . By using the above program Now you need to send a leave request ,

The leave request work flow is like this

- Select the Type of user from the list of user
- the leave request form with the parameters of [Leave Star Date , End Date and Reason]
- Requested Leave Should be visible to the employees involve in the above mentioned work flow
- While the appropriate employees accept or reject then the progress should visible to user

Q29 . This is the scenario about Defect tracker

1. Create a project with the parameters [project Id , Project Name]
2. Can able to add Defects for the particular project with parameters [Defect Id , defect Description , Severity , Defect Status =NEW]
3. Defects should be listed in the order of their Severity as (HIGH, MEDIUM, LOW)

Q30 . By following Q29 , the Defect tracker Defect status should be is as follows

1.Ask the User to select Whether they are QA or Developer

If they are a Developer

- Ask a user to select the particular defect by defect ID
- After its selected the option with [OPEN , REJECTED] should available
- After OPEN the defect you have the options to select [FIXED]
- After you have FIXED the defect final defect status records must be visible

If they are QA

- You can enter a defect
- [CLOSE] rejected defects
- [REOPEN or CLOSE] fixed defect