SUNRISE ACADEMY

PROJECT QUESTIONS

Class – 12th

Instructions:

1. Type the given programs in java.
2. Start each program from the fresh page and type the question before typing the solution of the program.
3. Show the output of the following programs.
4. Decoration and colouring is not allowed on the cover.
5. The project should have the following pages:

a. **Title page**
b. **Table of contents (program title like – 1. Program 1- Disarium number check)**
c. **Certificate**
d. **Acknowledgement**
e. **Programs**
f. **Bibliography**

6. Computer project should be printed with spiral binding.
7. Project will be evaluated and the student will be awarded marks out of 10 for the project work.

Programs

1. A disarium number is a number in which the sum of the digits to the power of their respective position is equal to the number itself.

Example: $135 = 1^1 + 3^2 + 5^3$
Hence, 135 is a disarium number.

2. Design a class Merger to input and concatenates two positive integers that are greater than 0 and produces a new merged integer.

Example: If the first number is 23 and the second number is 764, then the concatenated number will be 23764.

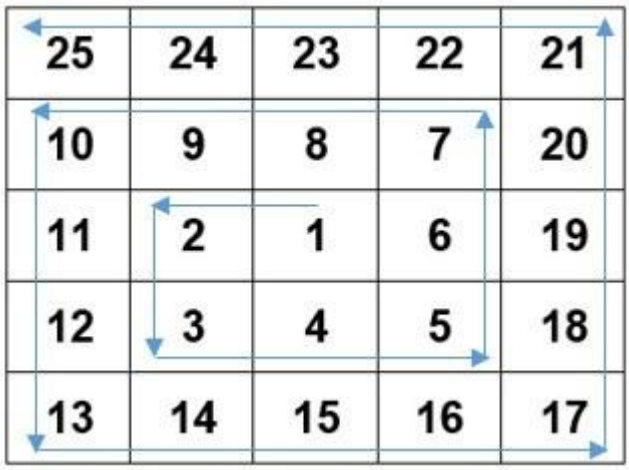
3. A class mixer has been defined to merge two sorted integer arrays in ascending order.

4. Accept a number and check whether it is an Emirp number of not. An emirp number is a number which is prime backwards and forwards.
Example: 13 and 31 are both prime numbers. Thus, 13 is an emirp number.

5. Design a class VowelWord to accept a sentence and calculate the frequency of words that begins with a vowel. The words in the input string are separated by a single blank space and terminated by a full stop.

6. Write a Program in Java to fill a square matrix of size 'n*n" in a spiral fashion (from the inside) with natural numbers from 1 to n*n, taking 'n' as input.

For example: if n = 5, then n*n = 25, hence the array will be filled as given below.



7. Write a program which first input two integers, the first between 1 to 12 and second between 0 to 59 and print out the time they represent, in words.
Example: Input: 3, 0
Output: 3:00 Three O'clock

8. Write a program to input two dates from the user and count the number of days between two dates.

9. Write a program to input an array of integers and sort it using Bubble Sorting Algorithm.

10. Write a program to check the number is unique or not. A unique digit integer is a positive integer (without leading zeros) with no duplicate digits. For example 7, 135, 214 are all unique integers whereas 22,3121, 300 are not.

11. The input in this question will consist of a number of lines of English text consisting of the letters of the English alphabets, the punctuation marks (') apostrophe, (.) full stop, (,) comma , (;) semicolon , (:) colon and white space. Write a program to print the words of the input in reverse order without any punctuation marks other than blanks.

For example, Consider the following input text:

INPUT:
Enter number of sentences: 2
Enter the sentences:
This is a sample piece of text to illustrate this question
if you are smart you will solve this right.

OUTPUT: right this solve will you smart are you if question this illustrate to text of piece sample a is this

12. A **Circular Prime** is a prime number that remains prime under cyclic shifts of its digits. When the leftmost digit is removed and replaced at the end of the remaining string of digits, the generated number is still prime. The process is repeated until the original number is reached again.
A number is said to be prime if it has only two factors I and itself.
Example:
131
311
113
Hence, 131 is a circular prime.
Test your program with the sample data and some random data:

13. Write a Program in Java to input a number and check whether it is a **Pronic Number** or **Heteromecic Number** or not.
Pronic Number : A pronic number, oblong number, rectangular number or heteromecic number, is a number which is the product of two consecutive integers, that is, n (n + 1).
The first few pronic numbers are:
0, 2, 6, 12, 20, 30, 42, 56, 72, 90, 110, 132, 156, 182, 210, 240, 272, 306, 342, 380, 420, 462 … etc.

14. The result of a quiz competition is to be prepared as follows:
The quiz has five questions with four multiple choices (A, B, C, D), with each question carrying 1 mark for the correct answer. Design a program to accept the number of participants N such that N must be greater than 3 and less than 11. Create a double dimensional array of size (Nx5) to store the answers of each participant row-wise.
Calculate the marks for each participant by matching the correct answer stored in a single dimensional array of size 5. Display the scores for each participant and also the participant(s) having the highest score.
Example: If the value of N = 4, then the array would be:

	Q.1	Q.2	Q.3	Q.4	Q.5
Participant 1	A	B	B	C	A
Participant 2	D	A	D	C	B
Participant 3	A	A	B	A	C
Participant 4	D	C	C	A	B

Key to the question:	D	C	C	A	B

Note: Array entries are line fed (i.e. one entry per line)
Test your program with the sample data and some random data:

Example 1
INPUT : N = 5

Participant 1 D A B C C
Participant 2 A A D C B
Participant 3 B A C D B
Participant 4 D A D C B
Participant 5 B C A D D
Key: B C D A A

OUTPUT : Scores :
Participant 1 D A B C C
Participant 1 = 0
Participant 2 = 1
Participant 3 = 1
Participant 4 = 1
Participant 5 = 2
Highest score: Participant 5

15. A company manufactures packing cartons in four sizes, i.e. cartons to accommodate 6 boxes, 12 boxes, 24 boxes and 48 boxes. Design a program to accept the number of boxes to be packed (N) by the user (maximum up to 1000 boxes) and display the break-up of the cartons used in descending order of capacity (i.e. preference should be given to the highest capacity available, and if boxes left are less than 6, an extra carton of capacity 6 should be used.)
Test your program with the sample data and some random data:

Example 1
INPUT : N = 726
OUTPUT :
48 x 15 = 720
6 x 1 = 6
Remaining boxes = 0
Total number of boxes = 726
Total number of cartons = 16

16. Write a program to declare a square matrix A[][] of order (M x M) where 'M' must be greater than 3 and less than 10. Allow the user to input positive integers into this matrix. Perform the following tasks on the matrix:
(a) Sort the non-boundary elements in ascending order using any standard sorting technique and rearrange them in the matrix.
(b) Calculate the sum of both the diagonals.
(c) Display the original matrix, rearranged matrix and only the diagonal elements of the rearranged matrix with their sum.
Test your program with the sample data and some random data:

Example 1
INPUT :M = 4

9	2	1	5
8	13	8	4
15	6	3	11
7	12	23	8

OUTPUT:

ORIGINAL MATRIX

```
9    2        1        5
8    13       8        4
15   6        3        11
7    12       23       8
```

REARRANGED MATRIX

```
9    2        1        5
8    3        6        4
15   8        13       11
7    12       23       8
```

DIAGONAL ELEMENTS

```
9             5
     3        6
     8        13
7             8
```

SUM OF THE DIAGONAL ELEMENTS = 59

17. Write a program to declare a square matrix A[][] of order (M x M) where 'M' must be greater than 3 and less than 10. Allow the user to input positive integers into this matrix. Perform the following tasks on the matrix:
(a) Sort the boundary elements in descending order using any standard sorting technique and rearrange them in the matrix.
(b) Calculate the sum of the boundary elements.
(c) Display the original matrix, rearranged matrix and sum of the boundary elements.
Test your program with the sample data and some random data:

Example 1

INPUT :M = 4

```
9  2  1  5
8  13 8  4
15 6  3  11
7  12 23 8
```

OUTPUT:

ORIGINAL MATRIX

```
9  2  1  5
8  13 8  4
15 6  3  11
7  12 23 8
```

REARRANGED MATRIX

```
23 15 12 11
1  13 8  9
2  6  3  8
4  5  7  8
```

The sum of boundary elements is = 105

18. Write a program to accept a sentence which may be terminated by either '.' or '?' only. The words are to be separated by a single blank space. Print an error message if the input does not terminate with '.' or '?'. You can assume that no word in the sentence exceeds 15 characters, so that you get a proper formatted output.

Perform the following tasks:
(i) Convert the first letter of each word to uppercase.
(ii) Find the number of vowels and consonants in each word and display them with proper headings along with the words.
Test your program with the following inputs.

Example 1
INPUT: Intelligence plus character is education.
OUTPUT:
Intelligence Plus Character Is Education

Word	Vowels	Consonants
Intelligence	5	7
Plus	1	3
Character	3	6
Is	1	1
Education	5	4

19. Write a program to accept a sentence which may be terminated by either'.', '?'or'!' only. The words may be separated by more than one blank space and are in UPPER CASE.
Perform the following tasks:

(a) Find the number of words beginning and ending with a vowel.

(b) Place the words which begin and end with a vowel at the beginning, followed by the remaining words as they occur in the sentence.

Test your program with the sample data and some random data:

Example 1
INPUT: ANAMIKA AND SUSAN ARE NEVER GOING TO QUARREL ANYMORE.
OUTPUT: NUMBER OF WORDS BEGINNING AND ENDING WITH A VOWEL= 3

20. Write a program to accept the year, month and the weekday name of the 1st day of that month and generate its calendar.

Example :
INPUT :
Year : 2016
Month : February
1st day of February : Monday
OUTPUT :

```
---------------------------------
           February 2016
---------------------------------
SUN MON TUE WED THU FRI SAT
---------------------------------
     1   2   3   4   5   6
---------------------------------
 7   8   9   10  11  12  13
---------------------------------
 14  15  16  17  18  19  20
---------------------------------
 21  22  23  24  25  26  27
---------------------------------
 28  29
```

SUNRISE ACADEMY

Session: 2021 - 2022

COMPUTER SCIENCE

Made by:

Name: _____

Class: _____

CERTIFICATE

This is to certify that (Name of the student) of class (Class) has successfully completed the project work on Computer Science for examination in the year of 2021-2022, under the guidance of Miss. Shipra Khanna. It is further certified that this project is the individual work of the candidate.

_____

Miss. Shipra Khanna
(Subject Teacher)

_____
External Examiner

_____
Mrs. Nitu Tomar
(Principal)

ACKNOWLEDGEMENT

Primarily I would thank God for being able to complete this project with success. Then I would like to thank my subject teacher Miss. Shipra Khanna whose valuable guidance has been the one that helped me patched this project and make it full prove success. His/Her suggestion and instruction has served as the major contribution towards the exhaustive of the contribution.

I would also like to extend my gratitude to the principal mam Mrs. Nitu Tomar for providing all the facility that was required. Then, I would like to thank my parents and friends who have helped me with their valuable suggestions. Their guidance has been helpful in various phases of the completion of the project.
Last but not the least I would like to thank my classmates who have helped me.

Date:_____ Name: _____

Class: _____