RM Coding C++ Worksheet

1. Write a C++ program to sort a character array alphabetically using bubble sort. (lower case only). Eg: input: “worksheet” Output: “eehkorstw”

2. Write a C++ program to multiply two matrices and print the product. If the entered matrices are not compatible then print a message saying so.

3. In a given matrix for all zero elements the corresponding row and column must be replaced with zeroes. Write a C++ program to do that.

Eg: Input: [1 2 0 Output: [0 0 0
2 3 4 2 3 0
3 3 3] 3 3 0]

4. Write a C++ program to print whether a number is a hill number or not.

Note: Assume that a Hill Number is a natural number that has digits in ascending order followed by digits in descending order where consecutive digits are not the same i.e. the number has a peak and an ascending slope and descending slope.
Example:
Hill Number: 147521, 23454
Not Hill Number: 1, 12, 22, 12334, 123212321

5. Write a C++ program to input a decimal number and print its equivalent hexadecimal, octal and binary forms.

(If you are unaware of different number systems then please learn about them).6.
Write a C++ program to find if two numbers are Amicable numbers.
Note: Amicable numbers are two different numbers such that the sum of proper divisors of each is equal to the other number. e.g. 220 and 284
Factors of 220 1 + 2+ 4+ 5+ 10+ 11+20 +22+44+55+110 = 284
Factors of 284 1 + 2+ 4+ 71+142 = 220

6. Write a function for Bubble and Selection Sort. Ask the user for which method to use: ‘s’ for Selection Sort and ‘b’ for Bubble Sort. Call the correct function based on the user’s choice. After sorting the array, call another function that implements Binary Search to find the position of the number taken as input from the user. [Take the array as input from the user].

7. Write a function to copy a string into another string using pointers.

8. Write two functions:
i.To perform matrix multiplication
ii.To find the transpose of a matrix.
Use two matrices to verify the identity (A.B)' = B'. A'

9. (a) Given a 2D character array, where each row is a string, write a function which rearranges the strings in ascending order based on their lengths.
Input: word
number
cat

Output: cat
word
number

(b) Also, sort each individual string in ascending order.
Output: act dorw
bemnru

10. Display the first 40 terms of the Fibonacci sequence using recursion. It should not take more than 1 second to execute the program.

11. Implement Binary Search using recursion. (Take array as input).

12. Find the factorial of a number using recursion.

13. Find sum of digits of a number with and without recursion.

14. Implement the Euclidean algorithm to find the greatest common divisor of two numbers.

15. Implement a sort of your choice (bubble/selection) using recursion. (Take array as input).

OPTIONAL TASK:

16. **Input any graph, create its adjacency matrix and perform Dijkstra's, Kruskal's, and Prim's Algorithm.**