



Name: **CP Lab - 5** Duration: **3 Hrs** Date: **28 Dec, 2022**

Maximum Marks: **20**

INSTRUCTIONS:

1. Please carefully read all assignment problems and write the required programs in C language.
2. All **PROBLEMS** are **COMPULSORY**.
3. **You should submit the following**
 - **Five C files** - Name the file as follows:
 - **Program1_S2022xxxxx.c**
 - **Program2_S2022xxxxx.c**
 - **Program3_S2022xxxxx.c**
 - **Program4_S2022xxxxx.c**
 - **Program5_S2022xxxxx.c**
 - **Five text files** containing output of running the programs
 - **Output1_S2022xxxxx.txt**
 - **Output2_S2022xxxxx.txt**
 - **Output3_S2022xxxxx.txt**
 - **Output4_S2022xxxxx.txt**
 - **Output5_S2022xxxxx.txt**
4. Replace the “**S2022xxxxx**” in the filenames with your full roll number.
5. **DO NOT zip**. Upload the files directly to your submission in the common Google classroom.
6. Don't share or copy the codes. If malpractice is found, you will be awarded **Zero**.
****If you do not follow the above-mentioned instructions, a strict penalty would be imposed****

ASSIGNMENT PROBLEMS

1. Read a character array of length at-most 10 characters (it might include newline or tab or space character) and print its reverse. Do not use any library functions related to strings. Use EOF to mean end of the input, [**4 Marks**]
2. **insertion sort**: read an array of 10 integers. Sort them using the insertion sort. In insertion sort, an array of one integer is already sorted. If the first m elements of the array are sorted then we place the $(m+1)$ th element at its correct place in the already sorted sub-list. If the remaining array is

empty we can stop. Display the sorted output on the screen. Use nested for loops. Print number of comparisons and number of swaps done. **[4 marks]**

3. Fill a 2D array of two columns and 100 rows. Each row corresponds to a point in a straight line, where 1st column gives the x ordinate and 2nd column gives the y ordinate of a point on the line. Starting point for the line is (2,3) and Ending point is (200, 300). All points are equispaced. For a given (x,y) from the keyboard find its nearest neighbor on the line. Use the standard Euclidean distance to measure distance between two points. **[4 Marks]**
4. For a given 3x3 matrix (i) find whether it is singular or not, (ii) if nonsingular, find its inverse and print. **[4 Marks]**
5. Read a big string bs of length at-least 8 characters and utmost 24 characters and a small string of length at-least 1 character and utmost 4 characters, such that $|ss| < |bs|$. Find how many times ss is occurring as a subsequence in bs. **[4 Marks]**