CS-1004 Object Oriented Programming Fall - 2023

[Assignment – 01] **[Total Marks 100]**

Question 1: [Char Pointer Array (Cstring), Recursion] (10 marks)
Write a recursive function for the following problem. You need to change the location of the entries with indices between the two boundaries of the char array.

```
void ChangeLocation(char *Array, int b1, int b2);
```

Example:
Char array [8] == {'P', 'A', 'K', 'I', 'S', 'T', 'A', 'N'}
The bounds are 3 and 7 then after the function execution the value should be like
Char array [8] == {'P', 'A', 'A', 'I', 'S', 'T', 'K', 'N'}

Question 2: [Recursion] (10 marks)
Write a recursive function to print the following pattern.

```
void PrintPattern(int &n);
```

Example:
Enter any number = 4
4
2 2
1 3
1 1 2
1 1 1 1

Question 3: [Char Pointer Array (Cstring), Recursion] (10 marks)
Write a program to take two string inputs from user and call the recursive function to find whether the second string is a subsequent of the first.

```
void CheckSubsequent(char *str1, char *str2, int i, int j);
```

Example:
Enter String 1: patheticEnter String
2: the

Output: **True**

Example:
Enter String 1: packEnter String
2: cap

Output: **False**

Question 4: [DMA Int Pointer, Recursion] (10 marks)
Write a program to take input in dynamic integer array and show the occurrence of each number in the array in descending order using recursive function.

```
void FindOccurances(int *A, int i);
```

Example:
Enter elements in the array: {2,4,1,5,6,4,2}

Output:

Number	Occurrences
2	2
4	2
1	1
5	1
6	1

Question 5: [DMA, 2D Pointer] (10 marks)
Write a program and take distinct input in the 2D-dynamic array at each index. An element array[i][j] of array is termed as an "inversion of Array" if i < j and A[i][j] > A[j][i]. Write a program to count the number of inversions in the array using recursive function.

Question 6: [2D Pointer Array] (10 marks)
Write a program that takes a 2D pointer array and calculate sum of even and odd using pointer notation of the array.

Question 7: [String, Cstring] (10 marks)
Write a function that receives a string consisting of several lines of text and returns arrays indicating unique words in the text along with their size.

```
void countingUniqueWords (char * string, char *&uwords, int *size);
/*uwords - list of unique wordssize-size
ofwords*/
```

Question 8: [DMA 2D Pointer Array] (25 marks)
Write a program that takes a three 2D pointer array and find the following by implementing the function for each of the following task:

1. Is the sum of any two arrays is equal to the 3rd array?
   ```
   void CheckEqualSumArrays(int **A1, int **A2, int **A3);
   ```
2. Is the difference of any two arrays is equal to the 3rd array?
   ```
   void CheckDifferentArrays(int **A1, int **A2, int **A3);
   ```
3. Are there any equal arrays among these?
   ```
   void CheckEqualArrays(int **A1, int **A2, int **A3);
   ```
4. Find the same rows in each array.
   ```
   void FindSameRows(int **A1, int **A2, int **A3);
   ```
5. Rotate all three arrays up to 90 degrees in clockwise direction.
   ```
   void RotateArrays(int **A1, int **A2, int **A3);
   ```
   Note: You can only use the pointer notation in manipulation of the array.

Question 9:

- **Instructions.**
- Combine all your work in one folder. The folder must contain only the CPP files of each question separately. Format Q1_22i_1234.cpp
- Rename the folder as ROLL-NUM_SECTION_NAME (e.g. 22i-1234_A_Ali) and compress the folder as a zip file. (e.g. 22i-1234_A_Ali.zip).
- Do not submit .rar file.
- Submit the .zip file on Google Classroom within the deadline.
- Submission other than Google classroom (e.g. Email etc.) Will not be accepted.
- The student is solely responsible to check the final zip files for issues like corrupt file, virus in the file, mistakenly exe sent.
- If instructor cannot download the file from Google classroom due to any reason it will lead to zero marks in the assignment.
- Deadline to submit assignment is **17th September 2023 11:59 PM.**
- Assignment submitted after the deadline will be marked DIRECT ZERO.
- You are supposed to submit your assignment on GOOGLE CLASSROOM (CLASSROOM TAB only, not lab).
- Correct and timely submission of the assignment is the responsibility of every student; hence no relaxation will be given to anyone.
- For timely completion of the assignment, start as early as possible.
- Plagiarism is not allowed. If found plagiarized, you will be awarded zero marks in all the assignments.
- Comments: Comment your code properly. Write your name and roll number (as a block comment) at the beginning of the solution to each problem.
- You must do proper allocation and deallocation of the memory where necessary.
- All programs must be generic.
- For timely completion of the assignment, start as early as possible.
- Your code should be modular, function prototypes are given with each question.
- Note: Follow the given instructions to the letter, failing to do so will result in a zero.