NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES
ISLAMABAD CAMPUS
CS217 Object Oriented Programming- Fall 2020
ASSIGNMENT- 1
Section (A, B, C, D, and F)
Due Date: Wednesday 21st October 2020 at 11:59 pm on Google Classroom

Instructions:

1. Assignments are to be done individually. You must complete this assignment by yourself. You cannot work with anyone else in the class or with someone outside of the class. The code you write must be your own and you must understand each part of coding. You are encouraged to seek help from the instructors through email, on google classroom or individually visiting their respective offices.
2. The AIM of this assignment is to practice with Pointers, Dynamic Memory Allocation (DMA) in C++.
3. No late assignments will be accepted.
4. Displayed output should be well mannered and well presented. Use appropriate comments and indentation in your source code.
6. Plagiarism:

Plagiarism of any kind (copying from others and copying from internet, etc.,) is not allowed. If found plagiarized, you will be awarded zero marks in the assignment. Repeating such an act can lead to strict disciplinary actions and failure in course.

Submission Guidelines:

Dear students we will be using auto-grading tools, so failure to submit according to the below format would result in zero marks in the relevant evaluation instrument.

i) For each question in your assignment, make a separate .cpp file e.g. for question 1, make q1.cpp and so on. Each file that you submit must contain your name, student-id, and assignment # on top of the file in the comments.
ii) Combine all your work in one folder. The folder must contain only .cpp files (no binaries, no exe files etc.,).
iii) Run and test your program on a lab machine before submission.
iv) Rename the folder as ROLL-NUM_SECTION (e.g. 19i-0001_B) and compress the folder as a zip file. (e.g. 19i-0001_B.zip).
v) Submit the .zip file on Google Classroom within the deadline.
vi) Submission other than Google Classroom (e.g. email etc.) will not be accepted.
vii) The student is solely responsible to check the final zip files for issues like corrupt file, virus in the file, mistakenly exe sent. If we cannot download the file from Google classroom due to any reason, it will lead to zero marks in the assignment.

Questions: Total Points: 100

Q1. Write a C++ program (using pointers and dynamic memory allocation only) to implement the following functions and call it from the main function.

i. Write a function which take an int array and the array' size as arguments. It should return maximum value of the array elements (use only pointers with no loop variable in the body of the loop). (3 points)
ii. Write a function to swap the values of two integer variables by using pointers (instead of reference variables) and return its swapped values to the main function. (3 points)
iii. Write a function that takes two int arrays and the arrays' sizes as arguments (e.g., four arguments). It should create a new array big enough to store both arrays. Then it should copy the contents of the first array to the new array, and then copy the

contents of the second array to the new array in the remaining elements and return a pointer to the new array. (4 points)

iv. Write a piece of code which prints the characters in a cstring in a reverse order. (2 points)

v. Create an array of Planets. Populate the array and print the contents of the array using the pointer notation instead of the subscripts. (3 points)

vi. Write a function countEven(int*, int) which receives an integer array and its size, and returns the number of even numbers in the array. (3)

vii. Write a function whose signature looks like (char*, char) which returns true if the 1st parameter cstring contains the 2nd parameter char, or false otherwise. (2 points)

Q2. Write a C++ program using a dynamic array (or arrays) to assign passengers seats in a Bus and your program will ask the user how many rows the Bus has and will handle that many rows (Assume the Bus does not always have the same rows). (5 points)

Expected output: Assume a small Bus with seat numbering as follows:

1 A B C D
2 A B C D
3 A B C D
4 A B C D
5 A B C D
6 A B C D
7 A B C D
8 A B C D
9 A B C D
10 A B C D

The program should display the seat pattern, with an X marking the seats already assigned. For example, after seats 1A, 2B, and 4C are taken, the display should look like this: (5 points)

1 X B C D
2 A X C D
3 A B C D
4 A B X D
5 A B C D
6 A B C D
7 A B C D
8 A B C D
9 A B C D
10 A B C D

After displaying the seats available, the program prompts for the seat desired, the user types in a seat, and then the display of available seats is updated. This continues until all seats are filled or until the user signals that the program should end. If the user types in a seat that is already assigned, the program should say that the seat is occupied and ask for another choice. (10 points)

Q3. Write a C++ program using dynamic arrays that allows the user to enter the last names of the candidates in a local election and the number of votes received by each candidate. The program must ask the user for the number of candidates and then create the appropriate arrays to hold the data. The program should then output each candidate's name, the number of votes received, and the percentage of the total votes received by the candidate. Your program should also output the winner of the election. (20 points)

A sample output is:

Name of Candidate	Votes Received	% of Total Votes
Ali	5000	25.91
Imran	4000	20.73
Ahmad	6000	31.09
Ijaz	2500	12.95
Khan	1800	9.33
Total	19300	

The winner of the local election is Ahmad.

Q4. Write a C++ program that outputs a histogram of student Marks for a Mid-term-1 Examination. The program should input each student's Marks as an integer and store the Marks in a dynamic array. Marks should be entered until the user enters -1 for marks. The program should then scan through the Dynamic array and compute the histogram. In computing the histogram, the minimum value of a marks is 0 but your program should determine the maximum value entered by the user. Then use a dynamic array to store and output the histogram. (20 points)
For example,
if the input is:
80
60
80
70
60
50
50
50
-1
Then the output should be:
The frequency of 80's: 2
The frequency of 70's: 1
The frequency of 60's: 2
The frequency of 50's: 3

For Histogram: https://www.mathsisfun.com/data/histograms.html

Q5. Write a C++ program, which will prompt the user for entering an amount in Pakistani currency and convert the rupees amount to the Chinese Yuan currency. You must use only one pointer. Your program must print the Pakistani rupees and the Chinese Yuan converted amount. Your program should allow the user to repeat the program using different Rupees values until the user decides to quit the program. (20 points)