

National University of Computer and Emerging Sciences, Lahore Campus



Course:	Programming Fundamentals Lab	Course Code:	CL 118
Program:	BS(Computer Science)	Semester:	Spring 2020
Duration:	2 hrs 20 minutes+10 minutes	Total Marks:	100
Date	17-07-2020	Weight	50%
Section:	All	Pages:	2
Exam Type	Final Exam	Roll No.	

Read below Instructions Carefully

1. Understanding the question statement is also part of the quiz, so do not ask for any clarification.
2. You have to complete exam in 2 hrs. 20 minutes. An extra 10 minutes are for uploading the files. •
3. Submit code files named as 19L-7845_Q1.cpp and 19L-7845_Q2.cpp.
4. **PLAGIARISM OF ANY KIND** will result in forwarding of case of Disciplinary Committee and negative marks in Finals.
5. Making sure of correct and timely submission is student's responsibility.
6. Keep a backup of internet in form of mobile data etc.
7. Failure to comply with these instructions will result in award of zero marks.
8. **No Indentation/commenting** in the code will result in marks deduction.

Question No. 01:

50 Marks

A number is called a **Macro Palindrome** if it's representation in bases BASE1* and BASE2* are both palindromes**.

e.g. Let BASE1 = 3 & BASE2 = 4, then the number 130 (in base 10) will be called a Macro Palindrome, as it is palindrome in base 3 (11211) as well as in base 4 (2002). However, it is not a Macro Palindrome for BASE1 = 3 and BASE2 = 5 as it is not a palindrome in base 5(1010).

*The numbers BASE1 and BASE2 can go from 2-16.

* * A **palindrome** is a word, phrase, number, or other sequence of characters which reads the same backward or forward.

Write a program to check if a number is Macro palindrome for two given bases - BASE1 and BASE2. You can assume that a number, when converted to any given base shall not exceed 10 digits. The solution code should be made in form of functions. **Perform all major steps in separate functions.**

Sample Input:

Sample Output:

Number: 130 Base 1: 3 Base 2: 4	130 is macro palindrome
Number: 51 Base 1: 6 Base 2: 2	51 is not macro palindrome

Question No. 02:

50 Marks

A sparse matrix is a matrix whose most of the cells are empty and a very few number of cells have data in them. Following are integer and character sparse matrices of order 4x4. Integer matrix has 0s in empty cells and character matrix has spaces in the empty cells.

0	8	2	0
0	0	3	0
0	7	0	0
6	9	5	0

	A		
j	M		
		P	z
f			T

Examples of Sparse Matrix

A smart way to store a sparse matrix is to only store the information of the populated cells. Each populated cell is represented as a set of index-number and the value as represented below:

0	8	1	0
0	0	3	0
0	7	0	0
6	9	5	0



1,8	2,1	
2,3		
1,7		
0,6	1,9	2,5

In this question, you are given a txt file named 'MatrixData.txt' that contains information about a character sparse matrix of order 5x5. Each line of the file represents a row of matrix. Each row of file can have multiple (index, value) sets separated by space.

- You have to write a function that receives a 2-D character array of 5x5 and populate it using the MatrixData.txt file.
- A **True_Sparse** matrix is filled up to 50% only. In the above function, make changes to let the user know if the given matrix is a true sparse matrix or not.

Note: Perform major steps in separate functions. Try to handle exceptional cases as well.

Sample Input

1,A
0,j 1,M
2,P 3,z
0,f 3,T
1,U 4,d

MatrixData.txt

Sample Output

	A			
j	M			
		P	z	
f			T	
U				d

Output Matrix

The matrix is 36% filled. It is a True_Sparse Matrix.