NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES

ISLAMABAD

OPERATING SYSTEMS SPRING 2022

ASSIGNMENT 01

Due Date: 11:59 PM 16th, March 2022

Instructions

• Zero marks will be awarded to the students involved in plagiarism.
• All the submissions will be done on google classroom.
• You have to submit .c/.cpp files. Naming convention has to be followed strictly. Each question will be named as q1.cpp/q1.c. You have to submit 1 zipped file having the questions and pdf files (word files should be names as e.g., q1_pdf)
• Be prepared for viva or anything else after the submission of assignment for two weeks.○

Question No. 1

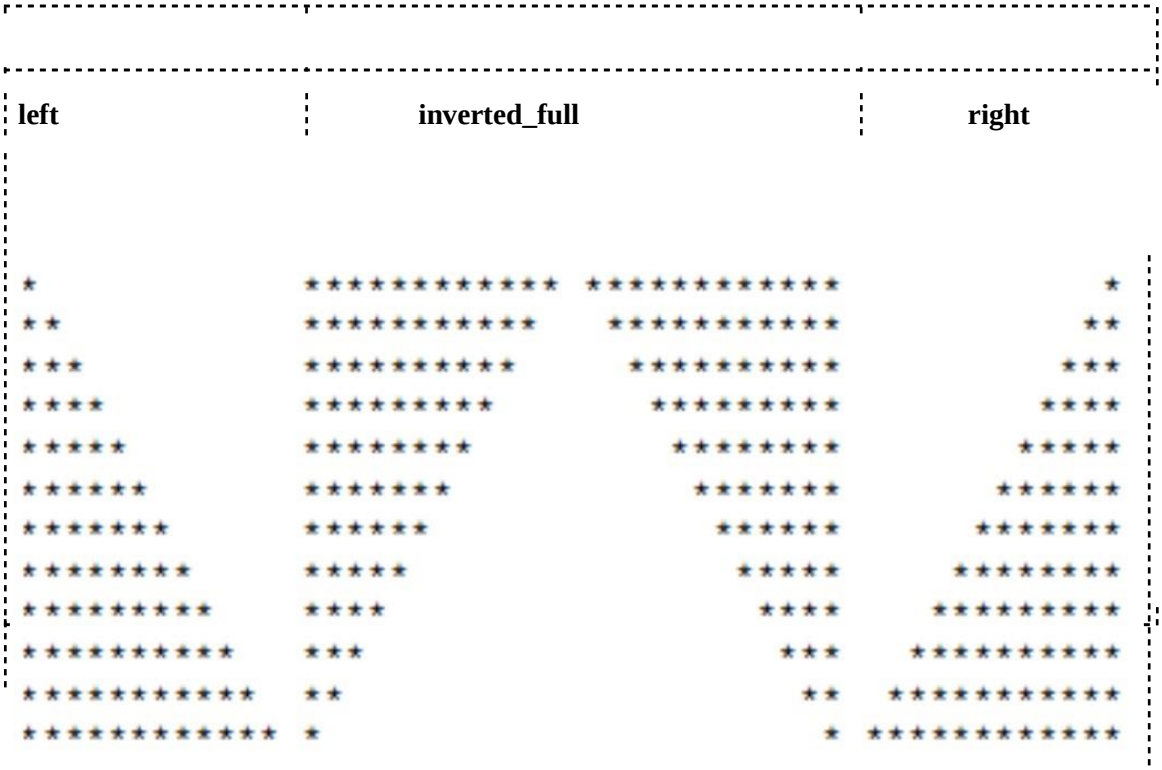
Write a c language code that takes two parametric variables:

./code pattern_option number

where

pattern_option = {left, inverted_full, right}

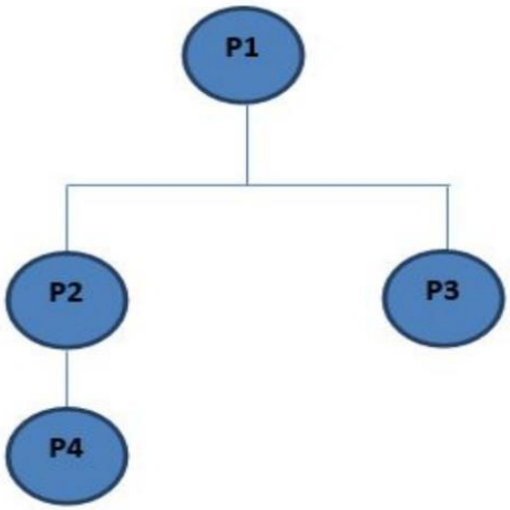
and output the pattern depending on the input parameters as shown in Fig 1. Generate error messages for invalid input parameters.



Question No. 2

Write a C program on Linux platform to implement the process hierarchy given below. Each process should display its name (e.g. P1), its process ID and the process ID of its parent. A process used the getpid () and getppid () system calls to obtain these IDs. Sample output of the process is:

P1: ID: = 1234, Parent ID = 1123



Question No. 3

Write a C program on Linux platform to implement the below given scenario. You

have to solve the following equation: x= (a*b) + (c/d) + (e-f);

Write a code in such a way that each part of the equation is solved by child processes and the parent process gets results from the child processes and computes the final result.
For Example,
Child 1 Solves: a*b
Child 2 Solves: c/d
Child 3 Solves: e-f
And Parent will compute x= (a*b) + (c/d) + (e-f) after getting the results of each portion of the equation from child processes.
Take values of a,b,c,d,e,f from the user in the parent process.

Important Note: There should be only one parent process and all the child be- longs to that parent process.

Question No. 4

Write a program in which parent process creates a child process. Child process has to run "grep" command of Linux shell and find the word "out" in all the text files of the current directory and store the result in "output.txt". You should have to use exec() family system call of your choice.

Question No. 5

Write a program which take string from user and you have to do following tasks with the string.

1. Swap adjacent indexes (i.e., swap index 1 with index 2 index 3 with index 4 and so on.)
2. Find the count of each character in the string
3. Add 2 in the ASCII of each character
4. Sort the array in descending order
5. Encrypt each character in the string by multiplying it with each digit of your roll number. In case the string is longer than your roll number start again with your roll number (For example)

String: antiquities Roll number: 17-0232

Encryption=a*1, n*7, t*0, i*2, q*3, u*2, i*1, t*7, i*0, e*2, s*3)

You have to create child process for each task and each child exec with the image of program of particular task. Print the string after each operation. Your output should be in the order as the tasks listed.