National University of Computer and Emerging Sciences, Lahore Campus

Course:	Operating Systems	Course Code:	CS 220
Program:	BS(Computer Science)	Semester:	Spring 2021
Due Date	04-Apr-2021 at 11:59 pm	Total Marks:	30 marks
Type:	Assignment 1	Page(s):	1

Important Instructions:

1. You have to submit the solution of both questions separately. There will be two submission folders on Google classroom, one for question 1 and the other for question 2.
   a. For question 1, name your solution file as your roll number, i.e., 19_1111.cpp, and submit it in question 1's submission folder on Google classroom. Do not zip your file.
   b. For question 2, name your solution file as your roll number, i.e., 19_1111.cpp, and submit it in question 2's submission folder on Google classroom. Do not zip your file.
2. You are not allowed to copy solutions from other students. We will check your code for plagiarism using plagiarism checkers. If any sort of cheating is found, negative marks will be given to all students involved.
3. Late submission of your solution is not allowed

Question 1: Custom Shell [15 marks]

In this question, you will develop your own version of shell. Your shell will execute commands given by the user. The steps involved will be as follows:

1. User types a command, such as "cp ./OS ../newOS". The command will be stored in a character array or a string object.
2. Shell will perform tokenization and separate the command and its arguments.
3. Shell will create a child process and use **execvp** system call to execute the command.
4. Shell will wait for the command to finish execution.
5. After the command has been executed, shell will ask the user to enter the command again.
6. Shell will exit when the command given by the user is "exit".

Question 2: [15 marks]

Write a program in C/C++ which is passed as command line argument a file name. Your program will read data from the file using read system call. The program will then pass the contents of the file to a pipe and create a child process. The child process will read the file's content from the pipe. The child process does two things to the file data: 1) it removes all integers from the pipe. 2) It changes the case of all alphabets. The child process then writes the modified file data to the second pipe. The parent then reads this data from the second pipe and writes the data (using write system call) to a new file whose name is also passed as command line argument. The input file from which the data will be read has no size restriction.