

Operating Systems Lab Final Exam - Spring 2020

Note: attempt all questions

Total time: 3 hours

- 1) **Shell Scripting:** One of the applications of shell scripting is that it combines lengthy and repetitive sequences of commands into a single, simple command. Write a shell script that performs the following,

- a) Addition of two integers
- b) Subtraction of two integers
- c) Multiplication of two integers
- d) Division of two integers
- e) Remainder of two integers

Your shell script file must be capable of accepting further three arguments (excluding the name of shell script file itself, i.e., com.sh) during the run time. The first argument should be a string that is either "add", "sub", "mul", "div" or "rem". Whereas the second and third arguments should be integer values. You have been taught two different syntaxes for arithmetic operations in shell scripting (see my shell script notes for this purpose uploaded on Slate). Specify in comments (**use # for commenting a line in shell script file**) within the same com.sh file that according to you which syntax seems more simple, suitable and easy for you and why in your own words.

sample input 1:

./com.sh add 10 5

sample input 2:

./com.sh mul 10 5

output 1:

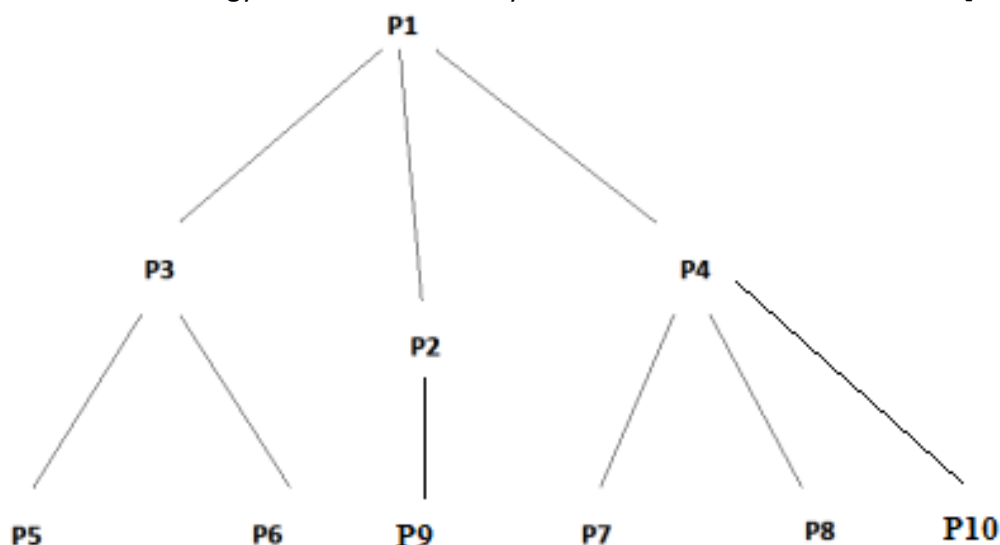
10 + 5 = 15

output 2:

10 * 5 = 50

[15marks]

- 2) **fork():** Write the corresponding process_tree.c code for the following process tree using the fork system call. Also state in comments in the same process_tree.c file that whether this task is easily performed using only if-else statements or the combination of if-else with execv system or any other strategy you have in mind and also state why you think it's a better strategy to solve this task in your own words ? **[10 marks]**



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3) **IPC - Message Passing:** Consider the following user input from the sender side

1 3 2 3 3 1 3 2 3 1 3 2 3 1 3 2 3 1 3 2
U D F I S N C A I I P I L T I T N Y E H

There are three types of packets inserted, i.e., 1, 2 and 3. These packets are inserted from left to right sequence. I am attaching two further files in Slate. One file is message_sender.c (which if executed, it will input the above packets in the exact same sequence). The second file is message_receiver.c (change only the relevant lines to get the desired output string). Also state in comments (/* multiline comments */) in the start of each solution file that what is the strategy you are going to use and why in your own words)

part a) Modify the message_reciever.c so that it receive FAITH

Part b) Modify the message_reciever.c so that it receive UNITY

Part c) Modify the message_reciever.c so that it receive DISCIPLINE

Part d) Modify the message_reciever.c so that it receive UNITY FAITH DISCIPLINE

Part e) Modify the message_reciever.c so that it receive DISCIPLINE UNITY FAITH

[15 marks]

What you need to submit?

1. com.sh file, i.e., *solution to Q1*
2. fork.c and fork (object file), *solution to Q2*
3. message_receiver_part_a.c, message_receiver_part_b.c, message_receiver_part_c.c, message_receiver_part_d.c, message_receiver_part_e.c ; *solutions to Q3*

NOTE: There is zero tolerance to plagiarism. If any solution to any question is caught in any sort of plagiarism, zero marks will be assigned to that question straight forward.

GOOD LUCK 😊