

DHA SUFFA UNIVERSITY
Department of Computer Science
Lab Final-Term Examination- Fall -2023
(Data Structures and Algorithms SE-2001L)

Class/Section:

Time allowed: 2:30 Hours

Course Instructor: Ms. Sumera Rounaq

Max Marks: 30

Date & Time: 29 -01-24 & 8:30 – 11:00

Reg. No: _____

Student's Name: _____

Moderated by:

Q1: CPU Scheduler

A CPU can execute many processes. However, at a given time, a CPU can execute the instructions of only one process. To manage the execution of n processes, we make use of CPU scheduler. You need to write a basic type of scheduler which will work as follows: Suppose we have ten processes named p1, p2, p3,.....,p10. Each process has some number of instructions n1, n2, n3,, n10, respectively. Now to execute all the processes, we first execute some instructions, let's say three instructions of process p1, and then we will execute three instructions of p2, so on and so forth. After that we will restart from process p1 and execute three instructions of p1, then p2, then p3, so on and so forth. Then the cycle begins again. So, the processes are being executed by CPU in circular fashion. If a process has finished its instructions during this cycle, then we remove that process from the cycle. The given example below depicts the scenario:

Scenario 1: Suppose we have three processes:

Process_id: p1

Total instructions: 7

Process_id: p2

Total instructions: 6

Process_id: p3

Total instructions: 5

Scheduler output:

3 instructions of p1 executed.

3 instructions of p2 executed.

3 instructions of p3 executed.

3 instructions of p1 executed.

3 instructions of p2 executed.

P2 has finished execution.

2 instructions of p3 executed.

P3 has finished execution.

1 instruction of p1 executed.

P1 has finished execution.

Scenario 2 : Suppose we have five processes:

Process_id: p1

Total instructions: 4

Process_id: p2

Total instructions: 6

Process_id: p3

Total instructions: 5

Process_id: p4

Total instructions: 3

Process_id: p5

Total instructions: 1

Implement your scheduler function using queue. The function will take a file name as an argument. The file contains information about all the processes to be executed. The first number in the file tells about the number of instructions that the CPU will execute, of a process p, at one time. The second number tells us about the total number of processes in the file.

Create a file as below:

3 3

2 5

Q2: Design a stack-based expression parser that can evaluate complex mathematical expressions, including arithmetic operations and nested parentheses.