



# University of Central Punjab

(Incorporated by Ordinance No. XXIV of 2002 promulgated by Government of the Punjab)  
FACULTY OF INFORMATION TECHNOLOGY

## Operating Systems

### Midterm Exam

CLO	CLO STATEMENT	Bloom's Taxonomy Level	PLO
1	Solve real-world problems skillfully with precision using programming constructs learned in theory with the course toolkit	P3	5

Total Marks: 20

Time Allowed: 1.5 hours (1 hour and 30 mins)

#### Instructions:

1. Total number of questions given are 2.
2. Attempt all questions.
3. Submit the .c files on your respective portal.
4. Make sure to add necessary check in the code

### Task 1

Write a C program that inputs N numbers through command line parameters and passes the array to each of its child processes through pipes. One child process will calculate the average of the array and return it to the parent process. Second child process will find 2<sup>nd</sup> minimum from the array and return them to the parent process.

#### Sample Output:

```
PROBLEMS 6 OUTPUT DEBUG CONSOLE TERMINAL PORTS COMMENTS
moosawaqar@Moosas-Macbook-Air-M2-2 ~ % gcc mid.c
moosawaqar@Moosas-Macbook-Air-M2-2 ~ % ./a.out 1 2 3 4 5

Child 1:
Sum : 15.000000
Average Calculated: 3.000000

Child 2:
Second Minimum: 2

Average Returned from Child 1: 3.000000
Second Minimum Returned from Child 2: 2
moosawaqar@Moosas-Macbook-Air-M2-2 ~ %
```

**Note: Dynamic Memory Allocation is compulsory.**

### Task 2

\$ ls | grep "user" | more > output.txt