



# University of Central Punjab

(Incorporated by Ordinance No. XXIV of 2002 promulgated by Government of the Punjab)

## Faculty of Information Technology & Computer Science

Mid-term Lab Exam, F22  
Operating Systems  
BS(CS)

NAME \_\_\_\_\_ REG# \_\_\_\_\_

### Version V2

#### Instructions

- All questions are mandatory.
- Understanding the problem is part of the problem.
- The lab exam is available in two versions on the portal. You need to solve your version of the exam as per the instructions of the proctor or invigilator.

#### Question#1 (20 points)

Write a program that takes numbers as command-line arguments. The program then sends these numbers through a pipe to its child process. The child process finds the minimum and maximum numbers and sends them to the parent process. The parent process displays those numbers.

Example:

```
$/a.out 5 4 3 2 1
```

Minimum: 1

Maximum: 5

#### Question#2 (20 points)

Write a program that implements the following command. (Note: create an input.txt file with some multi-line data.)

```
$ sort < input.txt | grep "b" > output.txt
```