Graduate Systems (CSE638)

PA01: Implement Custom Shell in C [10 points]

Deadline: **January 27, 2025**

Objective: Design and implement a custom command-line shell in C that provides an interactive user interface for executing commands.

Functional Requirements:

1. **Command Execution**
    - Accept user input for commands. [1]
    - Parse the input into arguments. [1]
    - Execute the command using system calls (`fork`, `exec`, `wait`). [4]
        - Accept commands such as your custom program.
            - E.g., You wrote a factorial program. Your custom shell should be able to run the command, $ ./`fact 10`, where "fact" is your C program
        - Accept built-in commands such as `ls, cd, exit, help`
2. **I/O Redirection** [3]
    - Support input (`<`) and output (`>`) redirection
3. **Visualize** the process tree where you can see that your custom shell has created child processes. Take a snapshot and add it to the README. [1]

Non-Functional Requirements:

1. Code should be modular, with functions for parsing input, executing commands, and handling built-ins.
2. Proper error checking and reporting for system calls.
3. Efficient use of system resources.
4. Code should follow best practices for readability and maintainability.

Deliverables:

- Source code (`shell.c`).
- A Makefile for compiling the program.
- Documentation (README) explaining the implementation and usage.

- Add all of these in a folder named <roll_num>_PA01, and upload the compressed file, <roll_num>_PA01.zip