

1 Lab 1: Mini UNIX Shell

Week 1 Marks: 10

1.1 Problem Statement

Design and implement a UNIX-style command-line shell capable of executing external programs, managing processes, handling I/O redirection, pipelines, and basic job control, without invoking another shell.

1.2 Functional Requirements (Mandatory)

1. Execute external programs using PATH lookup
2. Argument parsing including quoted strings
3. I/O redirection (<, >)
4. Single pipeline support (`cmd1 | cmd2`)
5. Background execution (`&`)
6. Built-ins: `cd`, `exit`

1.3 Non-Functional Requirements

- No crashing on malformed input
- Proper cleanup of zombie processes
- Ctrl-C must not terminate the shell
- Clean compilation using GCC

1.4 Advanced Features (Optional)

History, multi-stage pipelines, `export`, job control, `fg/bg`.

1.5 Deliverables

- Source code + Makefile
- User documentation (2–4 pages)
- Technical report (1–3 pages)
- Test suite (10 cases minimum)

- Demo screenshots
- single tar.gz containg the directory in a structured form