

# Operating Systems (40424)

- Academic Year: 2023-2024, Second Semester
- Course Instructor: Dr. Rasoul Jalili
- Department: Computer Engineering

## Rules and Notes

1. The project must be done and submitted individually.
2. You can submit the project within three days after the deadline. A 25% penalty will be applied to the earned score for each day of delay, up to a maximum of 12 hours per day.
3. Submit your answers in a file named in the format:  
`OS_Prj2_StdNum_FirstName_LastName.`

## Project Requirements

- In this part of the project, you need to write a system call that establishes communication with the network and add it to the shell you developed in the first phase.
- The system call you write must be able to extract the following information:
  - Incoming traffic volume
  - Outgoing traffic volume
  - Number of incoming connections
  - Number of outgoing connections
  - Duration of activity time
- The system call should also be able to clear this information and measure the duration of activity time, which indicates the time elapsed since the last clearance.
- Additionally, the system call should be able to disconnect and reconnect the system with the network.
- Use the C programming language.
- Before each command entry, the shell should display the username, hostname, and the current path as follows:

`{userName}@{hostName}-{path}$`

- **The shell must include the following additional commands:**

1. Write a command that displays the extracted information.

```
>>> nw -m
```

2. Write a command that clears the measured values and restarts the measurement.

```
>>> nw -r
```

3. Write a command that disconnects the system from the network.

```
>>> nw -d
```

4. Write a command that reconnects the system to the network.

```
>>> nw -c
```

## **Additional Notes**

- You are not limited to kernel-level programming and can perform data extraction and modifications at any layer of the network stack. Feel free to use any library that is appropriate.
- You need to document and explain the process of writing the system call in a project documentation file that will be submitted along with the project files. Below are some useful links to help you become familiar with this process:
  - Adding a custom syscall to your Linux kernel
  - How to compile the Linux kernel
  - Adding a simple system call to the Linux 3.2.0 kernel
  - Adding syscalls to the Linux kernel documentation
  - Adding a system call to the Linux kernel 5.8.1

**Good Luck!**