Birzeit University

Department of Electrical & Computer Engineering

Second Summer Semester, 2024/2025

ENCS3130 Linux Laboratory

Shell Scripting Project – Online Course Log Analyzer

Objectives and Overview

The main objective of this project is to design and implement a shell script that processes log files generated from online teaching platforms such as **Zoom** and **Microsoft Teams**. These log files contain detailed information about course sessions, instructors, and student attendance.

The script will parse the log file, extract relevant information, and provide useful analytics to instructors, administrators, and students. The goal is to improve monitoring of student engagement, evaluate instructor activity, and analyze platform usage.

The system includes a **menu-based interface**, where the user interacts with the script using simple numbered options (e.g., 1. Number of sessions per course, 2. Average attendance per course, etc.). This makes the tool user-friendly and easy to operate from the terminal.

File Format

The log file is structured in **comma-separated values (CSV)** format, with each row representing a single student's participation in a session. The fields are as follows:

1. **Tool** – The platform used for the session (Zoom or Teams).
2. **StudentID** – A unique identifier for the student.
3. **FirstName** – Student's first name.
4. **LastName** – Student's last name.
5. **InstructorID** – Identifier of the instructor responsible for the course.
6. **CourseID** – Unique identifier of the course.
7. **StartTime** – The scheduled start time of the session.
8. **Length** – The scheduled length (duration) of the session.
9. **SessionID** – Unique identifier for each course session.
10. **StudentBeginTime** – The time the student actually joined the session.
11. **StudentLeaveTime** – The time the student left the session.

This structure allows the script to analyze attendance patterns, lateness, early departures, and session utilization. Here is a sample log file:

```
Zoom,1001,Ali,Ahmed,I200,ENCS101,2025-05-01 09:00,90,S1, 09:05, 10:30
Zoom,1002,Sara,Omar,I200,ENCCS101,2025-05-01 09:00,90,S1, 09:00, 10:35
Teams,1003,Mohammed,Hassan,I201,CS102,2025-05-01 11:00,60,S1, 11:02, 11:55
Teams,1004,Lina,Khalid,I201,CS102,2025-05-01 11:00,60,S1, 11:10, 11:45
```

Zoom,1001,Ali,Ahmed,I200,CS101,2025-05-03 09:00,90,S2,09:00,10:20
Zoom,1002,Sara,Omar,I200,CS101,2025-05-03 09:00,90,S2, 09:08, 10:30

Note: For each course, there is an additional **registration file** named **CourseID**. This file contains the **StudentID, FirstName, and LastName** of all students registered for the course. This file will be used to determine **absent students** and validate attendance.

Services Provided

1. **Number of sessions per course**
   - Calculates how many sessions have been conducted for a given course.
2. **Average attendance per course**
   - Computes the average number of students who attended a course's sessions. The user inputs the **CourseID**.
3. **List of absent students per course**
   - Identifies students enrolled in a course who did not attend any session. The user provides the **CourseID**.
4. **List of late arrivals per session**
   - Displays students who joined the session after the scheduled **StartTime**.
   - **Rule for lateness:** a student is considered *late* if they joined **X minutes or more** after the scheduled start.
   - Requires **CourseID** and **SessionID**.
5. **List of students leaving early**
   - Shows students who left before the scheduled end time (**StartTime + Length**).
   - **Rule for early leaving:** a student is considered to have *left early* if they left **Y minutes or more** before the official end time.
   - Requires **CourseID** and **SessionID**.
6. **Average attendance time per student per course**
   - Computes the average number of minutes each student attended in a given course. The user enters the **CourseID**.
7. **Average number of attendances per instructor**
   - Calculates how many students on average attended the sessions of each instructor across all their courses.
8. **Most frequently used tool**
   - Determines whether **Zoom** or **Teams** is more frequently used based on session records.

Submission Instructions

Submit a compressed .zip folder containing:

- Source code, files, ...
- A README.md file explaining code usage, execution instructions, and system features.

Notes:

- Write the code for the shell program to satisfy the requirements described above.
- Make sure your code is clean and well indented; variables have meaningful names, etc.

- Make sure your code has enough comments inserted to add clarity.
- Students must work in groups of no more than two. Working alone is not permitted and will result in a 30% deduction from the final project grade.
- Deadline: **Friday, 12 September, 2025 at 11:59pm.** Please submit your project (code + test cases) through Ritaj as a reply to this message.
- This project is per group effort: instances of cheating will result in you failing the course.