FIT9137

ASSIGNMENT 1 - Computer Architecture and OS functionalities

Purpose	*Assignment will include the material covered in **Weeks 1-3**. In particular, the assignment will consist of questions related to computer architecture and operating systems. The format of the student submission will be a **recorded video** showing skills on how to use the UNIX-based terminals and execute commands within an Operating System (OS). This is an **individual** assignment. Completing this Assignment will contribute to the Learning Outcomes 1 & 2. Students are expected to start working on Assignment 1 from the end of Week 3.*
Mode	*Open-book, non-invigilated*
Value	Assignment 1 is marked out of 20, and has **15**% weight of your total unit marks
Due Date	**Week 5: 11:55 PM Friday, 23rd August 2024 (Melbourne local time)**
Submission	Via Moodle Assignment Submission.
Assessment Criteria	*Allocated marks or marks breakdown per task is given in the instruction below.*
Penalties	• Late submissions will result in **5%** deduction of the total marks per calendar day (up to 7 calendar days). For example, if you get 10/20 marks originally and submit 2 days late, then you would get a 2-mark deduction (1 mark per day) and your final marks would be 8/20. • Submissions more than 7 calendar days after the due date will receive a mark of zero (0) and no assessment feedback will be provided. • The video limit is at most 11 minutes. If the video recording exceeds the 11:00 minutes maximum limit, then the remaining video content beyond the time limit will **NOT** be marked. • Speeding up the video recording (e.g. using a software) is not allowed and such submissions will receive a zero "0" mark.
Warning: Important Submission check for every student	It is the student's responsibility that the submitted video file can be opened on a standard Windows computer (without requiring specialised software), and that the images and texts shown in the video are clearly understandable/readable (in English). If the video file cannot be opened, you will receive zero marks. After uploading **draft** files (**before** finalising the submission), we recommend you to; download your submitted file and check that it opens and runs properly. Once you finalise your submission, you will **not** be able to revise it.
Support Resources	See Moodle Assessment page.

Feedback	Feedback will be provided on student work via general cohort performance. Specific student feedback is provided ten working days post submission.

INSTRUCTIONS (for all tasks)

In this assignment, you must record yourself and your screen while performing a number of tasks detailed further below. For each task, the allocated marks are indicated in front of it. Your entire presentation cannot be less than 5:00 minutes or more than 11:00 minutes. At the beginning of your presentation, you must have a slide as shown in Appendix A to show your face and student ID in the recording. Your camera view must remain on at a corner of the video throughout the whole duration of the recording. If you think a task cannot be performed, you have to explain WHY you cannot do it. You are **not** allowed to record a video only and add a voice over later on; your explanations must be provided while you are performing the tasks and presenting your solution.

The submission video file should be named as follows: ***firstname_studentID.filetype***

Note 0: If you feel uncomfortable recording yourself, you must present this assessment in a live session to Adamu/Ian. You must have a concrete and valid reason for this to be accepted. If you want to arrange for a live presentation (rather than recording yourself), you have to send Adamu/Ian an arrangement email by the Friday of Week 5 (by close of business) and we will arrange the live presentations for students sometime on Monday of Week 6 just after the deadline. This is to achieve fairness for all students.

Note 1: If you do not have your student ID (digital or physical one) yet (to show at the beginning of the recording), you can use your confirmation of enrolment (CoE) from Monash University or Passport copy instead.

Note 2: You may use any software to record yourself. We recommend Monash Zoom, which is free for all Monash students. You can refer to the following links on how to install/use Zoom.

- *Zoom*
- *More details on Zoom*

Note 3: You are allowed to pre-install new software if needed and do not need to display installation in the video.

Note 4: You can do (online) research in advance, take notes and make use of them during video recording. However, you are **not** allowed to simply copy commands from a file and paste them to the terminal. Similarly, simply using commands from the terminal history is **not** allowed. You must perform a live-recording of the tasks and provide a proper (brief) explanation while carrying out the tasks.

Note 5: If you require extension or special consideration, please refer to this link: - https://www.monash.edu/students/admin/assessments/extensions-special-consideration

No *teaching team member is allowed to give you extension or special consideration, so please do not reach out to a teaching team member about this. Follow the guidelines in the aforementioned link.*

Note 6: If your device does not have a camera (or for whatever reason you can't use your device), you can borrow a device from Monash Connect or Library. It's your responsibility to plan ahead for

this. Monash Connect or Library not having available devices for loan at a particular point in time is not a valid excuse.

Note 7: You can create multiple video parts at different times then combine and submit a single video at the end. Make sure that the final video is clear and understandable.

Note 8: Zero tolerance on **plagiarism** and **academic integrity violations**: If you are found cheating, penalties will apply, e.g., a zero grade for the unit. The demonstration video is also used to detect/avoid plagiarism.

University policies are found at: https://www.monash.edu/students/academic/policies/academic-integrity

Note 9: At the end of your presentation, you can add a slide(s) to acknowledge the references you made use of. You do not need to spend time reading through the references, just making sure that they are captured in the recording is fine.

Task 1: Operating System processes management using Command Line: All Task 1 related execution is about using a Unix-based terminal. Students have to demonstrate the sub-tasks using the command line terminal. The terminal can be the one from your VM or your own Unix-based computer.

- **Task 1.1:** *Identify the Linux command used to control the status of any Linux services to start/stop/enable or disable. Using this command show how you would check the status of the installed default Web services in your given VM machine Ubuntu?* **(1 mark)**

- **Task 1.2:** *Display the Linux command to list all the operating system parameters? List the directory where these parameters are stored in Linux?* **(1 mark)**

- **Task 1.3:** *List the command to display all the available signals to terminate a process? List and explain which is the default signal it sends for process termination.* **(1 mark)**

- **Task 1.4:** *Show the command to list all threads specific to a Core emulator daemon process in Linux VM?* ***Hint:*** *first run the core emulator software, and then examine the details of the core daemon.* **(1 mark)**

- **Task 1.5:** *Using process management command, show how you would order the processes that are using the most CPU or disk read/write? Clearly show which processes on your system have the (a)* ***highest CPU usage****, and (b)* ***highest disk usage*** *at the time of recording your video. One (not necessarily different) process for each of (a), (b), and (c) is required.* **(1 + 1 marks)**

- **Task 1.6:** *Using Linux command list the processes with different process running priorities? Now list the Linux command to change the priority of a currently running process called* ***`systemd`*** *to its highest priority value?* **(1 mark)**

- **Task 1.7:** *Identify the Linux command used to modify existing Linux users. The command can be used to modify attributes of the user such as usernames, userId, GroupID, permissions, etc. When we execute this command on an existing Linux user, identify the system files it will make some changes and where these files are stored?* **(1 mark)**

- **Task 1.8:** *When a user* ***`muni`*** *is logged in to a Linux system; List and explain the Linux command that shows all open files and active processes initiated by the user* ***`muni`****?* **(1 mark)**

- **Task 1.9:** *Show how to use Linux commands to create* ***two*** *users* ***alex*** *and* ***bill*** *with the default home directories and other environment settings and that both belong to the same group called* ***CSIRO.*** *Now allow them to share a* ***project.txt file*** *in bill's home folder with* **`rwx`** *permission. Restrict read, write and execute access to only the* ***CSIRO*** *group members only.* **(2 + 1 + 1 mark)**

Task 2: Investigating Processes using a Graphical User Interface (GUI) software: Task 2 is about using a free software/tool GUI (that student has to either install on their own VM/Host OS or have it already on their OS) and performing the task-2 activities using the mentioned software.

- **Task 2.1:** Find a GUI software that can be used to manage tasks suitable for your device and OS (e.g., task manager for Windows). You may choose this software according to your OS being **Windows, Mac, Linux**, etc. Show how this software works. **(1 mark)**

- **Task 2.2:** Take one of the running processes as an example and clearly explain at least 4 output fields relevant to that process in this software, for example PID, CPU percentage, Page Faults, Threads, I/O reads or I/O Writes. **(0.5 + 0.5 + 0.5 + 0.5 marks)**

- **Task 2.3:** Show how you would find a process related to a specific application like Firefox, Core network emulator, Wireshark etc in this software. **(1 mark)**

- **Task 2.4:** Show how you would "kill" a random process with the software. **(1 mark)**

Total 20 Marks:

- **Task 1** has total of **13 marks**,
- **Task 2** has total of **5 marks**,
- **Presentation marks**: **2 marks** will be given for clarity of your communication / explanation in your recorded presentation.

Appendix A

Sample first-slide to be shown at the beginning of the video recording (change the assignment number and year/semester details accordingly).