

## FIT9137

### ASSIGNMENT 1 - Computer Architecture and OS functionalities

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| <b>Purpose</b>   | <i>Assignment will include the material covered in <b>Weeks 1-3</b>. In particular, the assignment will consist of questions related to computer architecture and operating systems. The format of the student submission will be a <b><u>recorded video</u></b> showing skills on how to use the UNIX-based terminals and execute commands within an Operating System (OS). This is an <b><u>individual</u></b> assignment. Completing this Assignment will contribute to the learning outcomes 1 &amp; 2. <u>Students are expected to start working on Assignment 1 from the end of Week 3.</u></i>   |
| <b>Your task</b>   | <i>Open-book, non-invigilated</i>   |
| <b>Value</b>   | <b>15%</b> of your total marks for the unit   |
| <b>Due Date</b>  | <b>11:55 pm Friday, 31 March 2023 (Melbourne local time)</b>  |
| <b>Submission</b>  | <ul style="list-style-type: none"> <li>• Via Moodle Assignment Submission.</li> </ul>   |
| <b>Assessment Criteria</b>                                   | <i>Allocated marks or marks breakdown per task is given in the instruction below.</i>   |
| <b>Penalties</b>   | <ul style="list-style-type: none"> <li>• Late submissions will result in 10% deduction of the total marks per calendar day (up to one week). For example, if you get 10/15 marks originally and submit 2 days late, then you would get a 3-mark deduction (1.5 marks per day) and your final marks would be 7/15.</li> <li>• Submissions more than 7 calendar days after the due date will receive a mark of zero (0) and no assessment feedback will be provided.</li> <li>• If the video recording exceeds the 10-min limit, a penalty will apply as follows. For each extra 1-60 seconds, 1 mark will be deducted, e.g., for videos of 10.01-11:00 long, 1 mark will be deducted, etc. <ul style="list-style-type: none"> <li>◦ Speeding up the video recording (e.g. using a software) is not allowed and such submissions will receive a zero mark.</li> </ul> </li> </ul> |
| <b>Warning: Important Submission check for every student</b> | <i>It is the students' responsibility to check if their submitted work is markable by the teaching team. It is recommended that every student immediately download their own submitted work (e.g., <b>recorded video/PDF/imm file, etc</b>) and check if the submission would be downloadable/readable/understandable/markable by a tutor. If the teaching team is unable to mark your submission, you may lose up to 50% or more of your marks.</i>  |
| <b>Support Resources</b>                                     | See Moodle Assessment page.   |
| <b>Feedback</b>  | Feedback will be provided on student work via: general cohort performance. specific student feedback 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 10:00 minutes. At the beginning of your presentation, you must clearly show your face and student ID to the camera, followed by having your camera on in 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.

**Note 0:** If you feel uncomfortable recording yourself, you must present this assessment in a live session to Amin/Muhammed/Malik. 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 Amin/Muhammed/Malik 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:** Tasks 1.6 and 2.4 below ask you to kill a process, e.g., with PID = last two digits of your student ID. If there is not such a process or you cannot kill it due to various reasons, e.g. it will interrupt your Zoom recording, etc, then please choose another two random digits of your student ID and kill that process.

**Note 2:** 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 3:** 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](#)

**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:** *Show the Linux command to examine the running and stopped daemons/services in your Linux VM, name one such daemon/service that is currently running, and one such service that is currently stopped in your current VM? (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:** *Using process management Linux commands, take one of the running processes as an example and clearly explain at least 3 outputs fields relevant to that process, for example PID, start time, etc. (0.5 + 0.5 + 0.5 marks)*

- **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 memory or CPU or disk? Clearly show which processes on your system have the (a) **highest memory usage**, (b) **highest CPU usage**, and (c) **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 + 1 marks)**
- **Task 1.6:** Show how you would “kill” the process with PID = last two digits of your student ID in your Linux OS. **(1 mark)**
- **Task 1.7:** Find a different Linux command (from the one in Task 1.3) that lists all the running processes of your system. Show how it works. **(0.5 mark)**
- **Task 1.8:** Show a Linux command to report and examine the amount of available and used memory. The output should contain real-time information about the system’s memory usage, cache, buffers, VM allocated memory and shared memory used by the kernel in a system file. **(1 mark)**
- **Task 1.9:** Show how to use Linux commands to create **two** users **alice** and **bob** in the same group called **research** and allow them to share a research folder in alice’s home folder with **rw** permission. Restrict read, write and execute access to only the research group members only. **(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 **12 marks**,
- **Task 2** has total of **5 marks**,
- **Presentation marks: 3 marks** will be given for clarity of your communication / explanation in your recorded presentation.