Evaluation Scheme

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	Total Points							**/130**

Practice Exercises — **/30**

Question	1	2	3	4	5	6	7	
Points	2	4	2	3	4	11	4	
Score								

Content	Points
Programming Exercise	**/95**
Starting the Shell The program compiles and runs successfully.	/10
Terminating the Shell Exit and quit commands work properly. The program is not case sensitive to these commands.	/5
Creating Processes The process builder is properly implemented. Basic commands (ps, ls, cat, …) run successfully.	/20
Changing Directories • Absolute path is handled **cd /home** works properly • **cd** followed by **pwd** changes directory to **/home/user** • error message for invalid path	/20
Adding a History Feature • **history** command works properly. • **!!** command executes the last command in from the history**.** • **!#** executes the command # from the history or returns an error message if # is not a valid history command index**.**	/20
Handling Errors and Exceptions Code deals with exceptions in an appropriate manner. For example, exceptions such as attempting to change directory to an invalid directory should result in a message to the user and the continuation of the program.	/5
Documentation Code shows good indentation, meaningful variable names, modularity, and helpful comments.	/5
Testing Readme file contains a script showing all the test cases performed along with screenshots.	/10
Self-evaluation questions	**/5**

Self-evaluation   Please answer the following questions:

1. **[1 points]** Were you able to complete this assignment? What grade are you expecting? Please justify.   Not entirely.

2. **[2 points]** Describe 2-3 challenges you faced while completing this assignment. How did you tackle those challenges? Clarity of the questions. The one on android was especially unclear and didn't know whether to draw on general knowledge or the nature of sources to research from

3. **[2 points]** Provide a break down for the activities/milestones for this assignment. Give an estimate of hours spent on each activity. Try to be honest!

Date	Activities	Hours	Outcome
	I didn't really pay attention to this.		

Hints and Suggestions

✓ Start early, the solution for the programming exercise totals less than 100 lines, but if you are not comfortable with JAVA/shell, it may take you a bit longer to implement.

✓ Document your work properly.

✓ Backup your work frequently. It's possible (and most likely) you go try a new feature and your program crashes!

Academic Integrity

You are required to demonstrate academic integrity in all of the work that you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. Unless stated otherwise, it is expected that all the work you submit for this course, is your OWN work.

Lack of knowledge of the academic integrity policy is not a reasonable explanation for a violation. You are encouraged to consult the Academic Integrity and Student Code of Conduct sections of the Academic Regulations in the Academic Calendar, in order to be well informed on the consequences of dishonest behavior. Please visit the links below for more information.

A. In both systems, the processes are loaded onto the main memory to be executed. In a multiprogramming system, the next if the current process is completed or paused for any reason such as to perform I/O, the system will begin processing the next job in order to keep the CPU busy. On the other hand, the timesharing system switches between all the process loaded frequently regardless of the process state and so processes multiple jobs "all at once" (perpetually).

B. From my experience, dual-boot systems always have to have the HDD partitioned in two to have the operating systems and their individual bootloaders stored in those partitions. During booting when the firmware is ready to load the bootstrap program while it's running diagnostics, the user is prompted to select between the two OSes on the system. The selected one then has the kernel loaded into the RAM to be for the computer to start running.

C. For the OS developer, virtual machine architecture abstracts the hardware layer such that each process seems to have its independent environment and resources to be executed in. This way, they only interfere with each other when they have to ie separation between policy and mechanism

   For the user, the main advantage of virtual machine architecture is the ability to run programs larger than the actual physical memory of their computer

D. CPU: Time multiplexing
   RAM: Both
   Network Card:
   Printer:
   Keyboard: Time multiplexing
   Display: Space multiplexing

E.
   a. Two system goals for designing operating systems that contradict each other are the ease of design and implementation but demand for efficiency. These two are contradictory because in order for a system to be more efficient, it usually requires a series of algorithms programmed into it in order to cover the most likely scenarios where resources may be idle. Hence, there are several scheduling techniques, some of them a combination of one or more, and multi-threading approach to design.
   On the other hand, the ease of design and implementation requires a simple approach that will be easy to develop and will be less prone to bugs/unforeseen errors. Single threading is less efficient and easier to implement than multithreading but the latter came about as a need for more efficiency grew.
   b. Handhelds are primarily limited by power drain on the battery, limited resources such as processor speed and memory available to the operating system. More emphasis should be placed on efficiency of resource utilization and responsiveness of the system when it comes to user interaction.

F. The android architecture comprises 5 basic layers and starting from the bottom they are the Linux Kernel, Hardware Abstraction Layer, Native C/C++ Libraries & Android Runtime layer, Java API Framework and finally the System apps layer. These five work together to form the Android operating system.

The success of android as an operating system for mobile can be attributed to several factors primary amongst them being the fact that it's build on the linux kernel. The kernel has the drivers to support a wide variety of hardware allowing for the diversity of devices that can ran the OS. Also, depending on who is using it, the OS can be stripped down to the bare essentials which require very little resources from a system in order to ran. Hence, android is actually a viable OS for computers with low specs such as the Chromebook.

Android App Development for Beginners (Edx Course site, Lesson 1: Android overview)
https://en.wikipedia.org/wiki/Android_(operating_system)

G.
   a. At every moment, at most 5 (20/4) processes will be executed but in the worst case scenario where all of them are in the early stage of processes, 5 tape drives could be left idle. This happens because although each process is assigned 4, they won't need the fourth until later in during execution. The best case scenario is also that none of the drives will be left idle if the process have reached the later stage where they need 4 drives.
   b. The policy for the Scheduler would be to only allow a 4th tape drive once a process has completed the long period and needs that 4th for the final short stage. Instead of assigning 4 per execution and locking them in, the process should start with 3. That means we have at least 6 executions at every point in time. The most idle number of tape drives now becomes 2 and minimum would be 0.