

Security Systems Tutorial - Formative Self Assessment Time available - 1 hour 50 minutes

This tutorial is intended to help you evaluate your preparation for the knowledge test scheduled as assessment 1 part 1 for the Security Systems Theory UG2 module. Please don't obtain anyone else's help to complete these exercises. This would stop you from being able to use this test to evaluate your own knowledge or improve it in a way likely to help you pass. If you don't understand the questions, spending a couple of weeks figuring them out yourself is better than failing the real test, when questions of a similar difficulty will be asked, and knowing the answers to these mock questions will not help you answer the real ones. After this mock test you are encouraged to test your answers using a computer. During the real test you will not be able to do this. Write your answers directly on this paper, and if you need more space use the other side.

Student Name: _____ Student Number: _____

Q1. Write down the names of commands which have the following purposes: **10 marks**

- a. Copying a file
- b. Listing a directory
- c. Displaying information about processes on your system
- d. Adding a user to the system
- e. Changing ownership of a file on the system

Q2. Write down a command pipeline including use of the `ls` and `wc` commands with appropriate flags, which counts the number of files and subdirectories in the current directory. **5 marks**

Q3. Write down one or more `chmod` commands which set the read/write/execute permissions on the file `f1` to the following as displayed using `ls -l f1 : -rwxrwx---` **5 marks**

Q4. a. Write the command you would use to display information from which you could obtain the identity and name of the parent process of a shell script called `your_menu` which you have written and which is currently running. **5 marks**

Q5. a. How would you check the current value of the `$PATH` environment variable? **2 marks**

b. Write a shell command which will add the working directory `“.”` to this environment variable so that programs in the working directory can be executed without needing to put `./` in front of their names? **3 marks**

Q6. For each of the following 5 commands write a **B** against commands which are builtin to the bash shell or **E** if implemented using an external program:

mkdir **cd** **fg** **jobs** **adduser**

5 marks

Q7. Write a pipelined command making use of `grep` and `awk` (or `cut`) to print out the UID (numeric userid which is in the 3rd column) for the user `peter` in the file `/etc/passwd`. This file is column delimited using colons “:”, and the userid is the first column. **10 marks**

Q8. Write a shell script which checks if the file `book.txt` exists and is readable. If it is readable your script outputs the numbers of times each of the 4 following words are used: *and*, *or*, *if*, *then* in `book.txt`. If the file is not readable, the script should output an error message. Hint: The `sed` program: `sed '1,$s/\s\+/ /g'` can be used, e.g. within a pipeline, to put each word onto its own line by substituting any one or more consecutive whitespace characters for a new line. **20 marks**

Q9. a. Explain briefly the purpose of a `setuid` program. **5 marks**

b. Give an example of a system program which runs `setuid` and explain why it needs `setuid` permissions. **5 marks**

c. Which command or commands would you use to find out whether a program has `setuid` permission ? **5 marks**

Q10 a. How do you run a command in background ? Give an example. **2 marks**

b. How do you make an interactive program running in foreground stop running without it ending ? **3 marks**.

c. How do you cause a program stopped from running to continue running in background ? **2 marks**

d. How do you cause a program running in background to go into foreground ? **3 marks**

Q11 In what sense is a computer *virus* different from a *trojan* ? **10 marks**