PS1A

Graded

Student

Jae Hong Lee

Total Points

40 / 43 pts

Question 1

von Neumann

1 / 1 pt

✔ **+ 1 pt** Correct

Question 2

Kernal

1 / 1 pt

✔ **+ 1 pt** Correct

Question 3

Process

1 / 1 pt

✔ **+ 1 pt** Correct

Question 4

ASCII Terminal

1 / 1 pt

✔ **+ 1 pt** Correct

Question 5

UNIX path

0 / 1 pt

✔ **+ 0 pts** Incorrect: correct answer is none of the above

Question 6

Shell command

1 / 1 pt

✔ **+ 1 pt** Correct

Question 7

Home directory

1 / 1 pt

✔ **+ 1 pt** Correct

Question 8

Append line

1 / 1 pt

✔ + 1 pt Correct

Question 9

Kernal interaction

1 / 1 pt

✔ + 1 pt Correct

Question 10

Terminal

1 / 1 pt

✔ + 1 pt Correct

Question 11

UNIX path

0 / 1 pt

✔ + 0 pts Incorrect: correct answer is none of the above

Question 12

Notation **15** / 15 pts

12.1 **a) Binary I** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.2 **a) Binary II** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.3 **a) Binary III** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.4 **a) Binary IV** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.5 **a) Hex I** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.6 **a) Hex II** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.7 **a) Hex III** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.8 **a) Hex IV** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.9 **a) Hex V** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.10 **a) Dec I** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.11 **a) Dec II** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.12 **a) Dec III** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.13 **a) Dec IV** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.14 **a) Dec V** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.15 **a) Dec VI** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.16 **a) Dec VII** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.17 **b) ASCII I** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.18 **b) ASCII II** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.19 **b) ASCII III** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.20 **b) ASCII IV** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.21 **b) Binary I** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.22 **b) Binary II** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.23 **b) Binary III** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.24 **b) Binary IV** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.25 **b) Binary V** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.26 **b) Hex I** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.27 **b) Hex II** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.28 **b) Hex III** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.29 **b) Hex IV** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

12.30 **b) Hex V** **0.5** / 0.5 pts

✔ **+ 0.5 pts** Correct

Question 13

Unix Environment **5** / 5 pts

13.1 **i** **1** / 1 pt

✔ **+ 1 pt** Correct commit message

13.2 **ii** **1** / 1 pt

✔ **+ 1 pt** Correct

13.3 **iii** **1** / 1 pt

✔ **+ 1 pt** Correct

13.4 **iv a** **1** / 1 pt

✔ **+ 1 pt** Correct

13.5 **iv b** **1** / 1 pt

✔ **+ 1 pt** Correct

Question 14

Bash Command Tracing I — **5** / 6 pts

14.1 **a** — **1** / 1 pt

✔ **+ 1 pt** Correct

14.2 **b** — **1** / 1 pt

✔ **+ 1 pt** Correct

14.3 **c** — **1** / 1 pt

✔ **+ 1 pt** Correct

14.4 **d** — **1** / 1 pt

✔ **+ 1 pt** Correct

14.5 **e** — **0** / 1 pt

✔ **+ 0 pts** Incorrect: correct answer is hello

The correct output is "hello" with lowercase h.

14.6 **f** — **1** / 1 pt

✔ **+ 1 pt** Correct

Question 15

Bash Command Tracing II **6** / 6 pts

15.1 **a** **1** / 1 pt

✔ **+ 1 pt** Correct

15.2 **b** **1** / 1 pt

✔ **+ 1 pt** Correct

15.3 **c** **1** / 1 pt

✔ **+ 1 pt** Correct

15.4 **d** **1** / 1 pt

✔ **+ 1 pt** Correct

15.5 **e** **1** / 1 pt

✔ **+ 1 pt** Correct

15.6 **f** **1** / 1 pt

✔ **+ 1 pt** Correct

CS210 Fall 2023: PS1A

Instructions

For all multiple choice questions fill **ONE AND ONLY ONE circle**. Be sure to fill the circle in completely.
For all the questions we encourage you to login into the provided UNIX environment and explore your answers. For some questions you must use the UNIX environment to answer them.

If you use checkmarks or other symbols the auto-grader may not be able to process your answer and will assign you a grade of zero.

All pages must have your name and id written on it. Unidentified pages will not be graded

There are total of 15 questions, for a total of 44 points.

First Name: Jae Hong Last Name: Lee

BU ID: U27565203

First Name: Jae Hong Last Name: Lee BU ID: U29565203

PART A

1. (1 point) A von Neumann computer is composed of what three core parts?
   - ◯ Main Memory, Display, and Keyboard
   - ◯ Display, Mouse, and CPU
   - ◉ I/O Devices, Main Memory and CPU
   - ◯ Threads, Kernel, and Main Memory
   - ◯ All of the above
   - ◯ None of the above

2. (1 point) The kernel:
   - ◯ Bootstraps the hardware
   - ◯ Has direct access to the hardware
   - ◯ Is the bottom layer of software that enables other programs to be run
   - ◯ Provides a unique collection of functions that programs can invoke
   - ◉ All of the above
   - ◯ None of the above

3. (1 point) For each process started, a new kernel is started.
   - ◯ True
   - ◉ False

4. (1 point) An ASCII Terminal:
   - ◯ Translates ASCII data sent to it into characters on its screen.
   - ◯ Translates key presses into ASCII coded bytes that it sends to the computer it's connected to
   - ◯ Allows human users to interact with ASCII oriented programs running on a computer it's connected to
   - ◉ All of the above
   - ◯ None of the above

First Name: Jae Hong Last Name: Lee BU ID: U27565203

5. (1 point) Given the following valid path name below, meaning we know it exits on a UNIX system, what statement can we know to be true?

```
/home/jappavoo/bin/bar
```

- ◯ It names a read-only file
- ◉ It names a unique directory
- ◯ `bar` is a binary file
- ◯ All of the above
- ◯ None of the above

6. (1 point) Every shell command creates a new process.

- ◯ True
- ◉ False

7. (1 point) Which of the following will set the current working directory to a user's home directory:

- ◯ `cd`
- ◯ `cd $HOME`
- ◯ `cd ~`
- ◯ `cd $HOME/.`
- ◉ All of the above
- ◯ None of the above

8. (1 point) Which of the following can you know for sure will **append** (add to the bottom) a line to the file named `foo` where the "line" is the string `hello` on its own? Assume the current directory of the shell is writeable. Remember a line includes a ASCII newline byte at the end of it.

- ◯ `echo hello`
- ◯ `echo hello; touch foo`
- ◯ `echo hello > foo`
- ◯ `echo -n hello > foo`
- ◯ `echo hello | cat > foo`
- ◉ `echo hello >> foo`
- ◯ `echo goodbye > foo && echo hello > foo`
- ◯ `echo hello > foo || echo goodbye > foo`
- ◯ `cat foo`

9. (1 point) Users can interact directly with the kernel.

- ◯ True
- ◉ False

First Name: Jae Hong Last Name: Lee BU ID: U25565203

10. (1 point) When we create a new terminal window, it is like attaching a new terminal to the UNIX system we are working with. Which statement is true?

- ◯ All the terminals share a single common shell process
- ◉ A new independent shell process is started for each terminal window
- ◯ Terminals check each command for correctness prior to sending them to the shell
- ◯ The terminal allows users to directly interact with the UNIX kernel

11. (1 point) Given the valid path name (it exists) below, on a UNIX system, select all of the statements you can know to be true.

```
/home/abcd/Downloads/song.mp3
```

- ◯ It names a file that contains lines of ASCII text
- ◉ It names a unique directory
- ◯ `song.mp3` is an audio file
- ◯ `Downloads` is a read-only file
- ◯ All of the above
- ◯ None of above

First Name: Jae Hong Last Name: Lee BU ID: U 27565203

PART B

12. This question is to help get our brains familiar with work in binary and hexadecimal notation.

(a) (8 points) Complete the following table base on the example in the first row. We suggest you get comfortable doing the conversions between binary and hex by hand. This will help you recognize patterns in the values and relationships between them. The conversions to and from decimal are painful and doing them with the aid of a calculator make sense.

Binary	Hex	Dec
0100100011100111	48E7	18663
10111111	BF	191
01110111	77	119
0101000101000	5454	21588
11111111	FF	255
1101110101101	DEAD	57005
1011101111011111	BEEF	48879
0010011000000010	2602	9730
00000001	1	1

First Name: Jue Hong Last Name: Lee BU ID: U27565203

(b) (8 points) Complete the following table based on the example in the first row

ASCII	Binary	Hex
Hello	1001000, 1100101, 1101100, 1101100, 01101111	48, 65, 6c, 6c, 6f
i++	1101001, 0101011, 0101011	69, 2b, 2b
X=X+3	1111000, 0111101, 1111000, 0101011, 0110011	78, 3d, 78, 2b, 33
??	0111111, 0111111	3F, 3F
255	00110010, 00110101, 00110101	32, 35, 35
42	00110100, 00110010	34, 32
BASH	01000010, 01000001, 01010011, 01001000	42, 41, 53, 48
ls -l	01101100, 01110011, 00100000, 00101101, 01101100	6c, 73, 20, 2d, 6c

1 0001
2 0010
3 0011
4 0100
5 0101
6 0110
7 0111
8 1000
9 1001
A 10 1010
B 11 1011
C 12 1100
D 13 1101
E 14 1110
F 15 1111

First Name: Jae Hong Last Name: Lee BU ID: U27565203

13. To answer the following questions please use the provided UNIX environment. The questions will require you to clone a copy of the textbook source material and then use git and UNIX commands to answer specific questions.

    To get things setup:

    1. login to the provide online UNIX environment
    2. open a terminal window with the UNIX environment
    3. clone a copy of the text book source material:
        - git clone git@github.com:appavooteaching/UndertheCovers.git

    If you have any trouble with the above see the howto and getting started posts on PIAZZA.

    (a) Use the command

    ```
    git log --oneline --decorate --graph main
    ```

    to view the history of the `main` branch of the textbook repository. Please note you will run into problems if you cut and paste, you should manually type the command into the terminal. Each line summarizes a commit with a unique 7 character string (eg. 4f4e0e8) along the developer's commit message.

    i. (1 point) What is the commit message of 912fb13 commit?

    fix path example

    ii. (1 point) What is the commit id of the commit with the message: `Fixed L07 example syntax for setting memory`?

    263a9b8

    iii. (1 point) Compose a pipeline with the commands '`git log --oneline main`' and '`wc`' to determine the total number of commits on the main branch. What is this number:

    389

    iv. The `git show <commit id>` will show you the details of a commit with the specified id. For commit `94cb7df` fill in the following blanks.

    α) (1 point) The email address of the author is lewisd@bu.edu

    β) (1 point) What date was the commit made? April 28 2022

First Name: Joe Hong Last Name: Lee BU ID: U20565203

```
1  $ pwd
2  /home/jovyan/tmp
3  $ ls
4  A B C
5  $ echo $x
6  hello
7  $ cat B | wc -l
8  2
9  $ cd C
10 $ cat /home/jovyan/tmp/B | grep A | wc -l > wow
```

14. Given the above bash commands and output answer the following questions/fill in the blanks.

(a) (1 point) On line 5 the current working directory is:

/home/jovyan/tmp

(b) (1 point) The file `/home/jovyan/tmp/C/wow`, after all commands have run, contains?

- ◯ nothing – the file is empty
- ◯ a single line with the string: 0
- ◯ a single line with the string: 1
- ◯ a single line with the string: 2
- ◯ a single line with the string: 3
- ◯ a single line with the string: 4
- ● a single line with a string which is a number between 0 and 2 inclusively
- ◯ none of the above

(c) (1 point) On line 10 the current working directory is:

/home/jovyan/tmp/C

(d) (1 point) After all the commands are done, how many items are in directory `/home/jovyan/tmp`, excluding hidden files and hidden directories?

3

(e) (1 point) What would be the output of the following command

```
if [[ x = hello ]]; then echo A; else echo $x; fi
```

if run after line 10?

Hello

(f) (1 point) We know that '/home/jovyan/A' is a directory.

- ◯ True
- ● False

First Name: Jue Hong Last Name: Lee BU ID: U27565203

```
1  $ pwd
2  /home/jovyan
3  $ ls
4  $ echo $y
5
6  $ date 2> foo
7  Wed 7 Sep 2040 11:57:54 AM UTC
8  $ cat foo
9  $ ls /etc/passwd > out && y=7
10 $ cat /etc/passwd | grep jovyan
11 jovyan:x:1000960000:0::/home/jovyan:/bin/bash
12 $ [[ $y = 7 ]] &&  y=4
13 $ cat /etc/passwd | grep -i jovyan | wc -c > ./num
14 $ cat < ./num
15 46
16 $ [[ $(cat num) = $(cat < ./num) ]] && y=$(cat /etc/passwd | grep jovyan | wc -l 2>
       out)
17 $ ls
18 out foo num
```

15. Given the above bash commands and output answer the following questions/fill in the blanks.

(a) (1 point) At line 8 does the file `/home/jovyan/out` exist?

- ◯ yes
- ◉ no

(b) (1 point) At line 10 what is the value of the variable `y`?

7

(c) (1 point) At line 14 what is the value of the variable `y`?

4

(d) (1 point) At line 15 what is the value of the variable `y`?

4

(e) (1 point) At line 17 what is the value of the variable `y`?

1

(f) (1 point) After all the commands have run how many bytes of data are in `/home/jovyan/foo`?

- ◉ 0
- ◯ 1
- ◯ 2
- ◯ 4
- ◯ 31
- ◯ It is not possible to know