

ENGG1340 Computer Programming II
COMP2113 Programming Technologies
Module 1 Checkpoint Exercise

Name:

University ID:

Instructions:

For each single question or each group of questions in the Checkpoint exercise, please type your answer right after the question in this Word document. Please refer to the example below.

Checkpoint 0:

What is the meaning of the command “date”?

Ans: The “date” command prints the current date of the current machine

Checkpoint 1.1

Now, let’s try to answer the following questions. Although you haven’t been taught the meaning of the following commands, you can display the manual page of these commands and learn their meanings by yourself

1. Why do we need to learn command line although we can use a GUI to control a computer?

Not all computers come with a GUI, or other reasonable answer

2. What is the meaning of `ls -t`?

It lists the contents in the current working directory.

3. What is the meaning of the command `pwd`?

prints the name of the present working directory.

4. What is the meaning of the command `rm`?

Removes a file

5. What is the meaning of the command `mv`?

Can be used to rename a file/directory or moves a file to the defined directory

6. Suppose that the `fileA` does not exist in your present working directory, what is the meaning of the command `touch fileA`?

Creates an empty file called fileA

7. What is the meaning of the command `tar`?

Tar is used to create a compressed file in the format `gzip`

8. What is the command for creating an archive `files.tar` from two files named `fileA` and `fileB`?

`tar -cvf files.tar fileA fileB`

Checkpoint 1.2a

Assume we have logged in Ubuntu and started a bash shell. The current directory is the home directory, i.e., ~. We want to perform the following tasks sequentially. For each of the tasks below, please state the shell command(s) used to perform it.

1. Create a new subdirectory “*assignments*” under ~.

`mkdir assignments`

2. Create a new subdirectory “*assignment 1*” under “*assignments*”. (Note that we are creating one subdirectory “*assignment 1*” but not two subdirectories “*assignment*” and “*1*”)

`cd assignments`

`mkdir “assignment 1”`

3. Remove the directory “*assignments*” and all its subdirectories.

`rm -rf assignments`

Checkpoint 1.2b

[Self-learning question] - You need to search for the information on the Internet to answer this question.

There is another way to modify the permission, which is called the Absolute mode.

- a. Explain the meaning of `chmod 666 hello.txt`

In Absolute mode, the meaning of “666” is to set read and write permissions to all the users

- b. Explain the meaning of `chmod 700 hello.txt`

It is to set read, write and execute permissions for owner and no permissions for group and others

- c. What is the chmod command, in absolute mode, to set the following permission for *hello.txt*?

User permissions			Group Permission			Other permission		
r	w	x	-	w	-	r	-	-

`chmod 724 hello.txt`

- d. The administrator says that “One does not simply 777 their entire server”, explain what the problem is if we `chmod 777` for all the files.

The command “777” for all the files means that anyone can read, write and execute for all the files. It is dangerous to let everyone read and modify all the files on your system. They may read your passwords and change it etc

Checkpoint 1.3

Now you may have a doubt: I understand how **diff** works, but why the output is claimed to be the difference between the two files?

Consider the two files below:

<code>\$cat question1A</code> Apple Boy Cat Dog Egg	<code>\$cat question1B</code> Boy Cat Egg
--	--

Note that file **question1B** is created by removing “Apple” and “Dog” from the file **question1A**.

- A. What will be the output if we execute the following command (Please try to think about the output before trying it in the shell)? Please explain your answer.

```
$diff question1A question1B
```

The first and the fourth line of question1A will be deleted. Meanwhile, the line “Boy” and line “Egg” will be moved up one line separately.

- B. What will be the output if we execute the following command (Please try to think about the output before trying it in the shell)? Please explain your answer.

```
$diff question1B question1A
```

“Apple” will be added after line 0 of question1B (after this step, question1B will have four lines in total). Then “Dog” will be added after line 3 of question1B (the file will have five lines now).

Checkpoint 1.4

This is a challenging exercise! You need to understand the shell commands and the techniques introduced in the previous sections to work on this task.

The following C++ program *gen4.cpp* reads in a 4-character string from the input and generates all possible permutations from the 4 characters.

```
//gen4.cpp
#include <iostream>
#include <string>
int main() {
    std::string s;
    std::cin >> s;
    for (int i = 0; i < s.length(); i++) {
        for (int j = 0; j < s.length(); j++) {
            for (int k = 0; k < s.length(); k++) {
                for (int l = 0; l < s.length(); l++) {
                    if (i != j && i != k && i != l && j != l && j != k && k != l) {
                        std::cout << s[i] << s[j] << s[k] << s[l] << std::endl;
                    }
                }
            }
        }
    }
}
```

```
    }  
}  
return 0;  
}
```

To compile *gen4.cpp*

```
$ g++ gen4.cpp -o gen4
```

The input of the program should be stored in the file *gen4_input.txt* with the following content.

```
lopo
```

gen4_input.txt

1. Give **ONE** command (one line of command(s)) to run the *gen4* with *gen4_input.txt* as input and redirect the result to a file named *gen4_output.txt*.

Hints:

```
$ [your_command]  
$ cat gen4_output.txt  
lopo  
loop  
lpoo  
lpoo  
...  
$ wc gen4_output.txt  
24 24 120 gen4_output.txt
```

*The output file should contain all permutations of the letters 'l', 'o', 'p' and 'o'. There should be 24 permutations in total.

```
$ ./gen4.o < gen4_input.txt > gen4_output.txt
```

2. Give **ONE** command to sort the words in *gen4_output.txt* in alphabetical order, and then also remove the adjacent duplicate lines and finally store the result in a file named *sort_uniq.txt*.

Hints: Consider the command **uniq**

```
$ [your command]  
$ cat sort_uniq.txt.  
loop  
lopo  
lpoo  
olop  
olpo  
oolp  
oopl  
oplo  
opol
```

```
ploo
polo
pool
$ wc sort_uniq.txt
12 12 60 sort_uniq.txt
```

*There should be 12 unique words total.

```
$sort gen4_output.txt | uniq > sort_uniq.txt
```

3. Give **ONE** command to check the spelling in *sort_uniq.txt* and store the misspelled words into another file named *misspell.txt*.

```
$spell sort_uniq.txt > misspell.txt
```

4. Now *sort_uniq.txt* contains all distinct generated words, and *misspell.txt* contains all misspelled words. The differences between the two files are the meaningful 4-character words. Give **ONE** command to return the correctly spelled words as shown below:

```
$ [your command]
< loop
< polo
< pool
```

Hints: Consider the command **diff** and **grep**.

```
diff sort_uniq.txt misspell.txt | grep -E '[a-z]{4}'
```

Checkpoint 1.5

Consider the file *question1.txt*.

```
2011111111,John,M,98
2011222222,Marry,F,85
2011333333,Sally,F,85
2012111111,Kit,M,86
2012222222,Ben,M,97
2012333333,Smitty,F,92
2012444444,Jolly,F,93
2012555555,Ken,M,100
```

Figure 1 *question1.txt*

1. Give **ONE** command to return the lines that contain the record of Kit

Hints:

```
$ [Your command]
2012111111,Kit,M,86
```

```
grep "Kit" question1.txt
```

- Give **ONE** command to find the students with UID begin with “**2012**” (i.e., To find the lines that begin with 2012)

Hints:

```
$ [Your command]
2012111111,Kit,M,86
2012222222,Ben,M,97
2012333333,Smitty,F,92
2012444444,Jolly,F,93
2012555555,Ken,M,100
```

```
grep -E "^2012" question1.txt
```

- Give ONE command to return the lines that contain the record of the students who are both:
 - UID start at **2012**, and
 - Name starts with the characters **J** or **S**

Hints:

```
$ [Your command]
2012333333,Smitty,F,92
2012444444,Jolly,F,93
```

```
grep -E "^2012.*,[JS]" question1.txt
```