



FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF INFORMATION AND COMMUNICATION TECHNOLOGY
DEPARTMENT OF INFORMATION AND MEDIA TECHNOLOGY

SECOND SEMESTER 2016/2017 EXAMINATION

COURSE CODE:	IMT 321
COURSE TITLE:	System Programming
CREDIT UNITS:	3
TIME ALLOWED:	3 Hours
COURSE LECTURER(S):	Dr. H. O. Aliyu
NUMBER OF QUESTIONS:	4
NUMBER OF PAGES:	4

INSTRUCTIONS

- Answer all questions
- Do **not** use red pen
- Please use a clear handwriting
- This exam is closed book, closed notes, closed laptop and closed cell phone
- Do **not** use calculators



```
-rwxrwx-r-x 1 akpan imt 4096 2017-07-26 20:30 assigment
drwxr-xr-x 2 daniel sict 409600 2017-05-07 17:21 Videos
lrwxrwxrwx 1 ahot sict 409600 2017-10-23 08:00 result -> home/ahotexams/imt321
crwxrwx-r-x 1 akpan imt 4096 2017-07-26 20:30 sdb1
```

Figure 1

```
courselist
|
| -IMT321
| -CIT323
| -IMT322
| -CPT300
| -GST311
| -CPT350
| -IMT336
| -CPT301
| -CIT300
```

Figure 2

```
courselist
|--IMTcourses
|   |--IMT321
|   |--IMT322
|   |--IMT336
|--CITcourses
|   |--CIT323
|   |--CIT300
|--CPTcourses
|   |--CPT300
|   |--CPT350
|--Generalcourses
|   |--GST300
```

Figure 3

```
1  #!/bin/bash
2  do_backup () { ### study function do_backup carefully to identify what it does
3      counter=0
4      for file in $(ls $1); do
5          fname=${file}.bak
6          $(cp $1/$file $2/$fname)
7          echo "$1/$file copied"
8          counter=$((counter+1))
9      done
10     echo "$counter files copied"
11 }
12
13 if [ $# -ne 2 ]; then
14     echo "Exactly two operands required"
15     echo "command's syntax in imtbk source_dir dest_dir"
16     exit 1
17 fi
18
19 if [ -d $1 ]; then
20     if [ -d $2 ]; then
21         echo "$2: destination directory found"
22         do_backup $1 $2
23     else
24         $(mkdir $2)
25         echo "$2: backup directory created!"
26         do_backup $1 $2
27     fi
28     exit 0
29 else
30     echo "$1: No such directory"
31     exit 1
32 fi
```

Figure 4

**Question 1:**

- a.
- i. Name the four essential components of Disk Operating System (DOS) (4 marks)
 - ii. State three differences between file naming conventions in DOS and UNIX (3 marks)
 - iii. State three differences between DOS and UNIX commands (3 marks)
- b.
- i. What are wildcards? (2 marks)
 - ii. Explain any three wildcards you know, giving at least one example in each case (3 marks)

Question 2:

- a. With the aid of a suitable diagram, briefly describe the UNIX architecture (3 marks)
- b. **Figure 1** shows the result of executing the Linux command `ls -l` in a directory
- i. Briefly describe each of the listed files. (7 marks)
 - ii. What will be the result of executing `ls -l` in the same directory after executing the commands
`chmod 751 assignment`
`rm ahot`
`mkdir imt exams`
`chmod u=rx,o-rwx Videos`
[Take the following assumptions: current user is **imt**, and is in group **sict**; a directory has two (2) links and size 4096 KB upon creation; current system date is 2017-10-23 08:30] (5 marks)

Question 3:

- a. Given that **Figure 2** is a segment of a Linux file system tree. How would you turn the structure of the tree to the one shown in **Figure 3** (4 marks)
- b. Describe each of the following terminals in the Linux shell (4 marks)
- i. `ahot@imt:~$`
 - ii. `ahot@imt:/$`
 - iii. `ahot@imt:~#`
 - iv. `ahot@imt:/#`
- c. Considering that you are in the directory **IMTCourses** in **Figure 3**:
- i. What would be the outputs of issuing the commands `ls ./` and `ls ../` (2 marks)
 - ii. Describe, with a suitable diagram and comments highlighting the effect(s) of each command, the new structure of the tree after issuing the following commands in the order specified:
`mv IMT321 ../CITCourses/`
`mv * ../`
`cd ..`
`rm -r IMTCourses` (5 marks)

**Question 4:**

Assuming your Linux distribution comes with Bourn Again Shell (i.e., bash);

- a.
- i. Carefully study the shell script in **Figure 4** and describe, concisely, what it does **(3 marks)**
 - ii. Given that the name of the script is “**imtbk**”, briefly explain (including the use of a file tree) the effect(s) of executing it from the directory **courselist** shown in Figure 2 as follows:
`imtbkp ./ imt321.exam` **(3 marks)**
- b. Write a simple shell script that takes a non-empty directory as a parameter and merges the contents of its sub-directories into itself (the parent directory) while deleting the initial subdirectories. For example, when it takes the directory “**courselist**” in **Figure 3** as parameter, it should turn the file tree structure to the one in **Figure 2**.
Add sufficient comments to make your script comprehensible. **(9 marks)**