



UNIVERSITY EXAMINATIONS

REGULAR-NJORO CAMPUSSECOND SEMESTER, 2017/2018 ACADEMIC YEARSECOND YEAR RESIT/SPECIAL EXAMINATION FOR THE DEGREE OFBACHELOR OF SCIENCE IN COMPUTER SCIENCECOMP 224: UNIX OPERATING SYSTEM AND PROGRAMMING

STREAM: BSC. COMPUTER SCIENCE

TIME: 2 HRS

EXAMINATION SESSION: OCTOBERYEAR: 2018

INSTRUCTIONS

- i) Answer question ONE and any other TWO questions
- ii) Write on both sides of the answer sheet
- iii) Begin each new answer on a separate page of the answer sheet

Question One (30 marks)

- a) What is a file in a UNIX environment? [2 marks]
- b) Explain the reason for options and arguments with a UNIX command. [3 marks]
- c) Discuss how the system calls are different when used with C language in a UNIX environment in comparison with Windows. [4 marks]
- d) Explain how the multiprogramming feature is achieved in a UNIX operating system; [3 marks]
- e) What are the commands for the following; [1 mark]
 - i. Copying *file1 file2* to **Comp224** directory. [1 mark]
 - ii. Deleting *file2* with a confirmation prompt.

COMP 224

- iii. Listing the **dot c** (.c) files in a directory. [1 mark]
- iv. Displaying the first ten lines in *file2* [1 mark]
- v. Counting the number of files in a folder **Comp224** [6 marks]
- f) With examples, discuss the shell kernel relationship in a UNIX system. [7 marks]
- g) Write a C program that copies an existing file *file1* to *file2* if *file2* is not in existence, it should be created.

Question Two (20 marks)

- a) Differentiate between shared memory and a socket in inter-process communication. [3 marks]
- b) Discuss the effect of the executable rights on a directories and files. [3 marks]
- c) Discuss why a UNIX operating system is suitable for Information Technology professionals. [4 marks]
- d) Discuss the steps of creating a tcp server client application, illustrate each with an example. [10marks]

Question Three (20 marks)

- a) What is a library function? [2 marks]
- b) Differentiate between a file descriptor and a read/write pointer. [3 marks]
- c) Explain any four functions of an operating system. [4 marks]
- d) Write a C code that determines the size of a file. [4 marks]
- e) A UNIX command gave the following output

```
-rw-rwxr-x  2  kimutai  Comp224  512  Dec 6 12:33  Ex1.c
```

- i. What is the command?
- ii. Explain the significance of each field of the output.
- iii. What is the effect of this command **chmod u+rw Ex1.c**

[7 marks]

Question Four (20 marks)

- a) What is a Shell Scripting?

[2 marks]

- b) Discuss why a UNIX shell is a programming language. [3 marks]
- c) Write a shell script that lists shell script files in a folder. [3 marks]
- d) What is the output of the following commands;
- `$echo $SHELL`
 - `grep -i kimutai classlist`
 - `ls -l | wc -l > sortedlist`
 - `ls -lt`
 - `history`
- e) Write a C program that appends two files **file1** and **file2** to an existing **file3**. [5 marks]
- [7 marks]

Question Five (20 marks)

- a) Discuss the difference between a thread and a process. [3 marks]
- b) Differentiate between user and kernel models of operation, state one advantage of the kernel mode. [3 marks]
- c) Discuss the following types of operating system, stating an area of application in each;
- Embedded
 - Real time
- [5 marks]
- d) Given the following code;

```
#include <stdio.h>
#include <unistd.h>
int main(){
```

COMP 224

```
int pid, x;  
pid = fork();  
for(x=0; x<5; x++)  
    printf("%d\n", x);  
return 0;  
}
```

- i. Print the output of this code.
- ii. Modify the code to print the output of the child and parent processes separately.
- iii. Comment the code in ii. for readability

[9 marks]
