

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

SEMESTER FINAL EXAMINATION

WINTER SEMESTER, 2023-2024

DURATION: 2 HOURS

FULL MARKS: 120

CSE 4105: Computing for Engineers

Programmable calculators are not allowed. Do not write anything on the question paper.

Answer all 4 (four) questions. Marks of each question are written in the right margin with brackets.

1. a) Can you explain the followings in terms of OS working mechanism: 3 × 5
- A computer program like 'word.exe' does not take any CPU time when the projector is showing the graphics output, whereas a program for calculating n-th Fibonacci number is hungry for CPU.
 - When a computer is running many programs, it often happens that text input to the 'word.exe' program experiences a delayed output.
 - It is observed that a folder/directory, X, when moved to another directory, Y, in the same physical drive (D:\), does not take much time in the 'move' operation; whereas when the files inside the folder, X, are 'cut' and 'pasted' in directory Y, it takes much more time when number of files are many (e.g. 5000 files).
- b) A novice user used the commands **ls** and **cd** as shown in the following Code Snippet 1 and got a message: 'Error: not a directory'.
- ```

1 # pwd
2 /
3 #ls
4 user bin etc home dev
5 var myfileDirDev
6 # cd myfileDirDev
7 Error: not a directory

```
- Code Snippet 1:** A Bash script for question Question 1.b
- What is the cause of such error? What actions need to be performed to investigate the contents of **myfileDirDev**? 2
  - What will be the output of the **ls -l** when typed in the command prompt? (two line sample output will be enough for the demonstration) 3
  - Write a program that will take the output of **ls -l** as input and will just print the number of files and directories. Write a simple **algorithm** for the purpose. (you can assume any algorithmic artefact as needed without implementation, for example `getLine()`, etc) 5
- c) When OS transfers the control of the CPU to any program, how does it regain control of the CPU? 5
2. a) What do you understand by 'Man-month'? Can you always increase software project's productivity by hiring more people? Explain. 5
- b) What are the cloud services commonly referred to as 'aaS'? Which is the cloud service that reaches the end users? 6 + 4
- c) Suppose you have a matrix: 2 × 5

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

- i. How do you create a two-dimensional array in python using the above data named as, myarray.
  - ii. What will be the output of the operation, myarray[:,1]?
  - iii. What will be the output of the operation myarray[2,:]?
    - iv. What will be the output of the operation myarray[1:3,1:3]?
    - v. What will be the output of the operation myarray[1:3,-1]?
- d) Write few lines of code to demonstrate that Python is an interpreted language. 5
3. a) Sections in a PE has the four information in the section header: ['SizeOfRawData', 'Pointer-ToRawData', 'VirtualSize', 'VirtualAddress']. How does the loader use these information? 5
- b) FileAlignment is an Optional Header entry in PE that may help virus to creep into an executable. Explain by language or graphics. 5
- c) How does virus do obscuration and/or polymorphism to disguise itself? 5
- d) LAT viruses are hard to detect-why? 5
- e) Briefly explain XSS, SQL Injection attack on web applications. 10
4. a) Briefly discuss on HIPAA and FISMA. How much are they enacted in USA? 10
- b) Briefly describe the task of miner in a block chain. 5
- c) How does block chain invalidate double spending? 5
- d) How is PoW byzantine fault tolerant? 5
- e) How is the Merkel Tree used in Block chain? 5