ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
THE ORGANIZATION OF THE ISLAMIC CONFERENCE (OIC)
Department of Computer Science and Information Technology (CIT)

MID SEMESTER EXAMINATION   **SUMMER SEMESTER, 2011**
DURATION: 1 Hour 30 Minutes   **FULL MARKS: 75**
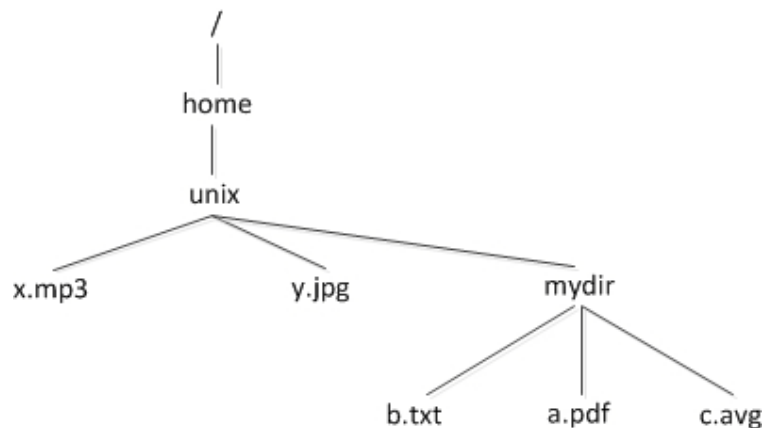
CIT 4613: Unix Programming

Programmable calculators are not allowed. Do not write anything on the question paper.
There are **4 (four)** questions. Answer any **3 (three)** of them.
Figures in the right margin indicate marks.

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1. a) Name five features of Unix systems that made it popular. Briefly describe two of them in respect of your own experience.   5+4

    b) Define kernel and shell. Describe how the works of Richard Stallman and Linus Torvalds complement each other in building a complete operating system.   3+5

    c) What are CLI and GUI? Give an example task (e.g. copying files, opening programs) each for these two systems that demonstrates their strength.   2+6

2. a) The directory structure of a Unix system is shown below. Suppose the present working directory is **/home/unix**   3

Write the output of each of the following commands:
    i.   ls x*
    ii. ls 'x*'
    iii. ls */*

    b) What are absolute and relative paths? If, for the directory structure shown in the figure above, your present working directory is /home/unix, answer the following questions: 2+2
    i.   What is the relative path of the home directory?
    ii. What is the absolute path of the file a.pdf?

    c) **date** is a Unix command that prints out the current date of the system, as shown below   8

$ date
Sun Jul 10 10:24:49 2011

Write the output of each of the following commands:
  i.   `date`
  ii. echo `date`
  iii. echo `echo date`
  iv. echo `echo \`date\``

d) For the directory **mydir** shown in the figure above, write whether the following statements are **True** or **False**. Moreover, state the reasoning behind your answer in one sentence.

10

  i.   If the permission for mydir is set to r-- , the command **cd mydir** executes successfully.
  ii. If the permission for mydir is set to -w-, the command **ls mydir** does not execute successfully.
  iii. If the permission for mydir is set to r-x, the command **cp x.mp3 mydir** executes successfully but **cd mydir** fails.
  iv. If the permission for mydir is set to rw-, the command **ls mydir** executes successfully but **cd mydir** fails.
  v.   If the permission for mydir is set to -wx, the commands **cp mydir/a.pdf .** and **cp mydir/* .** both execute successfully.

3. a) Which one is more powerful between **sed** and **awk**? Why?

5

    b) Write short note on each of the following topics with respect to Regular Expressions. Provide appropriate examples.

3x3

      i.   Anchors
      ii. Backreference
      iii. Greedy and lazy repetition

    c) Write an awk file that takes a text file as argument and prints each of the words in the text file along with the number of times they occur in that file. A sample run of the file is shown below:

6

$ cat test.txt
A quick brown fox jumps over and over
$ awk -f wordfreq.awk test.txt
fox 1
A 1
quick 1
over 2
brown 1
jumps 1
and 1

    d) Using the **wordfreq.awk** file and Unix filters in a pipeline, write a shell command that prints the 10 most frequent words of a text file in decreasing order.

5

4. a) Demonstrate how one can redirect both error and standard output to a single file.

5

    b) What are the meanings of **$$, $?** and **$@** in a shell script? Briefly describe the three ways one can use to return a value from a function in shell script.

3+3

    c) Write a shell script that reads a number from the user and prints out the factorial of that number.

7

    d) Write a shell script that takes a directory path from the user and list all the files in that directory to which you have read, write and execute permissions.

7