CS4023 Midterm Exam (15%), 16 Oct 2009

Version B

Student Name:_____

Student ID:_____

Course/Year:_____

Part A – Linux Skills (2%)

Step 1. Create a directory called **`labExamXYZ`** in your home directory where **`XYZ`** is your ID number.

Step 2. Change into this directory and create a file named **`linux_commands.txt`**. Open this file with a text editor (e.g., emacs or vi) and type any 5 Linux commands, each on a separate line; save the file.

Step 3. Create a backup copy of the **linux_commands.txt** file called **`linux_commands_16_10_09.txt`**

Step 4. Add the following line to your backup file as the last line:
`Backup of my work on Linux commands`

Step 5. Create a log file called **`logFile.txt`** to store a long listing of all the files and directories (including hidden files) in your home directory.

Step 6. Remove the read and write permissions of other users of your system for the **`linux_commands.txt`** file.

Step 7. Create an archived backup (e.g. zip, tar) of your **`labExamXYZ`** folder.

Step 8. Be able to demonstrate on the command line which processes are using memory and CPU time on your system.

Part B – General OS Questions (13%)

Q1. Multiprogramming operating systems are designed to **(1 mark)**

a. schedule multiple processes on multiple CPUs
b. support programming in multiple programming languages
c. maximize CPU usage
d. serve multiple interactive users
e. none of the above

Q2. POSIX is to UNIX the same as **(1 mark)**

a. Pthreads to MS Windows
b. Java API to MS Windows
c. Windows API to MS Windows
d. Windows API to the Java VM
e. none of the above

Q3. Give a short definition of **system call**: **(2 marks)**

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Q4. What will be printed on the screen by the following code: **(2 marks)**

```
#include <sys/types.h>
#include <stdio.h>
#include <unistd.h>

int x = 9;
int main()
{
   pid_t pid = fork();
   if (pid == 0) x = 10;
   x = x - 1;
   printf("x = %d ", x);
   exit(0);
}
```

a. x = 9 x = 9
b. x = 9 x = 8
c. x = 10 x = 9
d. x = 8 x = 8
e. x = 10 x = 8

Q5. A process P is waiting for a specific I/O event to occur. **(1 mark)**
Once the event has occurred, the state of P will change from *waiting* to:

a. *running*
b. *ready*
c. *new*
d. *terminated*
e. the state will not change

Q6 – Q8. Which statements are generally **WRONG**? There might be more than one wrong statement in a question. Explain any assumptions you make.

Q6. Microkernels: **(2 marks)**

a. are easier to port to new architectures
b. are easier to maintain
c. minimize the performance overhead of user to kernel space communication
d. have less code running in kernel mode
e. are more secure

Explanation: _____

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Q7. Context Switch: **(2 marks)**

a. is the switching of the CPU from one process to another
b. is the switching of a process from one CPU to another
c. can occur in kernel mode
d. can occur in user mode
e. can rely on a hardware support

Explanation: _____

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Q8. Message passing IPC: **(2 marks)**

a. can be direct or indirect
b. is generally faster than shared memory IPC
c. involves establishing a communication link
d. requires more complicated process/thread synchronization than shared memory IPC
e. involves exchange of messages via send and receive system calls

Explanation: _____

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