CIS-350 INFRASTRUCTURE TECHNOLOGIES

Study Guide for Test 4

Closed book, closed notes. You may use a calculator only for calculations. You may have a "cheat sheet", i.e., an index card 3"×5" filled up on one side with anything you want. The other side of the card should be blank. You need to turn this card with the test or show it to me after the test.

Materials covered:

(1) Chapters 15-18 as well as Windows command prompt (MS-DOS) and Unix/Linux to the extent they were covered in class or assigned explicitly for reading. Review mainly the lecture notes as well as slides posted for these chapters and the associated readings. There may also be a limited number of questions about the material in the textbook that we did not cover explicitly in class.
(2) Review In-class Activity 6 and Labs 1-5. You need to memorize and understand the syntax of the commands used in the labs. The solutions for Labs 1 and 3 as well as In-Class Activity 6 are posted on BB in the Course Documents and Assignments/Labs folders, respectively.

Test format:

(1) The test format will be similar to Tests 1, 2, and 3.
(2) Multiple choice questions on all the mentioned materials like in the Sample Test 4 which follows.
(3) Short essay questions, similar to those in Sample Test 4 as well as from the Reading Review Questions and Exercises following each chapter.
(4) Short numerical problems to work – see In-class Activity 6.
(5) Fill in blanks and matching questions. Memorize the description of the keywords (those in **bold**) used in the lecture notes and textbook. In my lecture notes, I tried to use consistent terminology with the textbook.

This Sample Test 4 is more or less of the size that the real Test 4 is going to be. You should be able to work this test in 75 minutes maximum, including 3-5 essay questions, and 1-2 problems from In-Class Activity 6. This Sample Test 4 is only an example of Test 4. You should not expect exactly the same questions on real Test 4. In fact, the vast majority of questions will be different. Good luck!

Sample Test 4

I. Multiple Choice and True/False Questions.

1. The OS manages basic hardware resources such as
a. CPU time b. memory c. I/O devices d. all of them

2. The user interface is a commonly called a _____ that is usually not part of the OS.
a. task b. shell c. entity d. program

3. To get the processor's attention, the peripheral device sends the electronic signal called an/a _____.
a. interrupt b. signal c. event d. message

4. File management tasks do not encompass
a. journaling b. backup and recovery
c. high-level scheduling d. file compression

5. System administrators' tasks do not include _____.
a. changing user privileges b. performing context switching
c. providing secure backups d. installing new software and upgrading software

6. Interrupts are detected (sensed) by _____ and handled by the OS _____.
a. software/software b. hardware/hardware
c. hardware/software d. software/hardware

7. If several programs are ready to execute, the _____ is polling all programs PCBs in memory and decides which one should be granted the CPU time.
a. kernel b. MMU c. scheduler d. dispatcher

8. CPU-bound programs are typically executed in non-preemptive environments.
a. True b. False

9. The command line interface allows the user to access data and programs by _____– the user is not concerned with physical characteristics and representation of the file or data and their physical storage locations.
a. clicking on icon that represents them b. selecting them from pull-down menus
c. name d. selecting them from directories

10. _____ is hard to implement as it is demanding on hardware and software and it requires powerful video capability and a lot of memory to store pictures and programs.
a. Command line interface b. Graphical user interface
c. Shell interface d. Menu driven interface

11. _____ derive the meaning from their position in the operands' field.
a. Keyword parameters b. Positional parameters
c. Relational parameters d. Absolute parameters

12. A named collected of data that is manipulated as a unit is called a _____
a. record b. file c. database d. byte

13. Which one is typically not an operation performed on an entire file?
a. open b. close c. rename d. copy e. insert

14. Which item is not an attribute of a file?
a. Size b. Location c. Type/Extension d. Name
e. All of them are attributes of a file

15. By using simple commands like read, write, close, copy to name a few, file systems allow users and applications to deal with a _____ view of files.
a. physical b. logical c. indexed d. direct e. indirect

16. File directories are also files.
a. true b. false

17. If a hard disk has 400GB of space and a block contains 8KB, how many entries at a minimum would be required in a tabular non-contiguous file allocation table to address each block?
a. 50,000,000 b. 400,000,000,000 c. 8,000
d. 50,000 e. 50,000,000,000

18. How many index pointers does the Unix/Linux indexed file allocation method use?
a. 1 b. 10 c. 13 d. 3 e. infinite number

19. Up to how many pointers does the indexed file allocation method use to locate any block of data in a file?
a. 1 b. 2 c. 3 d. 4 e. 5

20. The access control matrix specifies physical locations of the various subjects and their related objects.
a. True b. False

21. To the OS, the difference between the process and the program is insignificant
a. True b. False

22. Non-preemptive systems impose the clock interrupt. As a result, the process is given a slice/quantum of the CPU time.
a. True b. False

23. Which of the following memory management techniques leads to external fragmentation?
a. fixed partitioning b. dynamic partitioning c. paging d. segmentation and paging

24. Virtual addresses are different from real (physical) addresses and special-purpose hardware called _____ quickly maps virtual addresses to real addresses.
a. Translation Lookaside Buffer (TLB) b. Associative Memory c. Memory System
d. Memory Management Unit (MMU) e. Device Driver

25. In dynamic address translation using paging the program page size is always _____ the memory frame size.
a. greater than b. less than c. equal to d. much greater than e. not equal to

26. In dynamic address translation using segmentation and paging, the address part of the instruction has _____ parts.
a. 1 b. 2 c. 3 d. 4 e. 5

27. Excessive swapping-in and -out may result in so called _____ which may substantially decrease the system performance.
a. thrashing b. demand paging c. prepaging d. page fault e. working set

28. When you first log onto UNIX/LINUX, your _____ directory is your working directory.
a. root b. login c. home d. logon

29. Which DOS command would you use to copy the contents of a file to another file?
a. cat b. cp c. copy d. ls e. none of them

30. Assume a UNIX/LINUX command references file name xy?2. Which of the following file names are referenced?
a. xy122 b. xy72 c. xyab2 d. all of them

31. To run a program in the UNIX/LINUX background, type _____ at the end of the command line.
a. back b. a redirection operator c. a pipe d. an ampersand (&)

32. To uniquely identify a DOS file, combine one or more directory names and a file name to form a
a. file extension b. path name c. working directory d. batch file

33. At the top of the DOS directory structure is a single system _____ directory.
a. home b. source c. working d. root

34. Which UNIX/LINUX command would you use to list the contents of a file?
a. man b. ls c. cat d. cp e. vi

35. Which UNIX/LINUX command would you use to obtain help on the command *who*?
a. vi who b. ls who c. cat who d. cp who e. man who

36. A UNIX/LINUX file is viewed as a string of
a. bytes b. fields c. records d. data elements

37. What is physically stored in virtual memory?
a. nothing b. application routines c. the OS d. both b and c

38. In Windows command prompt (MS-DOS), the root directory is denoted by a
a. \ (backslash) b. / (slash) c. | (vertical bar) d. - (hyphen)

39. In a DOS/UNIX/LINUX command, which symbol is used for piping?
a. > (greater than sign) b. / (slash) c. | (vertical bar) d. < (less than sign)

40. In a DOS/UNIX/LINUX command, which symbol is used for input redirection?
a. > (greater than sign) b. / (slash) c. | (vertical bar) d. < (less than sign)

II. Fill out the blanks with the most appropriate word(s)

1. Two simple strategies for concurrent processing are:
_____ and _____.

2. List three general types of the interfaces through which the user communicates with the OS.
a. _____
b. _____
c. _____

3. Bringing a page into real memory only after it has been referenced is called _____.

4. When a virtual memory system refers to a page that is not yet in real memory, a _____ _____ is recognized.

5. A _____ is an executing program together with all the resources allocated by the OS.

6. A _____ is a miniprocess that can be executed independently of other parts of the process.

7. UNIX/LINUX creates a new process from an older one by operation called _____. The forking process is called a _____, whereas the forked process is called a _____.

8. List three names of popular shells in UNIX/LINUX. _____ _____ _____

9. LRU stands for _____.

10. The effectiveness of batch systems is measured by _____ time and _____.

11. The effectiveness of interactive systems is measured by _____ time.

12. TLB stands for _____.

13. FAT stands for _____.

14. In Windows NTFS file system, the core of each volume is a single file called the _____.

15. Many systems provide a means for dividing physical devices, particularly disks, into independent sections called _____.

16. Most systems provide an _____ called path that allows the user to specify other path locations that are to be searched for the file if a pathname is not given and if the file is not found in the current working directory.

17. _____ include automated file recovery procedures in the event of a disk crash or system failure during file access operations.

III. Matching. Match the UNIX/LINUX commands with their descriptions.

_____ 1. pwd	a. moves you to the parent directory
_____ 2. cd /	b. moves you to the home directory
_____ 3. cd	c. brings you to the root directory
_____ 4. cd ..	d. prints working directory

IV. Short calculations/answers

Work any one or two problems from each group of Problems 1-4 (segmentation), Problems 5-8 (Paging), and Problems 9-12 (segmentation and paging) in In-class Activity 6. Note that in In-class Activity 6 the page size and the frame size for paging as well as segmentation and paging is 4KB. On Test 4 I may change the page size and frame size to 2KB or 8KB, for example.

V. Short essay questions - These are examples of the short essay questions. There will be about 5 short essay questions on Test 4.

1. Describe the purpose of the following commands in this DOS AUTOEXEC.BAT file.

```
ECHO OFF
IF %1==XYZ GOTO GOOD
ECHO BAD PASSWORD... ENDING
GOTO END
:GOOD
ECHO YOU'RE OK...STARTING
IF EXIST E:LOOP.BAT ECHO YES THERE IS A LOOP
PAUSE
REPEAT RED BLUE GREEN
:END
```

2. What does the UNIX/LINUX command *sort -nr random.dat > randsor.dat &* do?

3. Draw and briefly describe the major process states and transitions from one state to another. Draw the diagram.

4. What does the UNIX/LINUX command *chmod g-w designmenu* do?

5. What is a deadlock? Draw a simple situation representing a deadlock.

6. Describe the way UNIX/LINUX handles security (file/directory access permissions)

7. Describe the simple round-robin polling algorithm. Draw the diagram

8. What are the advantages and disadvantages of virtual memory?

9. What does the file management system do?

10. Describe the operation of the multilevel feedback queue dispatching algorithm. Draw the diagram.

11. Explain the absolute path and the relative path concepts.

12. Compare and contrast preemptive and non-preemptive dispatching.

13. What is the difference between running tasks in foreground and background in Unix/Linux

14. What does the following Unix/Linux command do? (sleep *3600*; who >> *log*) &

Answers

I.

1. d
2. b
3. a
4. c
5. b
6. c
7. d
8. b
9. c
10. b
11. b
12. b
13. e
14. e
15. b
16. b
17. a
18. c
19. d
20. b
21. b
22. b
23. b
24. d
25. c
26. c
27. a
28. c
29. c
30. b
31. d
32. b
33. d
34. c
35. e
36. a
37. a
38. a
39. c
40. d

II.

1. sharing the CPU during I/O breaks, time-sharing the CPU
2.
   a. command line interface
   b. menu-driven interface
   c. graphical user interface
3. demand paging
4. page fault
5. process
6. thread
7. forking/spawning, parent, child
8. Bourne, Korn, C
9. Least Recently Used
10. turnaround, throughput
11. response

12. Translation Lookaside Buffer
13. File Allocation Table
14. Master File Table
15. partitions
16. environmental variable
17. Journaling file systems

III. Matching. Match the UNIX/LINUX commands with their descriptions.

__d___ 1. pwd	a. moves you to the parent directory
__c___ 2. cd /	b. moves you to the home directory
__b___ 3. cd	c. brings you to the root directory
__a___ 4. cd ..	d. prints working directory

IV. See the Solution to 12 problems for In-class Activity 6 posted on BB.

V. The answers to the essay questions are in the textbook, lecture notes and labs posted on BB.