CSCE 3613 Operating Systems Homework #1 ver. 4.11

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52 points

19 questions

**Instructions**

* Type your work, print it to a \*single\* PDF, and upload it to Blackboard before the due date and time. It is strongly suggested to use the given document.
* Show all of your work. Without proper justification and details of steps, correct answers alone may not carry full credit.
* -2 points if you do not insert your name and ID at the top of the document.
* -5 points if it is not typed.
* -5 points if it is not a PDF file.
* -5 points if it is not a single PDF file. Submit one PDF file. Do NOT submit zip files containing one or more files.
* -5 points if you present the worked problems out of order. In other words, please present the problems in the order assigned, 1, 2, 3, …

1. (6 pts.) What are the three operating system goals?

Execute user programs/make solving user programs easier

Make computer easier to use

Use computer hardware in efficient manner

1. (4 pts.) Describe the difference between the user and system view of an operating system.

User view is designed for ease of use with no care about the utilization of the CPU. The system view attempts to maximize its utilization and protecting the system from malicious content.

1. (1 pt.) In the computer science field, the computer engineering field, and in the operating systems class, how many bytes are there in a Kilobyte? Be specific. Do not round.

1024 bytes

1. (1 pt.) According to NIST, what is a *pebibyte*? Be specific. Do not round.

2^50 bytes

1. (1 pt.) The typical computer system organization has shared memory, device controllers, and one or more CPUs connected through a common communication channel called a .

bus

1. (1 pt.) The disk controller notifies the CPU that it has fetched the data by issuing a(n) .

interrupt

1. (3 pts.) Describe DMA.

Direct Memory Access (DMA) occurs when a device transfers blocks of data to or from its own buffer to memory without help of the CPU

1. (4 pts.) Given that a cache is smaller than the storage being cached, describe the important design problem of cache management.

Cache side and replacement policy

1. (3 pts.) What are the three advantages of a multiprocessor system?

Increased throughput, economy of scale, and increased reliability

1. (3 pts.) Expand the acronym SMP and describe it.

Symmetric multiprocessing: all processors are equivalent. Each can do the same calculations

1. (3 pts.) What is multiprogramming?

Organizes jobs so the CPU always has one to execute

1. (3 pts.) Describe kernel mode.

It is desirable to distinguish when the OS is running user code versus kernel code. Some instructions are designated as privileged, only to be executable when the OS is in kernel mode. Therefore, the user code must do a system call that changes the mode to kernel mode. In this way, the OS controls what code can execute instructions that could adversely affect the OS.

1. (3 pts.) What is the difference between a single-threaded process versus a multithreaded process?

A single process has one program counter specifying the next instruction to execute. Such a process is sequential. A multithreaded process has multiple program counters, each pointing to the next instruction to execute for a given thread

1. (3 pts.) What is cache coherency?

Multitasking environments must be careful to use the most recent value, no matter where it is stored in the storage hierarchy.

1. (2 pts.) Define what the host operating system is in a virtual machine environment

In a virtual machine environment, the host operating system is natively compiled for the CPU and it runs guest operating systems also natively compiled using a virtual machine manager

1. (3 pts.) Describe a real-time embedded system operating system.

A real time embedding system operating system has well defined fixed constrains. The processing must be done within the constraints because the correct operation of the system only occurs if the constrains are met

1. (2 pts.) In cloud computing, define and describe PaaS.

Platform as a service: Consumers have the ability to develop their own applications onto the cloud infrastructure. The applications are developed using a development environment provided by the service provider. However, the consumer cannot manage or control the underlying cloud infrastructure

1. (3 pts.) Describe the copyleft license used in open source agreements and list the name of a common copyleft license

Requires that the source code be distributed with binaries and that any changes made to the source code be released under the same GPL license. A common copyleft license is the GNU General Public License (GPL)

1. (3 pts.) List the three general methods used to pass parameters to the operating system.

Registers, block/table, and stack

The End.