CS300   
Computer Systems HW 1

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## Instructions:

1. Please name your file as CS300systems\_yourusername\_hw2.
2. All questions must be answered on an INDIVIDUAL basis. If your answer is inspired by the discussion with other students, you need mention their names in your acknowledgement section.
3. State clearly all your assumptions if anything is ambiguous. Always ask if you have any questions.
4. Please correctly cite and list any (online) references. Please pay attention to the academic conduct code, particularly the definition of plagiarism.
5. Please submit your homework through blackboard on time.
6. Thank You!

## Questions:

1. Dual Mode :
   * What is the kernel mode and what is the user mode? Why need dual mode?
   * How to switch from the user mode to the kernel mode?
2. Processes and Threads:
   * What are the differences and relationships between processes and threads?

**Answers:**

1. ***Dual Mode:***
   * ***Kernel mode:*** is known as system mode, supervisor mode, privileged mode, It is one of CPU operating modes. It can access kernel data which is in kernel address space, and it is separated from user address space.
   * ***User mode:*** It is nonprivileged mode and can only access user data.
   * We need dual mode to divide the performance of the operating system code and user developed code. Using dual mode, we can divide operating system from the user programs.
   * We have two ways to change from the user mode to kernel mode:
     + 1. Through a trap which is either a system call or a fault.
       2. Through an interrupt.
2. ***Processes and Threads:***
   * **Differences:**

- Process has separate virtual address space, while threads (of same process) shared virtual address space, so shared code section, data section and other OS resources likes open file descriptors and signals.

* + **Relationships:**
* Thread is portion of process (Process has multiple threads).

## Feedback:

1. How long do you take to complete this homework? Is it too hard, too easy or OK?

It took me 30 mins, Its ok

1. How well do you understand this topic?

I understand it quite well

1. Do you have any other feedback? N/A

***Q1: Good.***

***Q2:***

***A process is a consumption unit, meaning a program in execution.***

***A thread is an execution unit, a part or segment of a process thus a process can have multiple thread to carry out its execution.***

***A process can exist on its own but a thread can’t. It has to be part of a process.***

***Relationship:***

***One process can have multiple threads and these threads belonging to the same process usually require synchronization because they will share code, data, and other resources.***

***-John***

Reference:

* MET CS 300 O1 Introduction to software development slides and live class