CS376 – Problem Set #1

For the following questions, answer in this document completely, then submit the document back to Canvas. All answers must be in your own words – you can discuss answers with others, but any work you turn in must be your own. These questions are based on Ch1 and Ch2 of your text. Most questions have multiple parts –be sure to answer all parts of the question.

1. *(20 points)* What is an operating system? Give a short description of its purpose. Then, define and describe four of its duties specifying which part of the computer the duty serves: hardware or application.
2. *(10 points)* When the CPU makes a request for data that is not in RAM, a request will be made to retrieve the data from the hard disk. Describe the process including how the request goes from CPU to the disk drive, what components are used, what parts of the operating system are invoked.
3. *( 20 points)* Interrupts serve an important purpose. What is the purpose of an interrupt? Why is the CPU allowed to be interrupted in the first place? What are the different types of interrupt? When an interrupt occurs, by what mechanism does the OS determine what code to execute in order to carry out the task the interrupt requests?
4. *(5 points)* Find the definition of a trap. How does a trap differ from an interrupt?
5. (*12 points)* What is the difference between a CPU, a processor, and a core?
6. *(8 points)* Define the “kernel”. How does the kernel differ from system programs? Give an example.
7. *(13 points)* Describe how a user program makes a request to the operating system. Be sure to include something a program does that invokes a service from the operating system and give the mechanism by which a program you’ve written has requested a service from the OS.
8. *(12 points)* What storage devices are closest to the CPU? What storage device is the next closest? What qualities of these storage devices make them better for CPU operation than say, a hard disk or magnetic tape?