**Homework 1**

1.5

It helps to protect privileged instructions from destructive users as well as protect users from one another. It prevents users that are working in user mode to run harmful commands either against the system or against other users. It leaves the switching the mode to the OS.

1.6

These should be privileged:

Set value of timer

Clear memory

Turn off interrupts

Modify entries in device-status table

Access I/O devices

1.10

Caches are useful because they can help speed up memory access as help programs share information between them. Caches act as a buffer between the registers and the main memory, and can greatly speed up program execution when data is being read from the cache instead of main memory. They also help process share information in a timely manner. However, they cause problems with multithreading because cache coherency remains an issue. If one cache changes, the cache for the rest of the process needs to change as well. Caches are typically not large because of their high cost compared to hard drives and main memory.

1.19

Interrupts drive the behavior of the operating system because most modern operating systems are interrupt driven. They allow users or other process to interact with the OS. A trap is a software generated interrupt usually caused by an error, while an interrupt is generated by hardware. However, software can purposefully generate a trap to request a specific OS action to be performed as well