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Assignment 2

Problem 2.14

You could obtain a statistical profile of the amount of time spent by a program executing different parts of its code by using sufficiently frequent timer interrupts a statistical picture of the time spent on various parts of a program can be obtained. The importance of obtaining this information is it tells the time spent on various parts of the program instead of just the value of the program counter like using less frequent timer interrupts.

Problem 2.19

The separation of mechanism and policy is desirable because it is important for flexibility. Policies are likely to change across places overtime and in the worst case each change in policy would require a change in the underlying mechanism. If the mechanism is properly separated from policy, it can be used either to support a policy decision that I/O intensive programs should have priority over CPU intensive ones or to support the opposite policy.

Problem 2.20

A scenario in which it is unclear how to layer two system components that require tight coupling of their functionalities is when a user program executes an I/O operation. It executes a system call that is trapped to the I/O layer, which calls the memory-management layer that then calls the CPU-scheduling layer and then is passed to the hardware. The parameters may be modified and data may need to be passed at each layer. This causes each layer to add overhead to the system call and the net result is a system call that takes longer than one on a non-layered system.

Problem 2.21

The main advantage of the microkernel approach to system design is it makes extending the operating system easier. All new services are added to user space and consequently do not require modification of the kernel. The resulting operating system is easier to port from one hardware design to another. Also the microkernel provides more security and reliability since mode services are running as user processes not kernel processes.

Work Cited

Silberschatz, Abraham, et al. *Operating System Concepts.* 9th ed., Wiley, 2014