hw2 (Due Date: Feb. 19, 2025)

1. Find out how many processes can run at the same time on the computer you are using.

After running the code, my system has 487 running processes.

2. Advances in chip technology have made it possible to put an entire controller, including all the bus access logic, on an inexpensive chip. How does that affect the model of Fig. 1-6?

Advances in chip technology have impacted the architecture and design of personal computers, as seen in figure 1-6 (chapter 1 slides). The ability to integrate entire controllers, including all bus access logic, onto a single inexpensive chip has led to increased efficiency, lower costs, and more performance packed into modern computing systems.

In the standard model shown in the figure, components such as the keyboard controller, USB controller, and hard disk controller are separate entities connected via a bus to the main system. This setup requires more physical space and can lead to increased latency due to the need for communication between these connected components. However, with the development of advanced chip technology, these controllers can now be integrated into a single chip or a system-on-chip design. This integration minimizes the physical space of the computer, simplifies the motherboard design, and minimizes power consumption.

Additionally, integrating controllers onto a single chip increases data transfer speeds and reduces latency, due to communication pathways between controllers being significantly shorter with this design. One caveat to mention about this new design is it can be more complex and challenging due to the need to integrate multiple functionalities on a single chip this can lead to long development cycles as opposed to its counterpart.

In closing, the ability to integrate entire controllers on a single chip transforms the model by making the system more compact, efficient, and cost-effective, while also improving performance. This positive change reinforces the ongoing trend towards minimization and integration in computer hardware design in personal computer systems.