Worksheet 1.1: OS Basics, Free-Response Questions

Q1. The OS is interrupt-driven. Name the four kinds of interrupts studied in class, and explain how each interrupt drives the system? **(Limit: 2 lines for each interrupt, 8 lines in total)**

1. **Exceptions** - These occur when the CPU detects an error or special condition during instruction execution. such as division by zero or invalid memory access. It prevents the system from crashing.

2. **Timed Interrupts** - These are generated by an internal timer within the CPU to manage the execution of processes and ensure fair time-sharing. They control how long each process can run.

3. **Hardware Interrupts** - These are generated by external hardware devices, like the keyboard and mouse, to signal the CPU that they need attention or have completed a task.

4. **Software Interrupts** - These are initiated by programs when they need the operating system to perform specific operations. such as file handling or memory allocation.

Q2. The length of the time quantum (slice) given to each process by the scheduler of a time-sharing OS must be selected carefully. What's the negative consequence of making this time slice too long and what's the negative consequence of making it too short?

Problem with making the time quantum too long **(Limit: 2 lines)**
1. Processes with high CPU usage can dominate the CPU, making the system slow for other users. Long time slices can lead to poor responsiveness for applications. so users may experience delays or a slow system.

Problem with making the time quantum too short **(limit: 2 lines)**
1. Excessive context switching can occur, which increases the overhead. The CPU spends too much time switching between processes rather than executing them. This reduces the overall efficiency and performance of the system. Short time slices can lead to wasted CPU cycles.