CS3600

Worksheet 01

1. Which below given tasks need help of operating system?
    a. Load a program into memory.
    b. Click your mouse button.
    c. Call a recursive function from a program
    d. Close an application.
    e. Printing a document.

    **Answer:** A, B, D, E

2. Processes p1 and p2 share a single CPU and 2 independent I/O devices. Each process executes a compute-bound phase of 10-time units followed by an I/O-bound phase of 10 units.
    a. The total execution time when Sequential?

    **Answer:** 40 time units.

    b. The total execution time when Multiprogramming without timesharing?
    **Answer:** 30 time units.

3. Processes p1 and p2 execute on a system with a single CPU and 2 identical I/O devices. Each process executes a compute-bound phase followed by an I/O-bound phase. The system uses multiprogramming without time-sharing. The following table shows the lengths of each phase.

| | Compute | I/O |
|---|---|---|
| p1 | 40 | 70 |
| p2 | 30 | 80 |

**Answer:** The system successfully executes in 150 time units.

4. Four processes execute on a system with a single CPU and a single I/O device. The system uses multiprogramming without time-sharing. Each process has a compute-bound phase of 10 time units followed by an I/O-bound phase of 20 units. A process cannot initiate the I/O phase until the I/O device becomes free. The processes start executing in the order p1, p2, p3, p4.

   **Answer:** The system successfully executes in 90 time units.

5. Two concurrent applications, a1 and a2, execute the sequences of instructions (j1, j2, j3) and (k1, k2, k3), respectively. Execution switches between the applications whenever a timeout interrupt occurs or when one application terminates. If a2 starts, and interrupts occur after instructions k2 and j2, then what is the order in which the 6 instructions will execute?

   **Answer:** k1 —> k2 —> interrupt —> j1 —> j2 —> interrupt —> k2 —> k3 —> j2 —> j3