

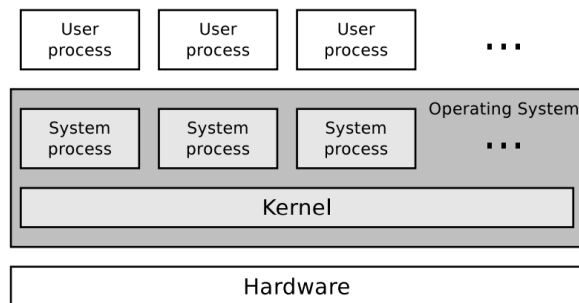
Operating Systems L^AT_EX Sheet

TunaCSE2020

January 2023

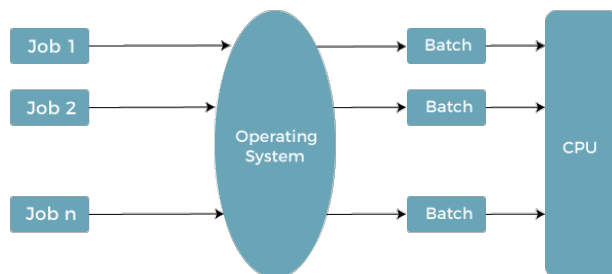
1 General Knowledge

1. **Operating System** belongs to both Practical Computer Science and Technical Computer Science fields.
2. **Basic Structure** of an Operating System



- **User Processes** process the user's jobs.
- **System Processes** provide services of the operating system
- **The operating system core** (Kernel) contains all components of the operating system, which are not implemented as system processes.

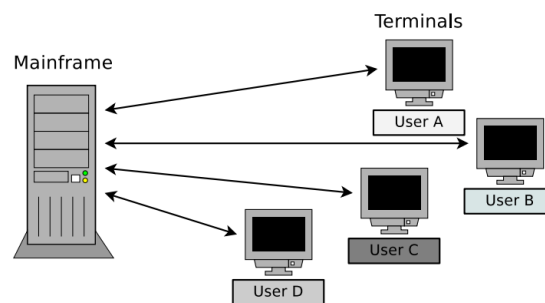
3. **Batch processing** Operating Systems



- Each program needs to be provided completely with all input data before the beginning of the execution.
- Batch processing is well suited for the execution of routine tasks.
- \Rightarrow **Objective:** Maximize CPU utilization.
- \Rightarrow **Drawback:** During I/O operations, the CPU is idle.

z.B: non-interactive batch files and shell scripts.

4. Time-sharing (interactive mode) Operating Systems



- **Multiple users** work with a single computer in a simultaneous and competitive way sharing the available computing time of the CPU.

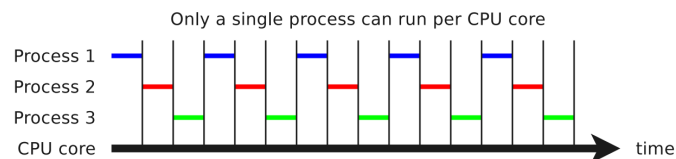
Multitasking



- \Rightarrow **Objective:** Minimize the response time.

5. Single-tasking Operating Systems

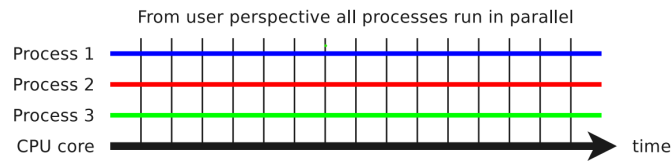
- At any given moment, only a single program is executed.
- Multiple started programs are executed one after other.



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6. Multi-tasking Operating systems

- Multiple programs can be executed at the same time (with multiple CPUs/Cores) or quasi-parallel.



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7. Single-User vs Multi-User

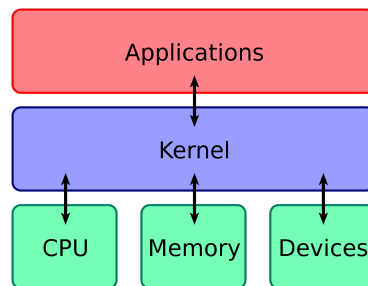
- Single-User

2 Exam WS21.22

Solutions:

- Question 1

1. **Kernel** is a computer program at the core of a computer's operating system and generally has complete control over everything in the system.



2. **Monolithic Kernel** is a type of **Kernel** in which