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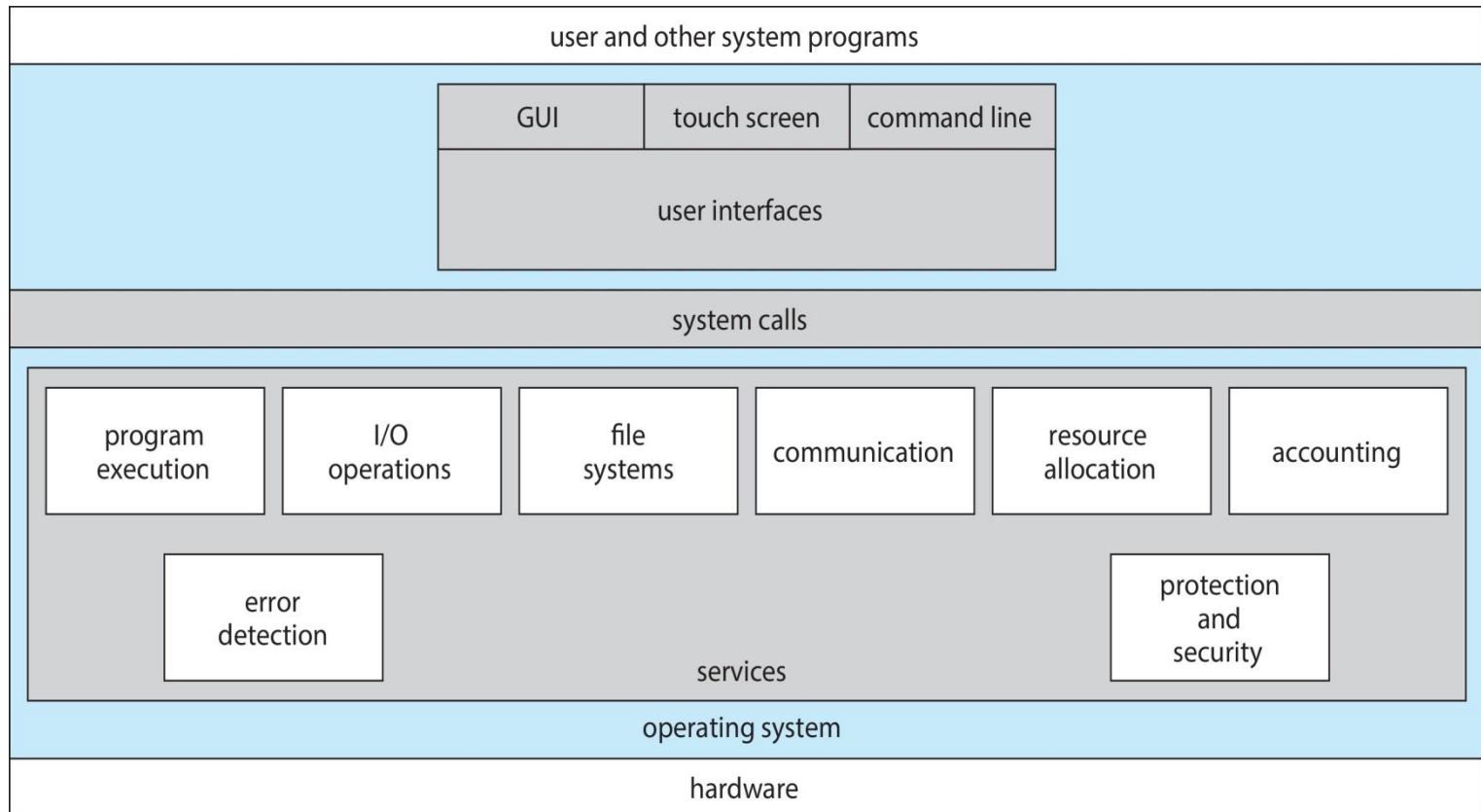
Operating Systems

BCSC0004



Operating System Services

- https://www.tutorialspoint.com/operating_system/os_services.htm



Operating System Services

- Operating systems provide an environment for execution of programs and services to programs and users
- One set of operating-system services provides functions that are helpful to the user:
 - ◆ **User interface** - Almost all operating systems have a user interface (**UI**).
 - Varies between **Command-Line (CLI)**, **Graphics User Interface (GUI)**, **touch-screen**, **Batch**
 - ◆ **Program execution** - The system must be able to load a program into memory and to run that program, end execution, either normally or abnormally (indicating error)
 - **Program Loading → Program Execution → Program Termination**

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- ◆ **I/O operations** - A running program may require I/O, which may involve a file or an I/O device
 - ◆ **File-system manipulation** - The file system is of particular interest. Programs need to read and write files and directories, create and delete them, search them, list file Information, permission management.
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- One set of operating-system services provides functions that are helpful to the user (Cont.):
 - ◆ **Communications** – Processes may exchange information, on the same computer or between computers over a network
 - Communications may be via shared memory or through message passing (packets moved by the OS)
 - ◆ **Error detection** – OS needs to be constantly aware of possible errors
 - May occur in the CPU and memory hardware, in I/O devices, in user program
 - For each type of error, OS should take the appropriate action to ensure correct and consistent computing
 - Debugging facilities

- Another set of OS functions exists for ensuring the efficient operation of the system itself via resource sharing
- ◆ **Resource allocation** - When multiple users or multiple jobs running concurrently, resources must be allocated to each of them
 - Many types of resources - CPU cycles, main memory, file storage, I/O devices.
- ◆ **Logging** - To keep track of which users use how much and what kinds of computer resources

- ◆ **Protection and security** - The owners of information stored in a multiuser or networked computer system may want to control use of that information, concurrent processes should not interfere with each other
 - **Protection** involves ensuring that all access to system resources is controlled
 - **Security** of the system from outsiders requires user authentication, extends to defending external I/O devices from invalid access attempts