Operating Systems Theory DA

Name → Kulvir Singh
Reg. No. → 19BCE2074

1) PROTECTION AND SECURITY

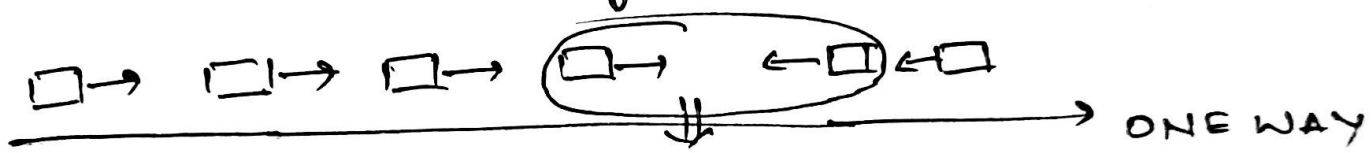
A real time scenario for protection and security of a software / operating system would be the use of HASH and salting of data. User data stored in a public or private system is stored in an encrypted manner. Many systems use bcrypt to perform hashing and salting for protection and security.

2) MULTI - THREADING

Multi-threading is a very common technique whose application can be seen in many existing software / operating systems. On Google-Drive, one can start the upload of a file and at the same time start the upload of another file or create a new folder or delete any object. This functionality is possible due to the implementation of multithreading in the backend code of Google-Drive.

3) DEADLOCKS

Deadlocks are perhaps the most common feature in a real-time scenario. Consider a narrow one-way road or a path. Cars can only move in one direction. Let us say that a car comes from the opposite direction. This causes all the cars to come to a stand still causing a deadlock situation.



Deadlock.

4) FILE SYSTEMS

All textbooks, story-books, novels, etc. are example of file systems. Imagine the entire book to be the system with the various chapters to be the files and the pages of each chapter to be the data of each file. To access the file we have a contents page and a reference page which acts as a page-table or index of each file. Hence we can see that books are a real-time example of file systems.

5) TIME SHARING SYSTEMS

A real time example of time-sharing systems would be the cowin registeration portal. The portal is opened for a stipulated amount of time and multiple users can use the portal to generate their vaccine token slot for a particular slot. This portal enables various users from different terminals access a particular system hence supports Time-Sharing.

6) INTERRUPTS

A real-time example of interrupts would be one VIT FFCS registeration system website. It uses interrupts in the following manner. It will not allow the user to login from various devices. Hence, if a user logs in and tries to login from another device, it would interrupt the process and put it on hold for 15 mins. Hence, we can say that it is a real-time example of interrupts.

7) MULTI-PROCESSOR SYSTEMS

The real-time operating systems which use multiprocessor systems are Windows 2000 and above, Macintosh, Linux OS etc. Another realtime example would be customized desktops which are used to perform heavy duty tasks such as gaming etc., all modern computer systems etc.

8) PROCESS SCHEDULING.

All online transactions use the OTP feature which is an example of process scheduling. The OTP generation process is first started then paused, to check if user recieves OTP or not. If the user does not recieve OTP, accurate acknowledgement is sent to restart the OTP generation process. Hence, we can say its an example of Process Scheduling.

9) VIRTUALISATION.

Virtual Machine/VMware is the perfect application to define Virtualisation as a real-time example. It can run any choice of operating system without making any changes to the actual BOOT setup of the system.

10) INTER PROCESS COMMUNICATION

All applications which have a client side (frontend) and a server side (backend) fall under the real-time example of inter-process communication. The client side takes data from the user through a particular process. Before displaying the output, it has to communicate/send the data for processing to the server and fetch results from server. Hence, inter-process communication is present.