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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Code & Name : 23CST206-OPERATING SYSTEMS AND VIRTUALIZATION
Class : II CSE
Course Faculty : Ms.R.SWATHIRAMYA

Question Bank

UNIT-I INTRODUCTION TO OPERATING SYSTEM

PUZZLE 1: "The Frozen Computer Lab"

Problem Statement

A college computer lab has 40 systems. When students log in at the same time and open multiple applications, the computers become extremely slow and sometimes freeze.

Students complain that:

- Applications take a long time to respond
- Multiple programs stop working
- The system becomes unresponsive

Puzzle Question:

What Operating System concepts are failing here, and how can the OS solve this problem?

Solution

The problem is due to:

- Poor process management
- Inefficient memory management
- Lack of multiprogramming

The OS can solve this by:

- Proper CPU scheduling
- Efficient memory allocation
- Using multiprogramming and time-sharing concepts



❄️ PUZZLE 2: “The Silent Computer”

🔍 Problem Statement

A computer has powerful hardware, but when a user switches it on, nothing appears on the screen. The keyboard and mouse also do not respond.

🧠 Puzzle Question:

Which part of the computer system is missing, and why is it essential?

✅ Solution

The Operating System is missing or corrupted.

Without an OS:

- Hardware cannot be controlled
- Users cannot interact with the system
- Application programs cannot run

The OS acts as a bridge between user and hardware.

❄️ PUZZLE 3: “Too Many Users, One CPU”

🔍 Problem Statement

A university server allows many students to access it remotely at the same time. Surprisingly, each student feels like they are using the system alone.

 Puzzle Question:

Which Operating System evolution concept makes this possible?

 Solution

This is achieved using a Time-Sharing Operating System.

The OS:

- Divides CPU time among users
- Switches between processes rapidly
- Gives the illusion of parallel execution

 PUZZLE 4: “The Messy Operating System”

 Problem Statement

An operating system developer places all OS services—file management, memory management, device drivers—inside a single large block of code. Debugging becomes extremely difficult.

 Puzzle Question:

Identify the OS structure used and suggest a better alternative.

 Solution

The OS uses a Monolithic Structure.

Issues:

- Difficult debugging
- Poor maintainability

Better alternatives:

- Layered OS for better organization
- Modular OS for flexibility

 PUZZLE 5: “The Helpful Assistant”

 Problem Statement

A user double-clicks a file, prints a document, saves data, and communicates with another computer—all without knowing how hardware works.

 Puzzle Question:

Which Operating System feature makes this possible?

 Solution

These actions are handled by Operating System Services, such as:

- Program execution
- File system management
- I/O operations

- Communication services

PUZZLE 6: “The Two Doors”

Problem Statement

One computer accepts typed commands like ls, dir, copy.
Another uses icons, menus, and mouse clicks.

Puzzle Question:

What are these two interaction styles, and why does the OS support both?

Solution

The two interfaces are:

- CLI (Command Line Interface)
- GUI (Graphical User Interface)

The OS supports both to:

- Help beginners (GUI)
- Provide powerful control for experts (CLI)

PUZZLE 7: “The Polite Program”

Problem Statement

An application wants to read a file stored on disk. Instead of directly accessing hardware, it politely asks permission from the OS.

Puzzle Question:

What mechanism is the application using?

Solution

The application uses a System Call.

System calls:

- Provide controlled access to resources
- Ensure security and stability
- Act as an interface between program and OS

PUZZLE 8: “The Invisible Helpers”

Problem Statement

A student writes a program, edits files, compiles code, and loads programs into memory—but never interacts with the OS kernel directly.

 Puzzle Question:

Which OS components support these activities?

 Solution

These tasks are handled by System Programs, such as:

- Editors
- Compilers
- Loaders

They provide a convenient environment for users and programmers.

PUZZLE 9:

Problem Statement An operating system runs efficiently on one system but performs poorly on another with different hardware.

 Puzzle Question: Which OS concept explains this issue?



 Solution This problem relates to Operating System Design and Implementation. Design must consider: Hardware architecture Performance requirements Portability generate image for this