

Topic 6

2019年3月14日 11:25

Resources include: primary memory, secondary storage, processor speed, bandwidth, screen resolution, disk storage, sound processor, graphics processor, cache, network connectivity.

6.1.5 Explain the role of the operating system in terms of managing memory, peripherals and hardware interfaces.

- i. **Control peripherals devices through the use of drivers**
- ii. **Managing the (primary) memory to ensure each process runs in its own allocated memory space, if the programs interfere, it would cause problems, e.g. corruption and security**
 - a. **Virtual momery:**
- iii. **Managing the (secodary) storage : providing structure and access methods to these structures**
 - a. **folder-structure**
 - b. **directory structure**
 - c. **security access of these folders**
- iv. **Provides interfaces : used to interact with the computer to performs various tasks**
 - a. **Graphical User Interface OS**
 - b. **Command Lind OS**
- v. **Time-slicing: alternately processed to give the illusion of many tasks happening at once**
- vi. **Interrupt handling**

6.1.7 Outline OS resource management techniques: scheduling, policies, multitasking, virtual memory, paging,interrupt, polling.

- i. **Scheduling: the method by which work is assigned to resources that complete the work.**
- ii. **Policies: what is to be done while the mechanism specifies how it is to be done.**
- iii. **Multitasking: allowing a user to perform more than one computer task (such as the operation of an application program) at a time.**
- iv. **Virtual memory: allows a computer to compensate for shortages of physical memory by temporarily transferring pages of data from RAM to disk storage.**
- v. **Paging: the operating system will need to move other pages to hard disk so it has room to bring back the pages it needs right away from temporary disk storage.**
- vi. **Interrupt: a signal to the processor emitted by hardware or software indicating an event that needs immediate attention.**
 - a. **hardware interrupts**
 - b. **software interrupts**
- vii. **Polling: the computer or controlling device waits for an external device to check for its readiness or state, often with low-level hardware.**

6.1.8 Discuss the advantages of producing a dedicated operating system for a device.

ADV:

1. Security: e.g. bank
2. Customisability: maximum efficiency
3. Modify priorities: make running some devices easier to use or better suited to their audience.

6.1.9 Outline how an operating system hides the complexity of the hardware from users and applications.

- i. Abstraction: hide hardware details
 - a. Hard disks, USB keys
- ii. Drive Letters
- iii. Java Virtual Machine

(b) An operating system uses interrupts which have priorities.

Describe the sequence of steps which would be carried out by the interrupt handler software when an interrupt is received and serviced.

- | | | |
|-------|--|-------|
| ..... | (b) Identify the source of the interrupt | ..... |
| | Disable all interrupts of a lower priority | |
| ..... | Save the contents of the PC | ..... |
| | Save the contents of the other registers ... | |
| ..... | Onto the stack | ..... |
| | Load and run the appropriate ISR code | |
| ..... | Restore the registers | ..... |
| | From the stack (stack mentioned 1 mark only ...) | |
| ..... | Enable all interrupts | ..... |
| ..... | Continue execution of the interrupted process | ..... |

CPU receives interrupts
 Interrupt stores programs counter
 Interrupt invokes handler
 Handler save rest of state of the CPU for the process
 Handler does its business
 Handler invokes the scheduler
 Scheduler selects a process to run
 Scheduler restores state of the CPU for that process
 Scheduler jumps execution to that process