Homework 1

3150103823 韩熠星

231 - Operating System | 操作系统

随堂练习

1. 操作系统的进程管理模块并不负责_____。

A. 进程的创建和删除　　B. 提供进程通信机制

C. 实现I/O设备的调度　　D. 通过共享内存实现进程间调度。

C：I/O设备的调度属于设备模块上的功能

2. Linux操作系统在内核里面或用模块（module）实现设备的驱动，而不是放在内核外面。这么做固然有其优势，但并非十全十美。例如，_____。

A. 设备管理的效率不如后者

B. 使操作系统所支持设备的种类受限制

C. 只能支持目前可知设备，对未来新发明的设备无能为力

D

3. 当操作系统完成了用户请求的“系统调用”功能后，应使CPU工作____。

A. 维持在用户态　　B. 从用户态转换到核心态

C. 维持在核心态　　D. 从核心态转换到用户态

D

4. 下列选择中，不是操作系统必须要解决的问题_____。

A. 提供保护和安全机制　　B. 管理目录和文件

C. 提供应用程序接口　　D. 提供C++语言编译器

D

5. 用户在程序中试图读存放在硬盘中某文件的第10逻辑块，使用操作系统提供的接口是____。

A.进程　　B.系统调用　C. 库函数　　D. 图形用户接口

B

6. 下列选项中，导致创建新进程的操作是_____。

I. 用户登录成功　II. 设备分配　III. 启动程序执行

A. 仅I和II　　B. 仅II和III　C. 仅I和III　D. I、II和III

C

7. 为了在通用操作系统管理下的计算机上运行一个程序，需要经历几个步骤。但是，不一定需要。

A. 向操作系统预定运行时间　　B. 将程序装入内存

C. 确定起始地址，并从这个地址开始执行　D. 用控制台监控程序执行过程

A

8. 对于一个正确运转的计算机系统，保护操作系统是很重要的。但为了向用户提供更大的灵活性，应尽可能少地对用户加以限制。下面列出的各操作通常是加以保护的。试问至少有哪几条指令需加以保护?

(1) 切换到用户模式

(2) 切换到内核模式

(3) 从存放操作系统的存储区上读取数据;

(4) 将数据写到操作系统的数据区

(5) 从存储操作系统代码区中取指令;

(6) 打开时钟中断

(7) 关闭时钟中断

(2) **(4)** 应当加以保护。这两条操作是对操作系统本身的内容进行修改，如果交由用户任意操作，不加限制，会对系统产生破坏，所以应在任何时刻都加以保护。

9. 下列哪些指令必须是特权指令（也即只能在核心模式下运行）？

(1) 设置核心模式

(2) 系统重启动

(3) 读取程序状态字

(4) 读取日期时钟

(5) 关闭中断

(6) 写指令寄存器

（1）（2）（5）（6）必须是特权指令

10. 硬件将处理机划分为两种状态，即核心态（内核态、管态）和用户态，这样做给操作系统设计带来什么好处?

这样设计使用户态不能干扰内核态，并使CPU指令分为特权指令和非特权指令，有利于权限的控制，避免操作系统内核被用户随意访问修改，起到保护作用。

习题作业

1.4 Which of the functionalities listed below need to be supported by the operating system for the following two settings: (a) handheld devices and (b) real-time systems.

a. Batch programming

b. Virtual memory

c. Time sharing

For Handheld Devices:

- Virtual memory
- Time sharing

For Real-time Systems:

- Virtual memory

1.17 Define the essential properties of the following types of operating systems:

a. Batch
b. Interactive
c. Time sharing
d. Real time
e. Network
f. Parallel
g. Distributed
h. Clustered
i. Handheld

a. Batch: Jobs with similar needs are batched together and run through the computer as a group by an operator or automatic job sequencer.
b. Interactive: Operating system is composed of many short transactions where the results of the next transaction may be unpredictable. Response time needs to be short since the user submits and waits for the result.
c. Time sharing: Use CPU scheduling and multiprogramming to provide economical interactive use of a system.
d. Real time: Reads information from sensors and must respond within a fixed amount of time to ensure correct performance.
e. Network: Provides network abilities for sharing and accessing information
f. SMP: Used in systems where there are multiple CPU's each running the same copy of the operating system. Communication takes place across the system bus.
g. Distributed: Each processor has its own local memory. They communicate with each other through various communication lines.
h. Clustered: Combines multiple computers into a single system to perform computational task distributed across the cluster.
i. Handheld: Handheld systems differ from traditional desktop systems with smaller memory and display screens and slower processors.

2.12 What is the main advantage of the microkernel approach to system design? How do user programs and system services interact in a microkernel architecture? What are the disadvantages of using the microkernel approach?

Advantages:

- Adding a new service does not require modifying the kernel,
- More secure : because more operations are done in user mode than in kernel mode,
- Simpler kernel design and functionality results in a more reliable operating system.

User programs and system services interact in a microkernel architecture **by using interprocess communication mechanisms** such as messaging.

Disadvantages:

- Because we need to operating system's messaging functions to enable the user process and the system service to interact with each other, **the overheads associated with interprocess communication may be large and frequent.**

2.14 What is the main advantage for an operating-system designer of using a virtual-machine architecture? What is the main advantage for a user?

For User : The system is easy to debug, and security problems are easy to solve.

Virtual machines also provide a platform where different operating systems could run on one physical system.