操 作 系 统

Operating system

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一、 操作系统服务概述

二、 提供应用执行环境的服务

三、 保证内核高效运转的服务

User and other system programs

GUI	Touch screen	CLI
User interfaces		

System call

Program execution | I/O Operations | File systems | Resource allocation | accounting

Communication | Error detection | Protection and security

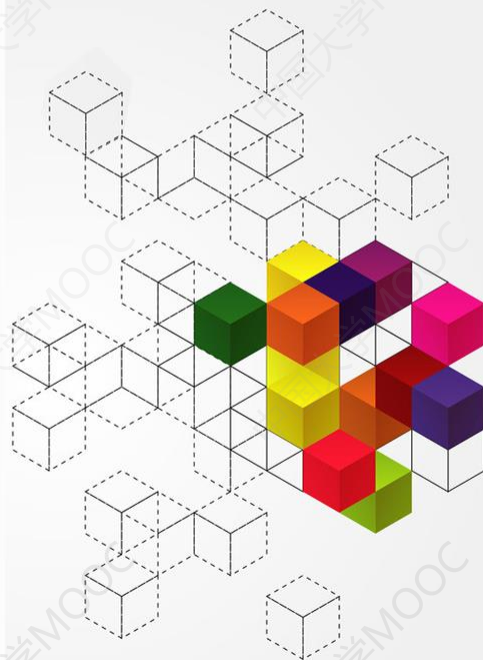services

OS kernel

hardware

OS提供的服务
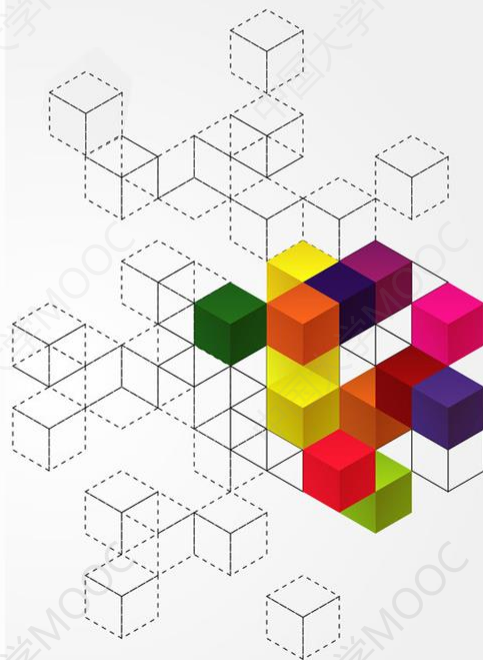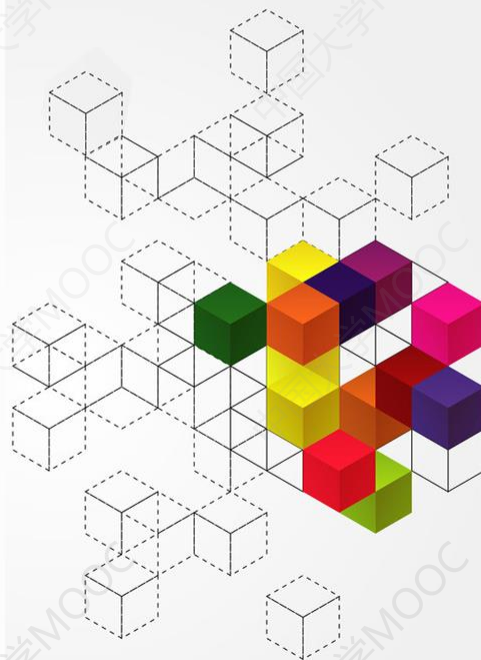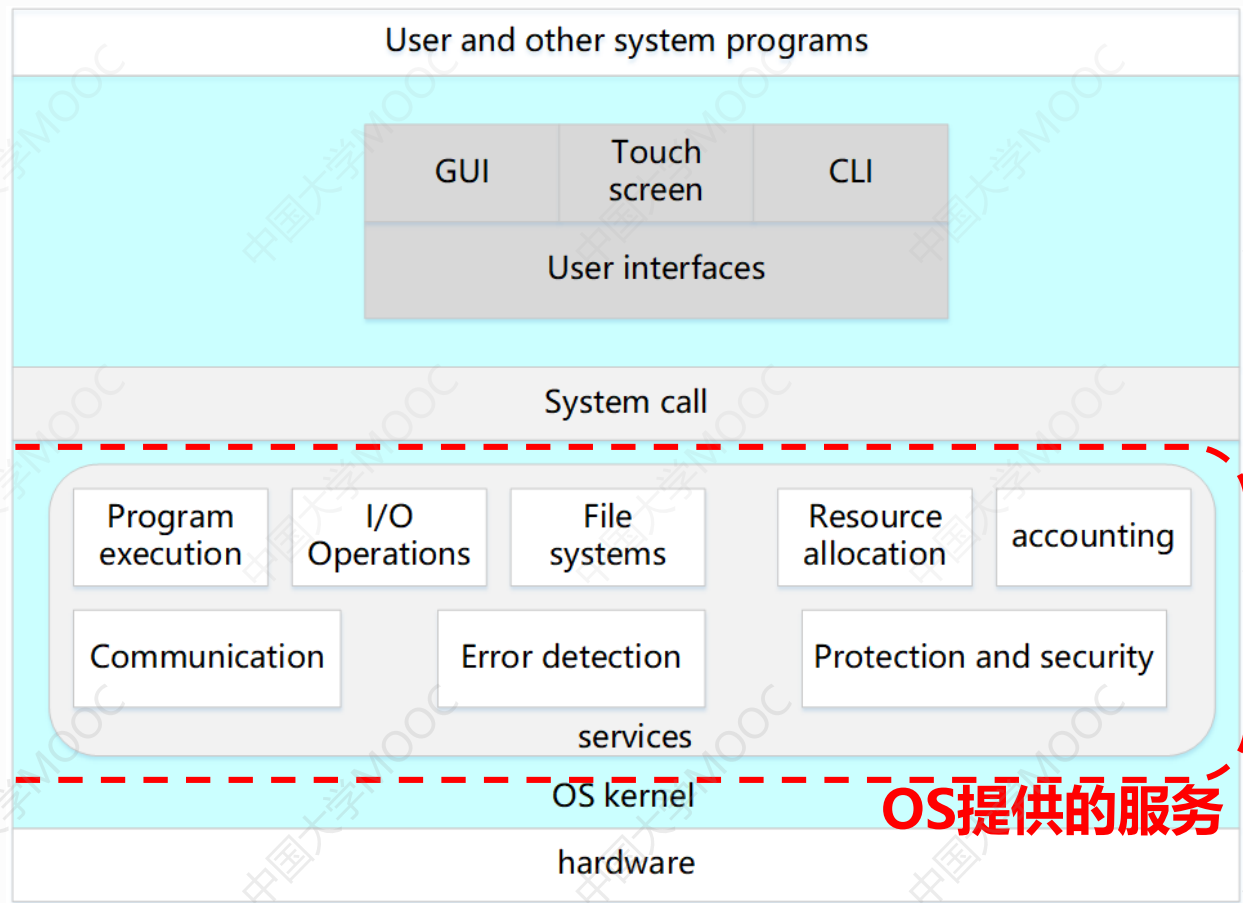
- 操作系统服务在宏观上分为两大类

提供应用执行环境，服务用户

services that are

helpful to the user

两类宏观上的划分
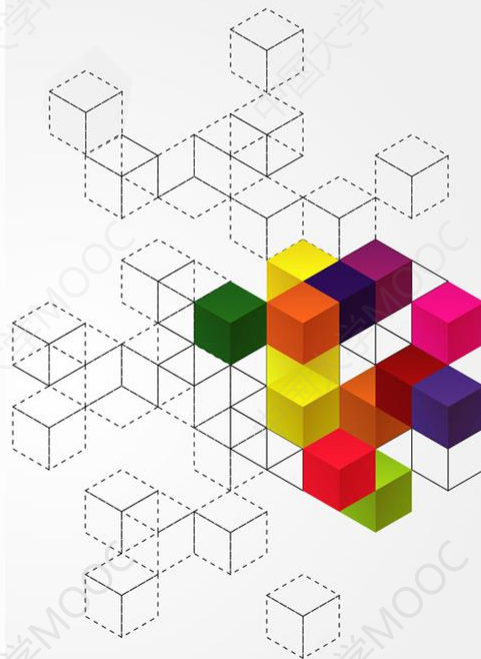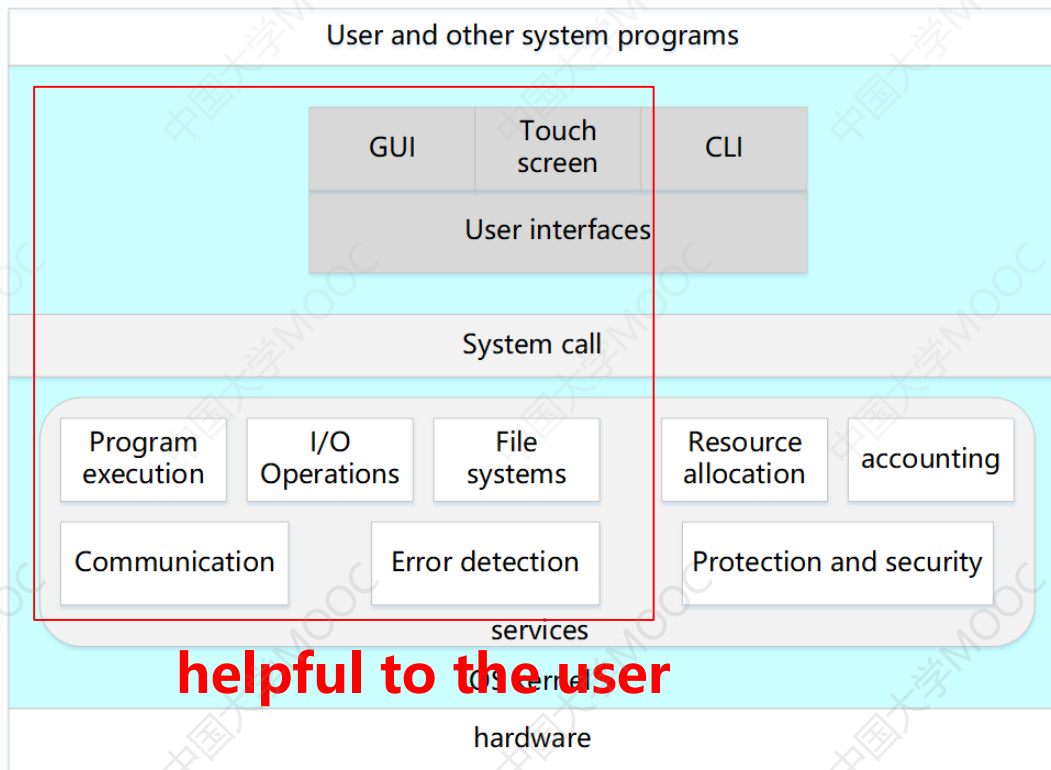
进行资源管理，保障操作系统内核的高效运作

for ensuring the

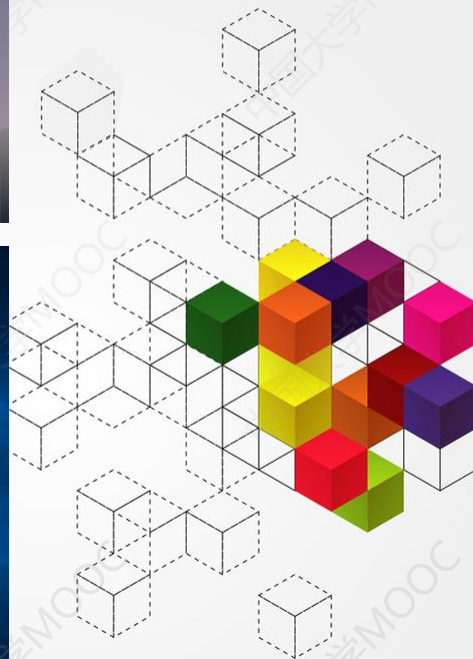efficient operation of the system itself via resource sharing
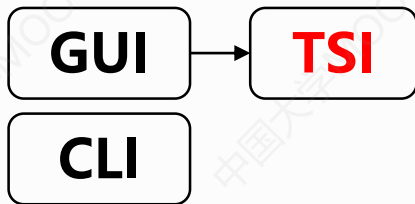
- 第一类服务中包括：UI，维护程序执行环境，IO操作，文件操作，进程间通信，出错处理。

一、维护应用执行环境的服务

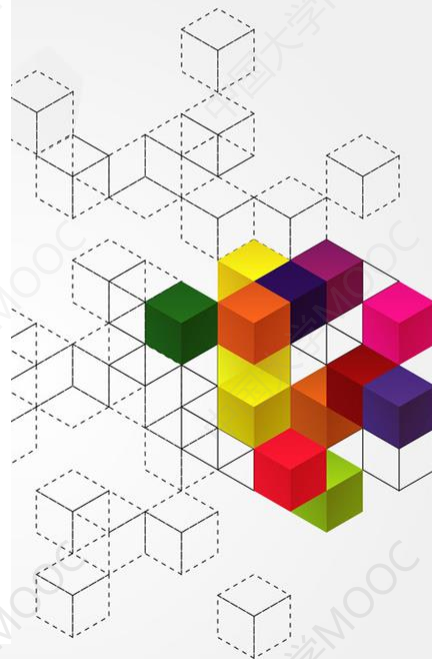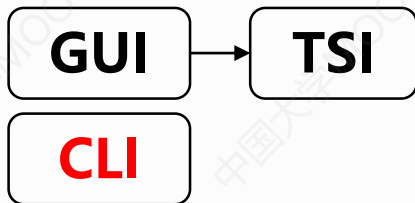· **OS服务1.1: UI**

GUI → TSI

CLI

Graphical User Interface

用图形方式显示的计算机操作界面

- **OS服务1.1: UI**

GUI → TSI

CLI

Touch Screen Interface
触摸形式操控的界面

iOS 13 GUI
The biggest free collection of iOS 13
screens and com...

· **OS服务1.1: UI**

GUI → TSI
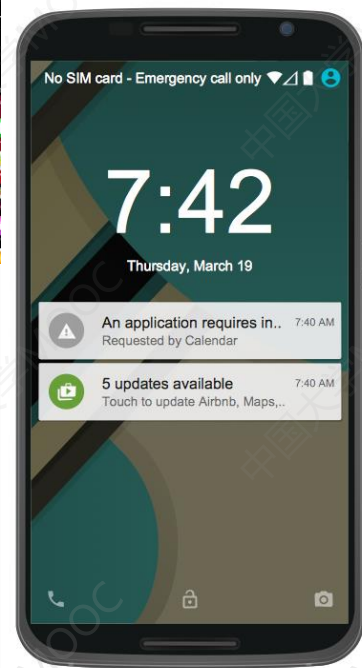
CLI

Command Line Interface

命令行方式操作的界面
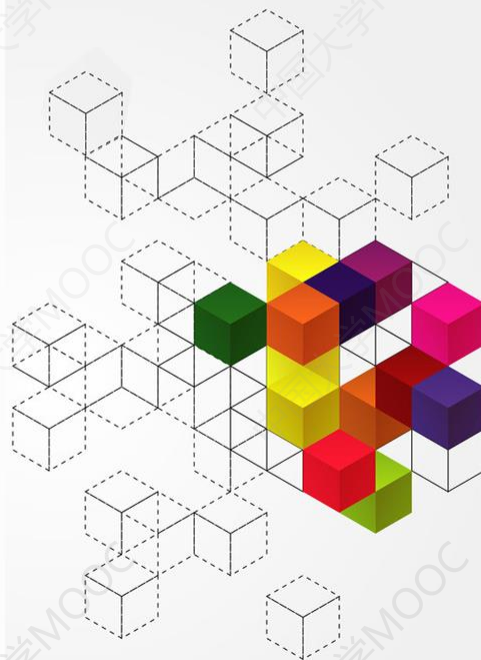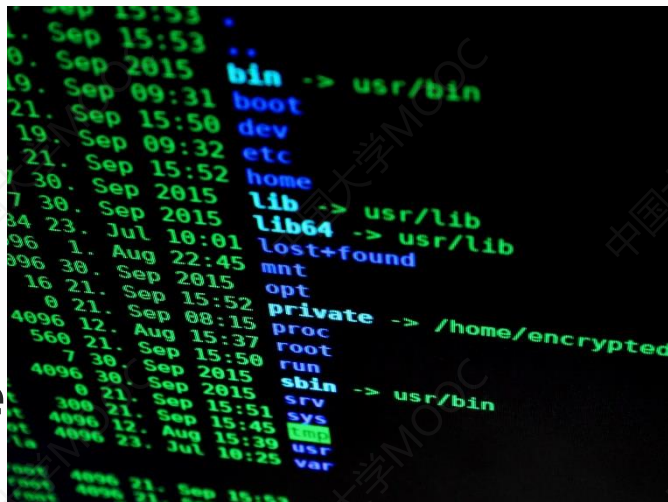
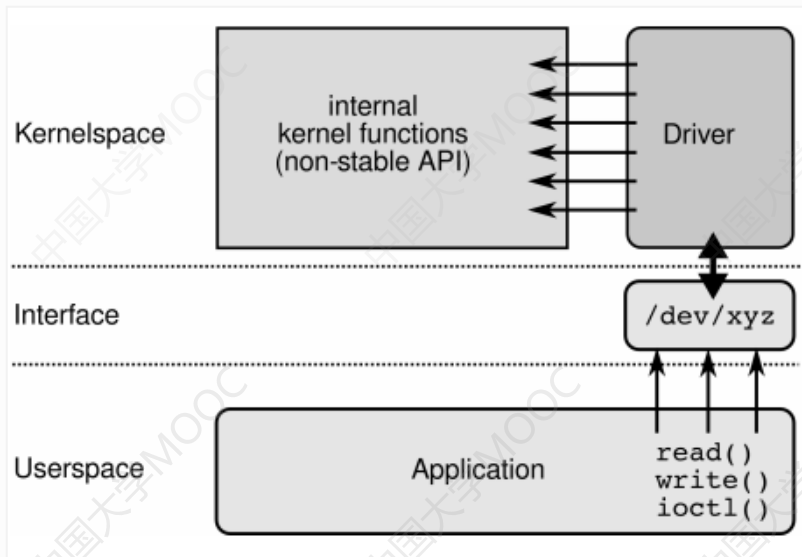## OS服务1.2: Program Execution

装载程序

执行程序

终止程序
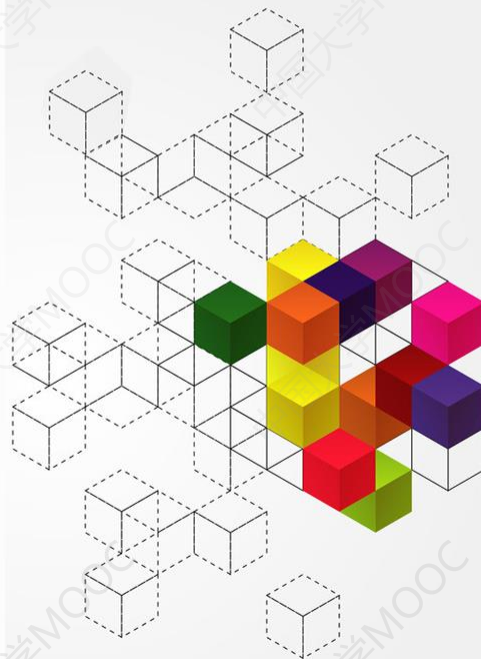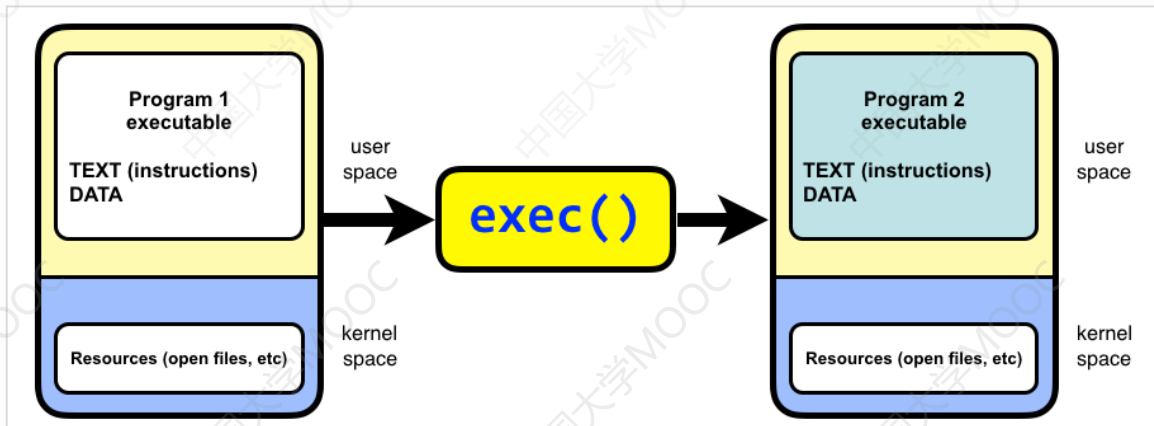
OS服务1.3: **I/O Operations**

设备初始化

设备控制

设备读写
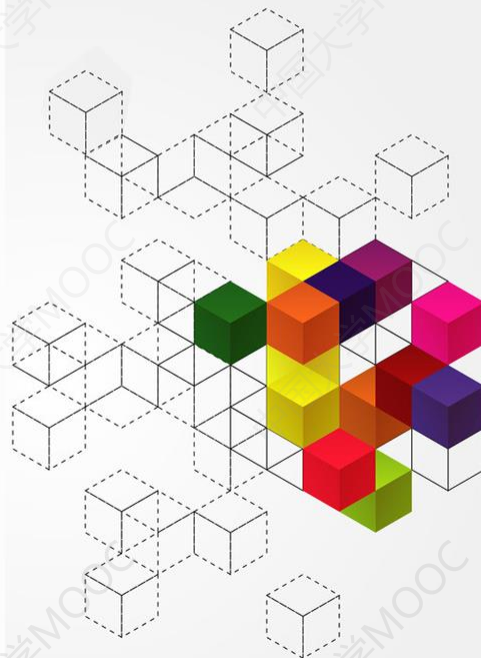
一、维护应用执行环境的服务

OS服务1.4: File-System Manipulation

元数据管理	存储管理	读写操作	缓存机制
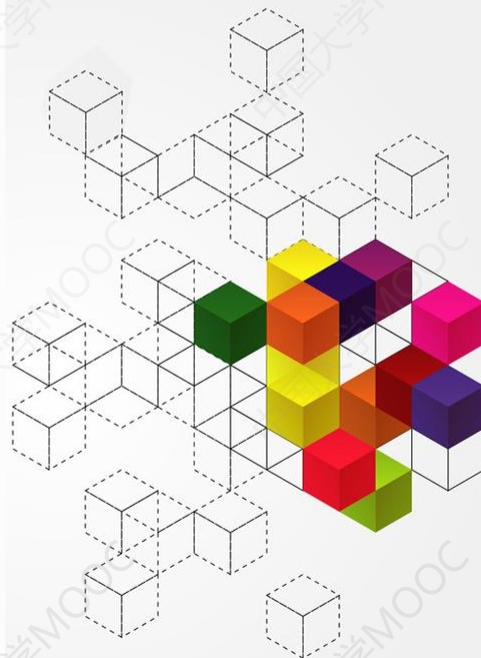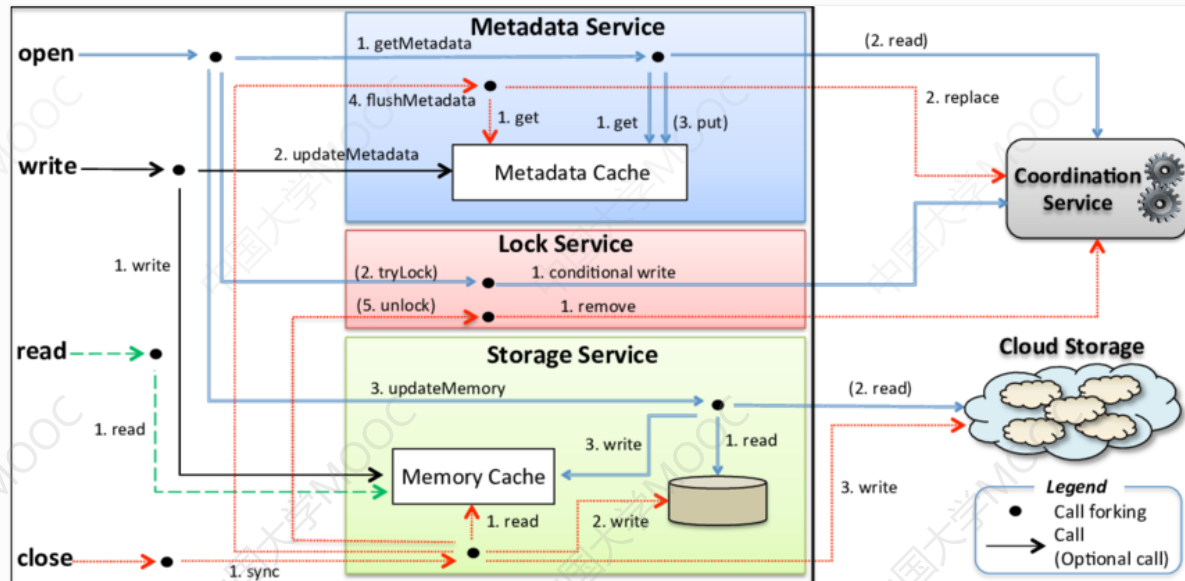
一、维护应用执行环境的服务

OS服务1.5: **Communication**

消息传递　　**共享内存**

(a)

process A
process B

message queue

| m_0 | m_1 | m_2 | m_3 | ... | m_n |

kernel

(b)

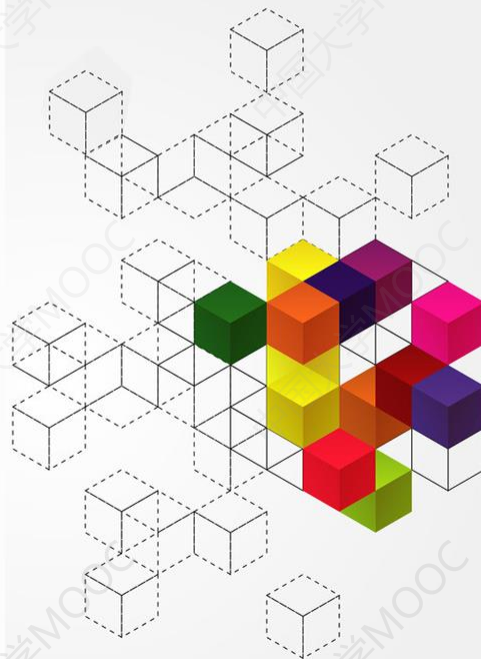process A
shared memory
process B

kernel
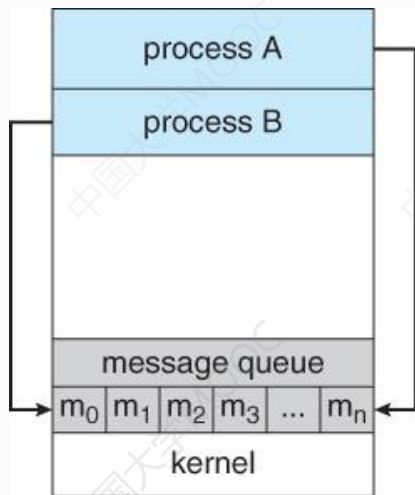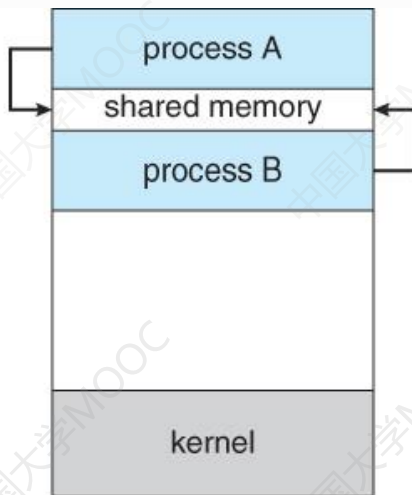
一、维护应用执行环境的服务

OS服务1.6: **Error Detection**

硬件错误　　**软件错误**　　**错误处理**

A problem has been detected and Windows has been shut down to prevent damage to your computer.

The problem seems to be caused

NMI_HARDWARE_FAILURE

If this is the first time you' restart your computer. If this these steps:

Check to make sure any new har If this is a new installation, for any Windows updates you mi

If problems continue, disable or software. Disable BIOS memo If you need to use safe mode t your computer, press F8 to sel select Safe Mode.

Technical Information:

*** STOP: 0x80

Administrator: Command Prompt

Microsoft Windows [Version 6.0.6000]
Copyright (c) 2006 Microsoft Corporation. All rights reserved.

C:\Windows\system32>chkdsk /f
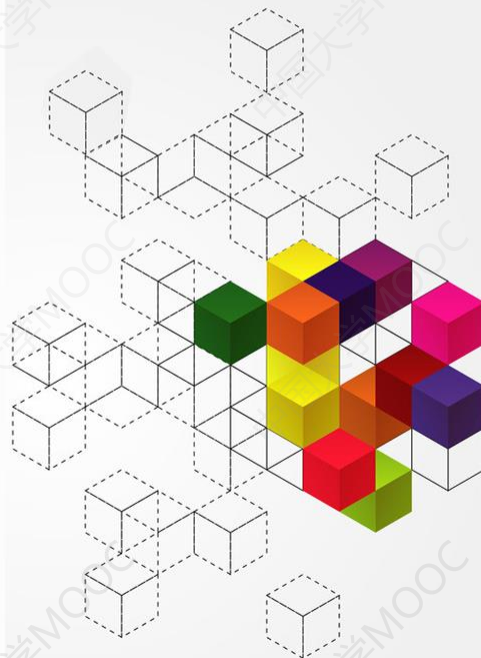The type of the file system is NTFS.
Cannot lock current drive.

Chkdsk cannot run because the volume is in use by another
process. Would you like to schedule this volume to be
checked the next time the system restarts? (Y/N) y

This volume will be checked the next time the system restarts.

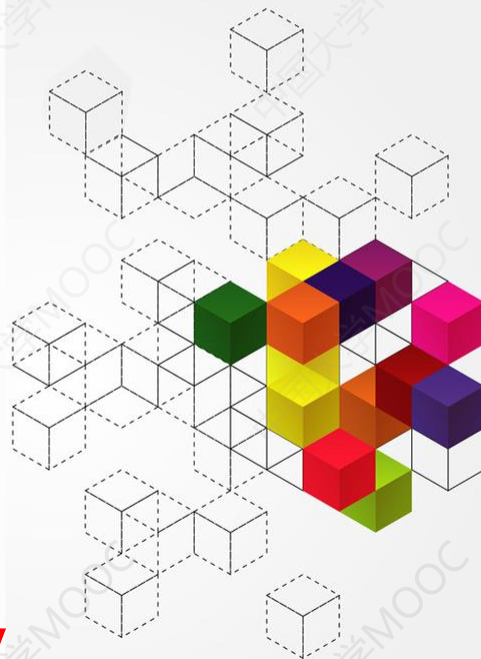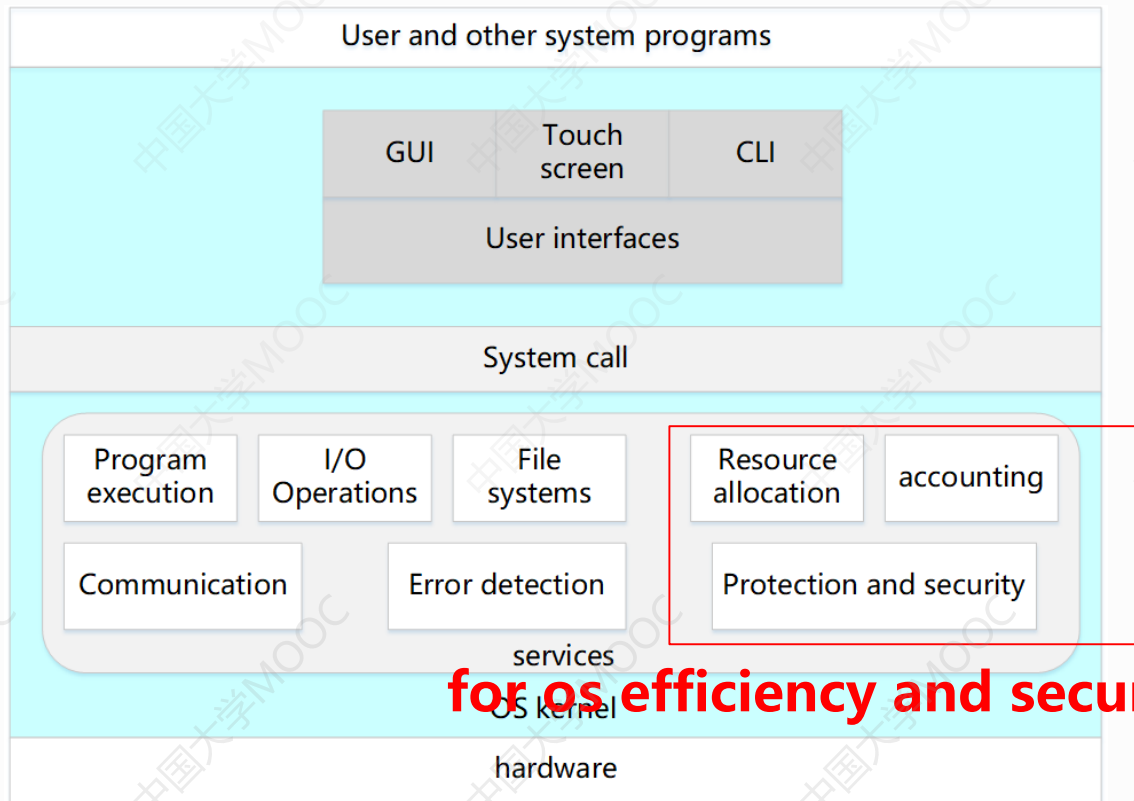C:\Windows\system32>
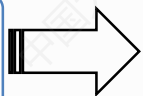
This command will check hard disk for errors
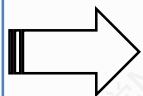
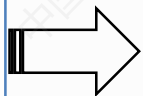- 第二类服务中包括：对资源使用的统计与管理。

OS服务2.1: Resource Allocation
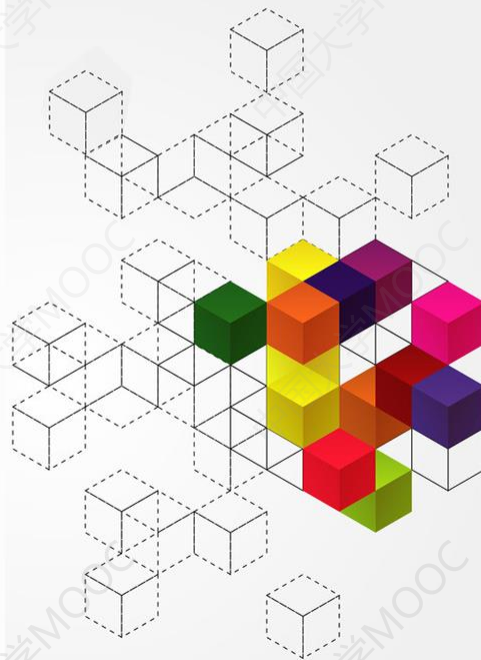
CPU Cycles ⟹ **CPU Scheduling**

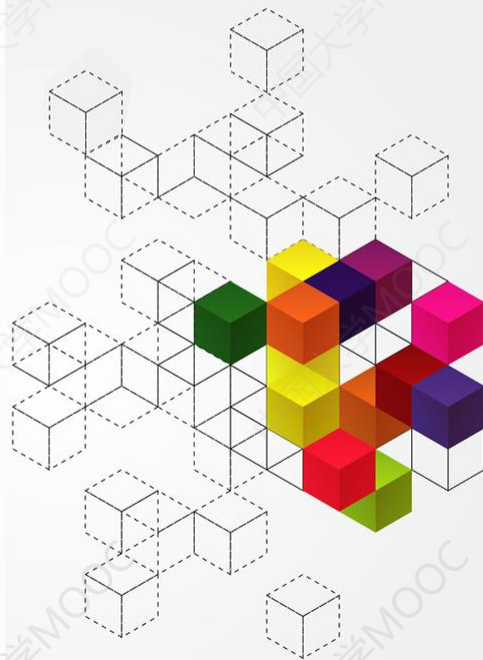Memory ⟹ **Memory Management**

I/O Devices ⟹ **I/O Scheduling**

OS服务2.2: Logging

Keep track of how much resources are used by programs

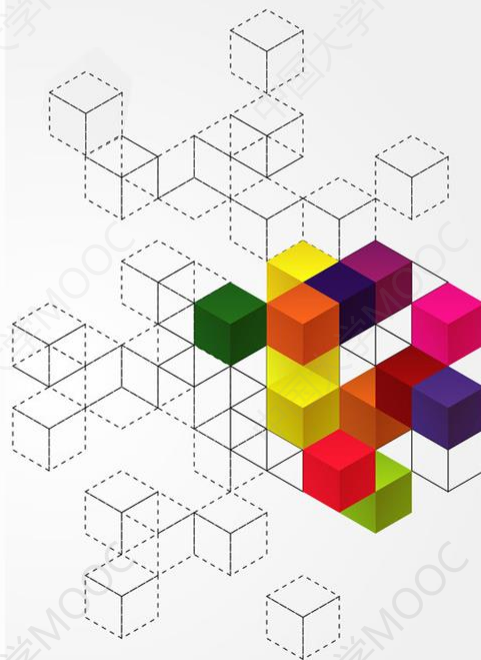Keep track of how resources are used by programs

二、保证内核高效运转的服务

OS服务2.3: Protection and Security

Protection: ensuring all access to resources is under control

Security: ensuring all outside access to the system is authenticated and secured.

本讲小结

- 提供应用执行环境的服务
- 保证内核高效运转的服务