

操作系统之哲学原理

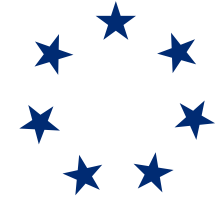
Philosophical Principles of Operating Systems

```
bash Terminal - 100 - 97x31
top
Processes: 53 total, 2 running, 2 stuck, 49 sleeping, 208 threads
Load Avg: 0.12, 0.15, 0.17 CPU usage: 0.40% user, 0.90% sys, 98.50% idle
SharedLibs: rux = 1; resident = 450 code, 4992K data, 456K linked;
FreeMem: rux = 7795; resident = 4170 + 1830 private, 2600 shared;
PhysMem: 1040 wired, 5420 active, 2700 inactive, 18800 used, 120 free,
VM: 120 + 1800 09770(1) pageins, 20140(0) pageouts
```

PID	COMM	%CPU	TIME	#TH	#IN	#OUT	MEM	IO	VSZ
849	screenlock	0.0%	0:00.02	1	38	77	20M	2720K	1910K
850	bash	0.0%	0:00.00	1	14	19	255K	62K	800K
855	login	0.0%	0:00.00	1	18	55	240K	260K	716K
817	top	3.5%	0:21.54	1	21	29	2432K	100K	2520K
814	iChatAgent	0.0%	0:00.21	2	73	73	1952K	2560K	5140K
778	bash	0.0%	0:00.01	1	14	19	240K	62K	800K
777	login	0.0%	0:00.01	1	18	55	240K	260K	716K
775	adworker	0.0%	0:00.13	4	53	30	644K	2220K	1840K
762	Terminal	0.3%	0:15.04	7	189	185	4240K	110	170
749	Safari	0.0%	0:12.62	22	282	766	668	338	505
714	iTunes	0.1%	0:25.49	15	311	585	458	258	358
733	Front Row	0.1%	0:20.98	14	288	724	1430	180	1540
732	adworker	0.0%	0:00.45	5	76	182	1900K	3120K	4160K
730	Freemove	0.0%	0:20.94	14	143	258	8560K	4940K	220
248	launchd	0.0%	0:00.01	3	24	25	20K	272K	184K
211	ncsd	0.0%	0:00.01	1	19	21	40K	184K	240K
206	AppleFileS	0.0%	0:04.00	2	81	50	316K	192K	1280K
195	checkuif	0.0%	0:00.22	2	25	28	60K	176K	272K
154	Finder	0.0%	2:15.20	21	752	919	1610	450	1050
150	iCalShareS	0.0%	0:00.14	1	70	83	144K	227K	966K
140	iTunesHelp	0.0%	0:00.09	1	40	42	124K	2312K	668K
142	MSAServer	0.0%	0:01.20	2	90	81	324K	4184K	3360K
140	SystemUISe	0.0%	0:02.11	6	231	235	1272K	9052K	336K



In Pursuit of Absolute Simplicity 求于至简，归于永恒



A Question to Ponder

- ⇒ Why cannot China produce a commercial operating system?
- ⇒ People say that China started much later in OS R&D
- ⇒ But is this is myth?

- ⇒ Can you find a way to this dilemma?

- ⇒ Or do we have a need to solve the problem
- ⇒ This is the question you keep thinking during the course.

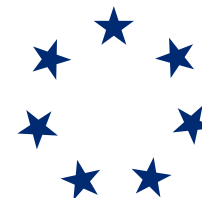




**A Complete Picture of
How Programs Execute**

Or How We Think Them Execute

给儿子的信



经上写着：‘做工懈怠的，与浪费人为弟。’最近，我发现你过着放荡和懈怠的生活、更喜欢放纵而不受约束、更喜欢玩乐而不去学习。当其他人埋头苦读的时候，你却在弹着吉他；在你读一卷法律书籍的时间里，你那些更加刻苦的伙伴们已经读完了好几卷。因此，我要力劝你从放荡和漫不经心中幡然悔悟，这样你就不会再被人称为一个‘浪费人’，而你的耻悔也可以转变为美名

-公元十世纪，一个父亲写给求学在外的儿子的信





Instructor Information

➔ Hengming Zou

⇒ Ph.D.: University of Michigan-Ann Arbor

⇒ M.S.: Institute of Computing Technology, CAS

⇒ B.S.: Huazhong University of Science and Technology

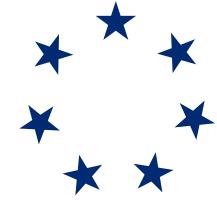
➔ 8+ years work experience in US software industry

⇒ IBM, National Data Corporation, Lucent, EMC

➔ Research interests:

⇒ Reliability, Availability, and Secure Storage



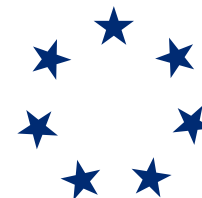


Contact Information

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 - ⇒ SE: 唐继禹 : tangjiyusjtu2010@gmail.com
- ➔ Course Website:
 - ➔ <http://cse.sjtu.edu.cn/OS/os.htm>



教材的选择



快起！我的朋友，丢开你的书本；
否则，我敢确定你将变成驼背；
快起！我的朋友，清晰你的面容；
为何满是辛劳和困顿？

...

书！是愚蠢而又无休止的争吵；

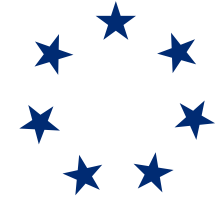
...

够了，那些科学和艺术；
盖上那空洞乏味的书页；
来吧，带上你的心灵
一颗愿观察愿接纳的心灵。



William Wordsworth
英国浪漫主义诗人代表





Textbook

➡ 计算机的心智：操作系统之哲学原理

⇒ Publisher: 机械工业出版社

➡ Reference Book:

➡ Modern Operating Systems, 3e, by Andrew Tanenbaum

➡ Operating Systems Concepts by A. Silberschatz et al.

➡ Addison Wesley

➡ Distributed Systems: Concepts and Design By George Coulouris



Grading System



➔ Home work and quizzes:

⇒ ACM: 30%

School of Software: 15%

➔ Projects (4):

⇒ ACM: 00%

School of Software: 35% (5, 10, 10, 10)

➔ Final exam:

⇒ ACM: 50~70%

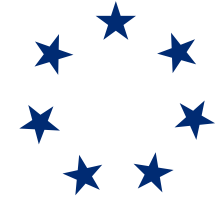
School of Software: 50%

➔ Course essay:

⇒ ACM: 00~20%

School of Software: 00%





Content of Instruction

- ⇒ Introduction
- ⇒ Processes/threads
- ⇒ Memory management
- ⇒ File systems
- ⇒ Input/output

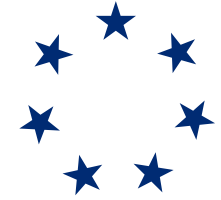




Look Ahead: Introduction

- ➔ Philosophy of computer (science)
- ➔ What is operating system
- ➔ Why study operating system?
- ➔ History of operating system
- ➔ Main operating system concepts





Look Ahead: Processes & Threads

⇒ Processes

⇒ Inter-process communication

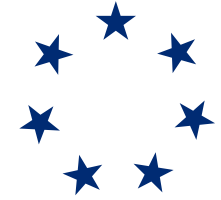
⇒ Threads

⇒ Thread synchronization

⇒ Lock Implementation

⇒ CPU scheduling

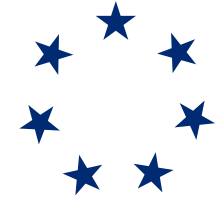




Look Ahead: Deadlocks

- ➔ Resource
- ➔ Deadlocks and its modeling
 - ⇒ Resource trajectory
- ➔ Deadlock detection and recovery
- ➔ Deadlock avoidance and prevention
 - ⇒ Banker's algorithm





Look Ahead: Memory Management

- ➔ Basic memory management
- ➔ Virtual memory
- ➔ Paging systems
- ➔ Segmentation systems

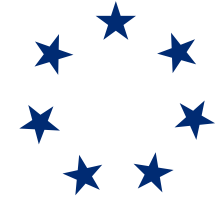




Look Ahead: File Systems

- ⇒ Files
- ⇒ Directories/folders
- ⇒ File system implementation
- ⇒ File system performance
- ⇒ Example file systems

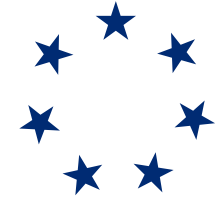




Look Ahead: Input/Output

- ➔ Principle of IO hardware/software
- ➔ IO software layer





What Is and Isn't About

➡ This course is about:

- ⇒ Common principles of all operating systems
- ⇒ Common problems and solutions to all OSs
- ⇒ General agreed practice in OS development/design

➡ This course is NOT about:

- ⇒ Specifics of any commercial OSs
- ⇒ Any data structure concerning any OS
- ⇒ Algorithmic implementation of any OS

➡ For this, you need Operating System Engineering



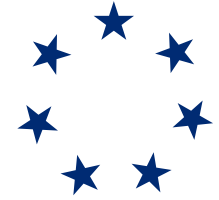
Homework #1



- ➡ Send an email to me with the following information:
 - ⇒ Your name and age
 - ⇒ Your background
 - Where are you from, What do your parent do,
 - What do you like the most so far in your life
 - ⇒ What do you expect from the course
 - ⇒ A one sentence of humor (try your best to amuse me)
- ➡ Due date: one week from today



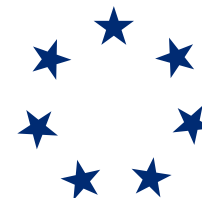
Course Essay (1000~1500 words)



- ➔ Discuss your thoughts on this course, this subject
 - ⇒ Do you like the course and the subject? Why or why not?
- ➔ Any reflection, comments, and suggestions
- ➔ Artes, Scientia, Veritas



Questions?



Then Ask!

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- ➔ Skype: henmingway
- ➔ Work Phone: 3420-4934
- ➔ URL: <http://cse.sjtu.edu.cn/zou>

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