Operating Systems

Introduction to Operating System (OS)

1

What is an Operating System (1)?

- A modern computer consists of:
  - One or more processors
  - Main memory
  - Disks
  - Printers
  - Various input/output devices.
- Managing all these varied components requires a layer of software – the **Operating System (OS).**

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2

What is an Operating System (2)?

- An Operating System is a program that acts as an intermediary/interface between a user of a computer and the computer hardware.
- OS goals:
  - Control/execute user/application programs.
  - Make the computer system convenient to use.
  - Ease the solving of user problems.
  - Use the computer hardware in an efficient manner.

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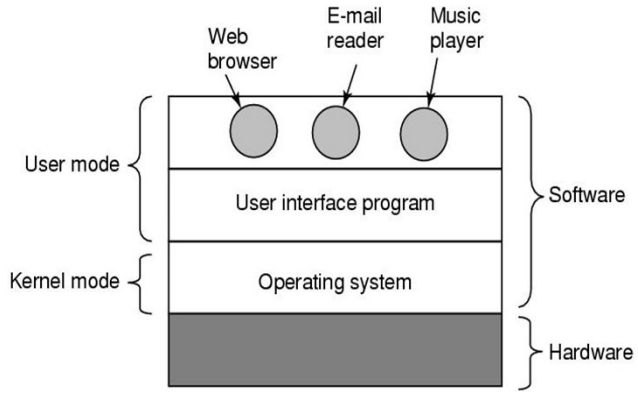
Where does the OS fit in?



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Services provided by an OS

- Facilities for program creation
  - editors, compilers, linkers, debuggers, etc.
- Program execution
  - loading in memory, I/O and file initialization.
- Access to I/O and files
  - deals with the specifics of I/O and file formats.
- System access
  - Resolves (giải quyết) conflicts (mâu thuẫn) for resource contention (tranh chấp).
  - protection in access to resources and data.

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Why are Operating Systems Important?

- Important to understand and know how to correctly use when writing user applications.
- Large and complex systems that have a high economic impact (tác động) and result in interesting problems of management.
- Few actually involved (tham gia) in OS design and implementation but nevertheless many general techniques to be learned and applied.
- Combines concepts from many other areas of Computer Science: Architecture, Languages, Data Structures, Algorithms, etc.

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Course Syllabus (1)

- **Motivation for Operating Systems (OS)**
- **Introduction**
  - What's an Operating System?
  - Computer/Operating System Overview
  - Evolution of Operating Systems
  - Functional/Protection Aspects
  - Operating System Structures

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Course Syllabus (2)

- **Concurrent Processes**
  - Process Models and Management
  - Process Description and Control
  - Task/Thread Description and Control
  - Concurrency: Mutual Exclusion and Synchronization
  - Concurrency: Deadlock and Starvation
- **Uniprocessor Scheduling**
  - Levels of CPU Scheduling
  - Process Scheduling

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Course Syllabus (3)

- **Memory Management**
  - Real Memory Management
  - Motivation for Virtual Memory (VM)
  - Paging and Segmentation
  - Page Fetch, Placement and Replacement

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Course Syllabus (4)

- **External Storage Management**
  - File Systems/Management
  - Directories
  - File Allocation
  - Disk Scheduling

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Course Syllabus (5)

- **Learning resources are available at the website**
  - itedu.edu.vn
- **Test time:**
  - Mid-term: Notice later
  - Final-term: Notice later

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Evaluation Strategy

- Must attend more than 80% of contact hours (if not, not allow to take exam).
- Evaluating
  - Assignment (A) x 2 20%
  - Mid-term (M) 30%
    - (25-31/10/2021)
  - Final Exam (FE) 50 %
    - (27/12/2021-23/01/2022)
- Total score=20%(A)+ 30%(M) + 50% (FE)
- Pass: All on-going assessment > 0 and Total score ≥ 5 and Final Examination ≥ 4 (of 10)
- Study again only when not passed

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How to study?

- This course is complex knowledge (however, it's attractive (hấp dẫn) and exciting (lý thú)), so you need to keep tight (chặt chẽ) grip on it
  - Read
    - On the books to get the general concept
    - Reference, study, collection from anywhere else (internet, your classmate, forum …)
  - Attend (chú tâm) lectures
    - Listens, understand, then make your own notes
    - Give your explanation (giải thích) about some topic in lectures
    - Ask questions
    - Practice all the exercises, demo to make your sense
  - After classes
    - Discuss your classmate in directly, on forum
    - Do the lab, assignments to submit via LMS, and do more exercises
    - Build your teams in yourselves to support together in studying

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Academic Policy

- Cheating (gian lận), plagiarism (đạo văn) and breach (vi phạm) of copyright are serious offenses under this Policy.
  - Cheating
    - Cheating during a test or exam is construed as talking (trao đổi), peeking (liệc trộm) at another student's paper or any other clandestine (giấu giếm) method of transmitting information.
  - Plagiarism
    - Plagiarism is using the work of others without citing it; that is, holding the work of others out as your own work.
  - Breach of Copyright
    - If you photocopy a textbook without the copyright holder's permission, you violate copyright law.

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Enjoy the Course

- Be enthusiastic (nhiệt tình) about the material because it is interesting, useful and an important part of your training as an IT engineer.
- We will do our best but we need your help.
- So let's all have fun together with OS!!!

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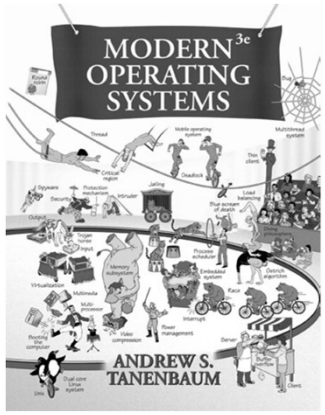
Main Bibliography

A. S. Tanenbaum, "Modern Operating Systems", 4th ed, Pearson, 2015. http://www.pearsonhighered.com/educator/academic/product/0,,0136006639,00%2ben-USS_01DBC.html



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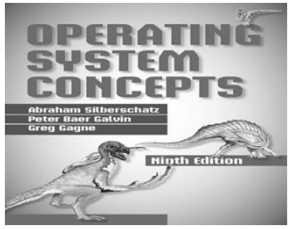
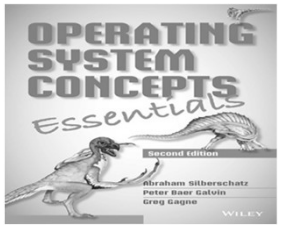
Main Bibliography

A. Silberschatz, P. B. Galvin, and G. Gagne, "Operating Systems Concepts (Essentials)", 9th Edition, John Wiley & Sons, 2012.

http://codex.cs.yale.edu/avi/os-book/





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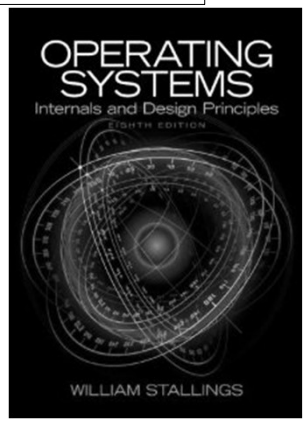
Main Bibliography

W. Stallings, "Operating Systems: Internals and Design Principles", 8th ed, Pearson, 2015.
http://williamstallings.com/OperatingSystems/



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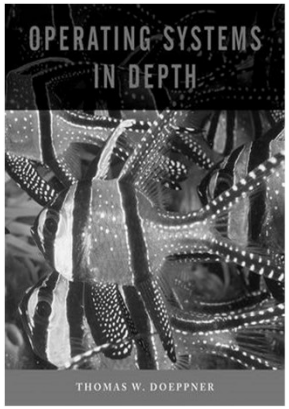
Main Bibliography

T. W. Doeppner, Operating Systems in Depth, John Wiley & Sons, 2011,
http://eu.wiley.com/WileyCDA/WileyTitle/productCd-EHEP001803.html



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