# Operating Systems: Internals and Design Principles (Eighth Edition) notes

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"the book is divided into five parts: background, processes, memory, scheduling, advanced topics (embedded OSs, virtual machines, OS security, and distributed systems)"

"Many treatments of operating systems bunch all of the material on processes at the beginning and then deal with other topics. This is certainly valid. However, the central significance of memory management, which I believe is of equal importance to process management, has led to a decision to present this material prior to an in-depth look at scheduling. The ideal soution is for the student, after completeing Chapters 1 through 3 in series, to read and absorb the following chapters in parallel: 4 followed by (optional) 5; 6 followed by 7; 8 followed by (optional) 9; 10. The remaining parts can be done in any order. However, although the human brain may engage in parallel processing, the human student finds it impossible (and expensive) to work sucessfully with four copies of the same book simultaneously open to four different chapters. Given the necessity for linear ordering, I think that the ordering used in this book is the most effective. A final comment. Chapter 2, especially Section 2.3, provides a top-level view of all the key concepts covered in later chapters. Thus after reading Chapter 2, there is considerable flexibility in choosing the order in which to read the remaining chapters."

## CHAPTER 1

Learning Objectives:

- Describe the basic elements of a computer system and their interrelationship.
- Explain the steps taken by a processor to execute an instruction.
- Understand the concept of interrupts and how and why a processor uses interrupts.
- List and describe the levels of a typical computer memory hierarchy.

- Explain the basic characteristics of multiprocessor and multicore organizations.
- Discuss the concept of locality and analyze the performance of a multilevel memory hierarchy.
- Understand the operation of a stack and its use to support procedure call and return.

# CHAPTER 2

Learning Objectives:

- Summarize, at a top level, the key functions of an operating system (OS).
- Discuss the evolution of operating systems for early simple batch systems to modern complex systems.
- Give a brief explanation of each of the major achievements in OS research, as defined in Section 2.3.
- Discuss the key design areas that have been instrumental in the development of modern operating systems.
- Define and discuss virtual machines and virtualization.
- Understand the OS design issues raised by the introduction of multiprocessor and multicore organization.
- Understand the basic structure of Windows 7.
- Describe the essential elements of a traditional UNIX system.
- Explain the new features found in modern UNIX systems.
- Discuss Linux and its relationship to UNIX.