

CSCI-GA.3033-016
Virtual Machines: Concepts and Applications
Spring 2017

Pre-requisites: CSCI-GA.2250 Operating Systems

Place: WWH 312

Time: Wednesdays 5:10-7pm

Instructor: Mohamed Zahran (Office WWH 320)

Office Hours: Tuesdays 2-4pm

What is it all about?

Virtualization technology from VMware, IBM, Xen, Microsoft, and others is an indication of the importance of this technology, especially in this era where almost everything is in the cloud. Virtualization became the IT world's hottest trend in recent years. Have you ever wondered how you can run multiple operating systems on a single physical system and share the underlying hardware resources? How does your operating system see a hardware that differs from the actual hardware, and why we need to do so? What is a virtual server? Virtual machine is the answer to all that and much more.

In this course we will study the design and implementation of virtual machines, virtual machine monitors (aka hypervisors), as well other recent trends in virtualization. We will study virtual machines across the disciplines that use them: operating systems, programming languages, and computer architecture.

Textbook

Virtual Machines: Versatile Platforms for Systems and Processes

Jim Smith and Ravi Nair

ISBN-10: 1558609105

Elsevier

Main Topics

- Basics of virtual machines
- Binary translation and optimization
- High-level language virtual machines
- Process virtual machine

- Co-designed virtual machines
- System virtual machines
- Hardware features for virtualization
- Multiprocessor virtualization
- Security Issues
- Applications of Virtual Machines

Grade Distribution

- Homework and programming assignments: 30%
- Project: 30%
- Final exam: 40%

Feedback: I would like as much feedback/criticisms as possible from you, as early as possible, so that I can try to improve the way the course is taught. Please feel free to give me any suggestions (anonymously if you wish) that you think could improve the way the course is handled. Keep in mind that you are not alone. If you have a question, undoubtedly others do too; and we will all benefit from your input. Do not be shy to ask about anything you do not understand in the course.

Good Luck and Have fun!