CST 337: Computer Architecture
Fall 2012
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Table of Contents

Time
Monday & Wednesday – 6:00 PM to 7:50 PM

Place
MLC 118

Instructor
Jonathan Shu (Email: JShu@csumb.edu)

Office
Please email me first.

Office hours:
Regular Office hours: Monday & Wednesday – 5:00 PM to 6:00 PM
Flexible on office hours (Email me to set up)

Description
This course is designed to provide students with the fundamental knowledge of computer architectures, hardware and software components of computer systems, functionalities of operating systems, and operations of computer networks. Coverage includes introduction to computer systems, data representation, CPU, memory, input/output devices, operating systems, communication protocols, and network architecture, parallelism, Cloud Computing, redundancy. ***This course is intended for CSIT majors.***

Textbook:
- Code: The Hidden Language of Computer Hardware and Software
  - http://www.amazon.com/Code-Language-Computer-Hardware-Software/dp/0735611319/
- Essentials of Computer Organization and Architecture by Linda Null, Julia Lobur
  - http://www.amazon.com/Essentials-Computer-Organization-Architecture-Linda/dp/1449600069/ref=sr_1_3?ie=UTF8&qid=1377537906&sr=8-3&keywords=computer+architecture+organization

- FREE: The Datacenter as a Computer: An Introduction to the Design of Warehouse-Scale Machines ("WSC"), which is freely available online
- FREE: Blown to Bits. You can download it for free here http://www.bitsbook.com/excerpts/

Prerequisites

CST 101
Recommended: CST 231 and MATH 170.

Outcomes

At the end of the course, students must

Knowledge outcomes

1. Have some knowledge of the history of computer
2. Be able to describe the fundamental organization of computer systems, how data is represented in computers, identify the various components and how they are interfaced, and how computers communicate with each other.
3. Be able to describe how software is executed on the hardware, various components that play a role in the execution.
4. Be able to describe the operation, allocation/management and inter-relationships of the different types of memory including cache memory & virtual memory.
5. Be able to describe some issues and possible solutions related to (Time-permitting)
    a. Program optimization.
    b. System program and system level Input/Output operation.
    c. Synchronization & Concurrency.

Skills/Abilities outcomes

6. Achieve at least one of the following three outcomes:
    a. Be able to implement/modify software programs that directly take advantage of the underlying hardware architecture.
    b. Be able to implement/modify software written using assembly language.
    c. Be able to design and develop a completely functional computer architecture using simulation software tools.

7. Be able to use simple analytical models to estimate computer performance.

Overall, we will be using the six great ideas of Machine Structure class from UC Berkeley as our overarching guidance for the class.

1) Layers of Representation/Interpretation
2) Moore's Law
3) Principle of Locality/Memory Hierarchy
4) Parallelism
5) Performance Measurement & Improvement
6) Dependability via Redundancy

Team Project

Create a team of 2-3 students to work on the project. You must prepare a plan for your project and get my approval as soon as possible. Your project will be based on the assignments, but will explore deeper into the areas. Report/presentation is due at the end of the semester. You will submit two intermediate status reports and may have to do one current status presentation during the semester and video at the end of the semester.

Create a project document on Google doc and share it with me. Your project progress and assignments should be updated on this document regularly.

Assignments

Assignments are posted on iLearn. You are responsible for keeping track of posted assignments and their due date/time.

Absolutely NO late assignments will be accepted. If you are late by 30 sec, you miss that assignment – **no exceptions**. If the amount of time allotted for an assignment is not enough, it should be brought for discussion during class. You are allowed to have 1 slip day for the semester.

Reading Assignments and Video Link

Chapter/sections for reading assignment are posted on the discussion forum. You need to read the chapter and identify five new ideas,

concepts, clearly explain them to your classmate in a post on the forum. We will discuss them in the class as well. Your **reading assignment and video assignments** significantly will be affected by your participation in these discussion and weekly quizzes and in class assignments.

Teaching modality

Two classes per week: 1-hour lecture and 40-50 minutes project/assignment discussion or lab/assignment work. 2-8 hours of homework/assignment work per week.

We will use the last 30-35 min in the class to discuss any questions related to the project or assignment. Basically, the last 30-35 min MUST be lead by the students.

Quizzes

We will have close to ~10 short quizzes throughout the semester. I will announce the class averages for each exam. Quizzes may be pre-announced or surprise, on Monday or Wednesday. You have one week from hand-back to address grading issues. **No makeups for quizzes if you are not in the class or late to the class.** If you have a proper excuse document, please let me know ahead.

Course Web Site

http://ilearn.csumb.edu/

Additional course information and announcements will be available on this site. It is student's responsibility to check this site frequently.

Course Prerequisite

Grading

First Midterm	12
Second Midterm	15
Final	25
Quizzes	10

Assignments	17
Labs / Attendance	8
Team Final Project	10
Effort, Participation, Altruism	3
Total	100

Email

When you email me, please put the class name in the subject line and include your name in the body of the message.

Also, I expect all email correspondence to adhere to academic and professional guidelines - TEXT MESSAGE approaches and other shortcuts are completely inappropriate.

Academic Integrity

By accepting admission to California State University Monterey Bay, you made a commitment to understand, support, and abide by the University policies without compromise and exception. The code and policies are available in your Student Handbook and on the web at http://policy.csumb.edu/csumb-policies. You are responsible for reading and understanding the **Academic Integrity policy.**

It is expected that you yourself have done the work you turn in. That is not to say you cannot get help from another student, your instructor or any other person. However, you need to be very clear about the difference between getting help and another person doing your work. Unless specifically authorized by a class instructor, all of the following

uses of a computer are violations of the University's guidelines for academic honesty and are punishable as acts of plagiarism:
copying a computer file that contains another student's assignment and submitting it as your own work.

- copying a computer file that contains another student's assignment and using it as a model for your own assignment.
- working together on an assignment, sharing computer files or programs involved, and then submitting individual copies of the assignment as your own work.
- knowingly allowing another student to copy or use one of your computer files and to submit that file, or a medication thereof, as his or her individual work.
- plagiarism—representing the work of others as your own, by not properly citing all sources (be especially careful of materials copied from the web).
- duplicating or distributing copies of copyrighted software programs, music, videos, images or other media—except as allowed by legal fair use standards in education.

Every student is expected to do his/her own work on individual assignments. Any evidence to the contrary for individual assignments will result in a grade of 0 (zero) and a report will be filed with the Department of Judicial Affairs. CSUMB's policies regarding **student discipline and judicial affairs** may be found at: http://catalog.csumb.edu/general-information/behavior-codes/student-conduct

Note: We have tools and methods for detecting this. You WILL be caught, and the penalties WILL be severe. At the minimum a ZERO for the assignment, possibly an F in the course, and a letter to your university record documenting the incidence of cheating and possibly expel from the University. We will seek out for maximum penalty.

Disabilities and Learning Issues

Your instructor wants every student to succeed. Students with disabilities who require accommodations such as time extensions or test accommodations **must** present verification from Student Disability Resources as soon as possible.

Meet with SDR professional staff to register yourself at Building 47, Student Services, First Floor, Phone: 831/582-3672 voice, or 582-4024

fax/TTY or contact SDR at Student_Disability_Resources@csumb.edu or see the website at http://sdr.csumb.edu

Please schedule an appointment to discuss specifics with your instructor. if a disability may impact your performance in this class.

Final Notes

Course Policies

Everyone is expected to adhere to the following rules:

1. Attend all course meetings
   a. Show up ON TIME
   b. Be ready to work at the start
   c. If you need to, arrive 10 minutes early
   d. If you need to miss, be late, or leave early, plan ahead and contact instructor

2. Complete and submit assignments on time
   a. Most assignments will be due on Sunday at midnight.
   b. If you need an extension, send an email to instructor PRIOR to the deadline asking for an extension
   c. You have one slip day token for this semester.
   3. Practice academic integrity
   4. Act respectfully toward classmates and instructor
   5. Participate in class discussions

Any failure to adhere to these rules may result in disciplinary action.

Attendance and Notes

Students are expected to be regular and punctual in class attendance. If you need to miss class, you must inform the instructor as soon as possible. Students with attendance problems will be subject to disciplinary action. If students generally have attendance problems, instructor will be forced to use punitive pop quizzes. Students are encouraged to take good notes. The instructor and course (and for that matter, life) do not rely on Powerpoint slides, so students are encouraged to not rely on Powerpoint slides!