

ENGR192/292 Lecture

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What is an engineer?

Two engineering students were walking across campus when one asked, "Where did you get such a great bike?" The second engineer replied, "Well, I was walking along yesterday minding my own business when a beautiful woman rode up on this bike. She threw the bike to the ground, took off all her clothes and said, 'Take what you want.' "

The second engineer nodded approvingly, "Good choice; the clothes probably wouldn't have fit."

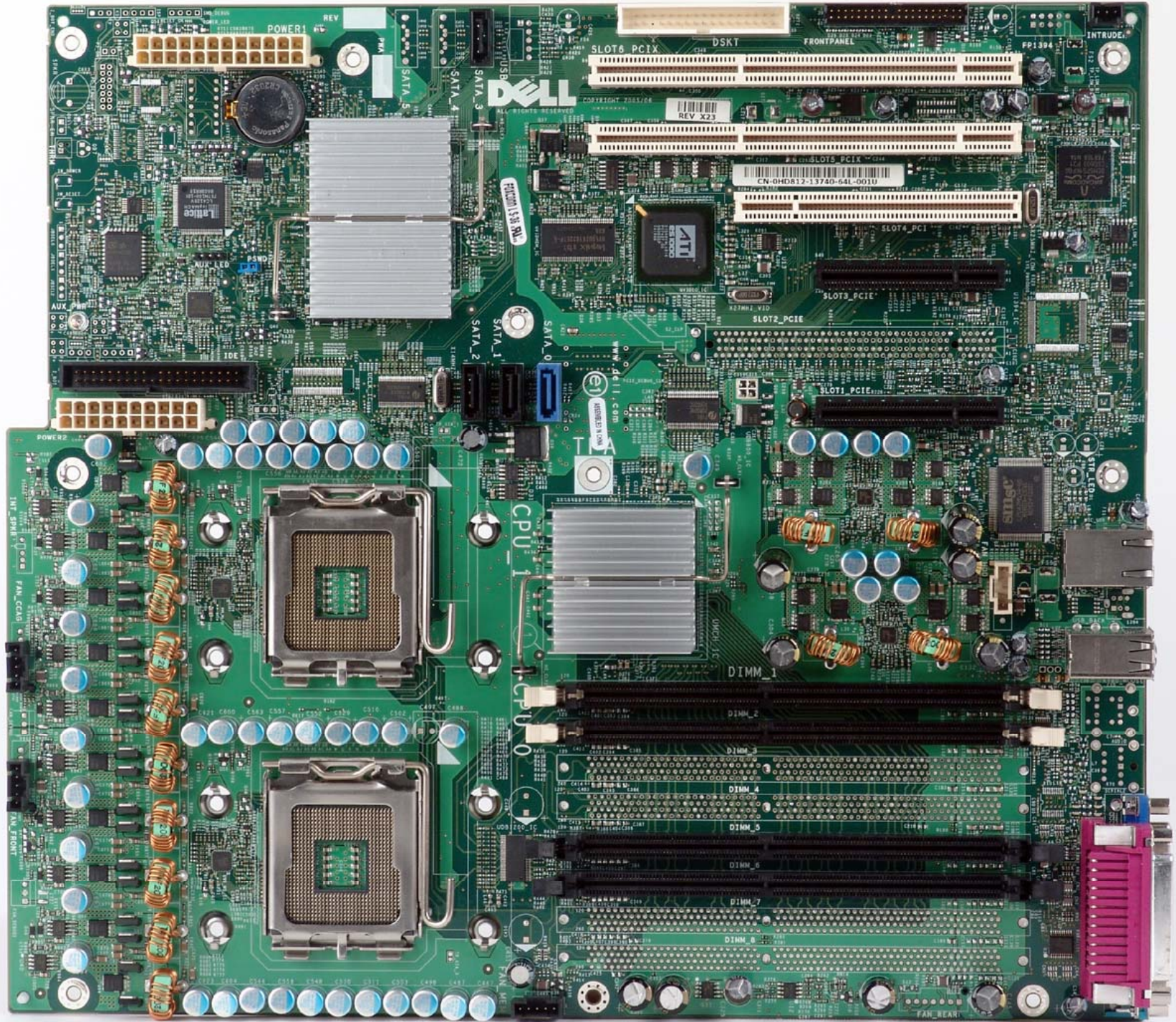
Outline

- My Background
- Working with Hardware
- Working with Software
- Life as a Professor

My Background

- BS, MS, and Ph.D. in Computer Engineering and Computer Science from the University of Southern California
- Moved to Anchorage in Fall 2007 for UAA position
- Taught Computer Science, Computer Engineering, and Electrical Engineering classes for 10 years
- Worked in industry for over 10 years, with ranks from intern, junior programmer, intermediate programmer, senior programmer, technical lead, director of engineering, and founder/CEO of my own company

Working with Hardware





Computer Hardware Engineering

- Research, design, develop, and test computer or computer-related equipment for commercial, industrial, military, or scientific use.
- May supervise the manufacturing and installation of computer or computer-related equipment and components.

Computer Hardware Engineering

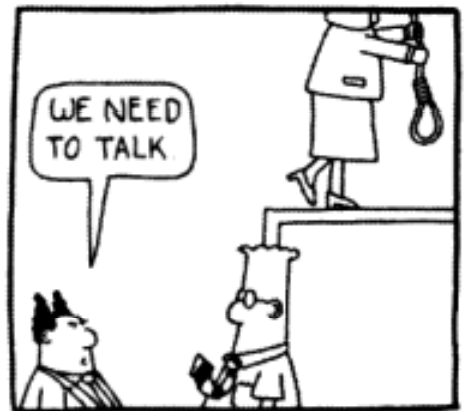
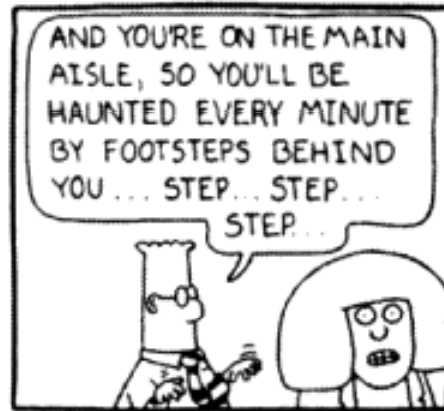
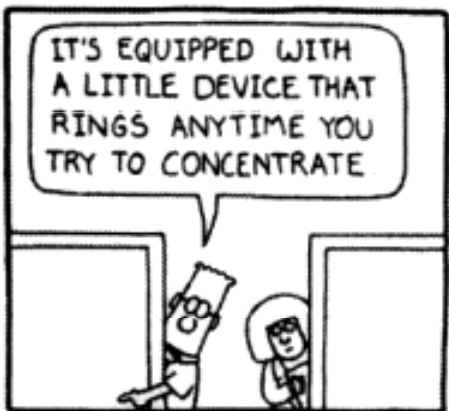
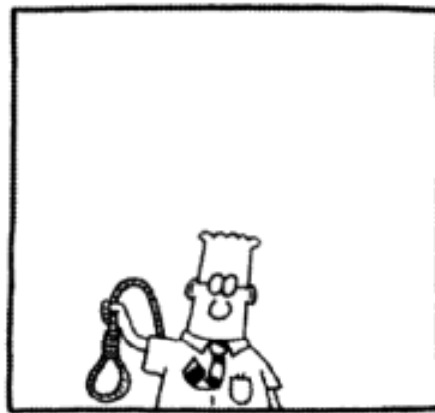
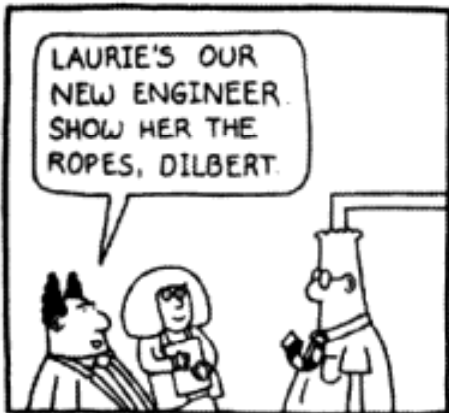
- Build individual components to make a computer, including the motherboard, memory, CPU, video cards, sound cards, network interface cards, peripherals, monitors
- Test components to determine proper functionality
- Average salary - \$91,280/year*

* As of May 2006, United States Department of Labor

Realistic Life

- Work a 40-hour per week job with flexible hours
- Most likely work in a cubicle until being promoted to management, where you *may* get an office
- Attend at least 5-10 hours of meetings each week
- Wear anything you want to work, or possibly business casual on certain days
- Drive a nice, expensive car and live in a large house
- Large number of jobs are on the west coast (Silicon Valley, Seattle, San Diego)
- Spend most of your time designing hardware devices in programs, simulating your design, and then building the device in a lab
- Overseeing production of the device on a large-scale after a significant amount of testing of the prototype

Working with Software



Outline Slides

23 Computer Software Engineering

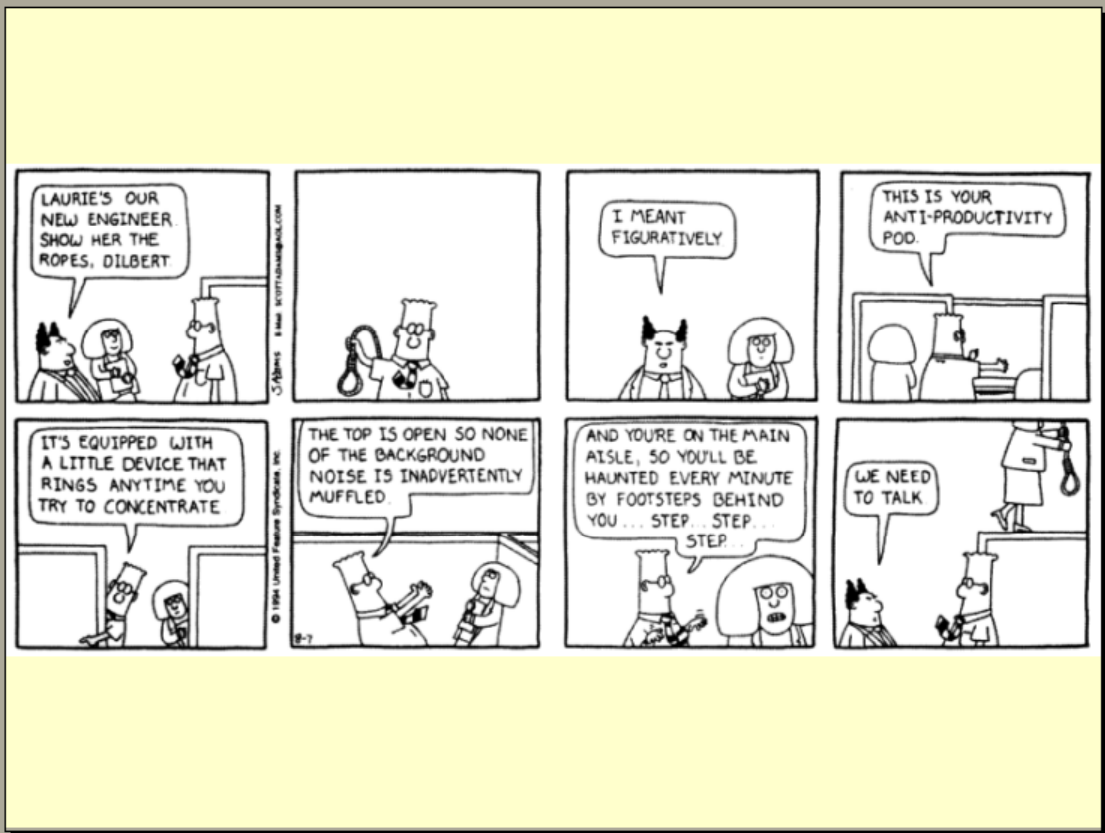
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25 Electrical Engineering

26 Electrical Engineering

27 Industrial Engineering

28 Industrial Engineering



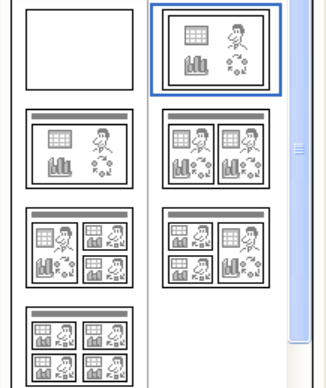
http://www.codinghorror.com/blog/images/dilbert_cube_ropes.gif

Slide Layout

Apply slide layout:



Content Layouts



Text and Content Layouts



Show when inserting new slides

Computer Software Engineering

- Convert project specifications and statements of problems and procedures to detailed logical flow charts for coding into computer language.
- Develop and write computer programs to store, locate, and retrieve specific documents, data, and information.
- May program web sites.

Computer Software Engineering

- Known as programmers or software engineers
- Generally sit in front of a computer and program for the majority of their time
- Develop algorithms (sequence of steps) to solve problems, such as determining how to sort five numbers:
 3, 7, 2, 1, 8
- Average salary - \$69,500/year*

* As of May 2006, United States Department of Labor

Realistic Life

- Work a 40-hour per week job with flexible hours
- Most likely work in a cubicle until being promoted to management, where you *may* get an office
- Attend at least 5-10 hours of meetings each week
- Wear anything you want to work, or possibly business casual on certain days
- Drive a nice, expensive car and live in a large house
- Live anywhere in the world that has computers (and possibly the internet)
- Gather the requirements for a program, design it, code it, test it, deploy it
 - Then repeat
- Possibly be on call if the program crashes...

Engineering Salaries

Occupation	Average Yearly Salary	Average Hourly Rate	Number Employed
Aerospace	\$89,260	\$42.92	86,720
Biomedical	\$78,030	\$37.51	14,030
Chemical	\$81,600	\$39.23	29,060
Civil	\$72,120	\$34.67	236,690
Computer Hardware	\$91,280	\$43.88	74,480
Computer Software	\$69,500	\$33.42	396,020
Electrical	\$78,900	\$37.93	147,670
Industrial	\$70,630	\$33.96	198,340
Mechanical	\$72,580	\$34.89	217,500
All Engineering	\$78,211	\$37.60	1,400,510
All Occupations	\$39,190	\$18.84	132,604,980

* As of May 2006, United States Department of Labor

Life as a Professor

Title of Professor

- We refer to anyone who teaches college classes as “Professor”
 - If a person has a Ph.D., refer to them as “Dr.”
- However, people who teach college have different job titles
 - Lecturer / Instructor / Adjunct Professor – non tenure-track
 - Assistant Professor – tenure-track
 - Associate Professor – tenure-track or tenured
 - Professor – tenured
 - Distinguished Professor – tenured

Professor Responsibilities

- Teaching
 - A professor will teach between 1 and 3 classes each semester, with two semesters a year
- Research
 - A professor is required to publish papers or books, attend conferences, further his/her field of study, and write grants to bring research money into the university
- Service
 - A professor is required to do volunteer activities within and outside of the university
 - Be on committees for hiring new faculty, buying new equipment, changing the curriculum, advising students, etc.
 - Volunteer in professional organizations, review papers, edit books and journals, etc.

Tenure or Ten-Year?

- Tenure
 - Guaranteed employment for life, regardless of the area of research pursued
 - Allows professors to openly disagree with the common opinion and to pursue ideas that may otherwise be disliked
 - Most universities give between 5-7 years for an assistant professor to gain tenure, which is based on his/her research and teaching
 - Some professors may become lazy or unproductive, though the university can not do anything about it after being tenured
 - Can tenured professors be fired?

Realistic Life

- Work a 20-hour to 168-hour per week job with flexible hours
- Most likely have your own office
- Attend around 2-3 hours of meetings each week
- Wear anything you want to work
- Drive a nice, expensive car and live in a large house
- Live anywhere in the world that has a university
- Teach, research, and service
- Possibly move into administration as a dean, provost, chancellor, president

My Research

- Improving the flow of traffic based on using the latest mobile technologies
 - Known as Intelligent Transportation Systems (ITS)
- Improving the safety of traffic based on alerts for conditions that pose a higher probability for an accident to occur
 - Road conditions (potholes, foreign substances, moose)
 - Weather conditions
 - State of driver (intoxicated, tired, etc.)
 - Number of vehicles on the road
 - Section of road
 - Etc.

freesim - Windows Internet Explorer
 http://www.freewaysimulator.com

freesim

Map Satellite Hybrid Terrain

Caltrans Northwest Loop Detectors

Freeway System: LA Northwest
 Load Freeway System

Zone Configuration: 1 Edge
 Load Zone Configuration

Start: LA-5-S at S FERNANDO 1
 End: LA-101-S at VERMONT
 Fastest Path Algorithm: APAP Hybrid
 Fastest Path Shortest Path
 Zoom In Create Vehicle

Messages

Fastest Path
 Path = LA-5-S S FERNANDO 1 ML1 LA-5-S S F
 Distance = 15.63 miles
 Time = 14 minutes 26 seconds

Refresh Freeway System

Start: LA-5-S at S FERNANDO 1
 End: LA-5-S at S FERNANDO 2
 Speed: 15 Lane: ML2 Update Speed

File: Caltrans Loop Detectors Lanes Load File
 Execute File Stop Execution

Messages

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72|0|10|S FERNANDO 2|LA-5-S|BRAND|LA-5-S|78|ML1
72|0|10|S FERNANDO 2|LA-5-S|BRAND|LA-5-S|78|Summary
72|0|10|CHATS WORTH|LA-5-S|RTE 118 CN|LA-5-S|69|ML1
72|0|10|CHATS WORTH|LA-5-S|RTE 118 CN|LA-5-S|69|ML2
72|0|10|CHATS WORTH|LA-5-S|RTE 118 CN|LA-5-S|69|Summary
72|0|10|RTE 118 CN|LA-5-S|OSBORNE 2|LA-5-S|68|ML2
  
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Simulation Time: 0

Done Internet 100%

Questions?

- Questions about college classes and majors?
- Questions about engineering careers?
- Questions about academic careers?
- Other questions about school, life, philosophy?

- Email me at jmiller@uaa.alaska.edu

Closing Remark

- The purpose of college is to learn a lot about a little and a little about a lot

When a person gets a bachelor's degree, he thinks he knows everything about everything

When he gets a master's degree, he thinks he knows everything about something

When he gets a Ph.D., he realizes he knows nothing about anything

- Never forget that the more you know, the more you realize you don't know