Engin 103
Fall '06
Meeting #3 –Sept 12, 2006

-Reminder: class attendance is absolutely required, if a member is missing a class without justification, that member may loose the spot in a team.
-Reminder: please check class-notes under e-syllabus for suggestions on what to write each day in the Engin 103 (two topics were suggested in the class notes for Meeting #2), and items due next class. Please also check electronic bulletin on the course web site for announcements.
-Reminder: maintenance of an active email account is **required** for the course. Especially all class-related email messages should be checked and replied. A great part of teamwork depends on team members' close communication using emails. Phone communication is also recommended when available.

Brainstorming Exercise
LEADERSHIP SKILLS, as suggested by teams

Team Number	Round 1	Round 2 (not mentioned in Round 1)
1	**Team Work**	Respect
2	Team player	Trust
3	**Discipline**	Creativity
4	**Open-minded**	Ingenuity
5	Open-minded	Hard Working
6	**Communication**	Connection
7	**Ability to unite the team**(Unity)	Responsibility
8	Communication	Execution
9	**Organization**	Inspiration
10	Correlation information	Decisiveness (decision maker)

Qualities that would help make a good Decision :

Team Number	Quality
1	Creativity
2	Strategy
3	Self assured (confidence)
4	Analytic mind
5	Good judgment
6	Good listener
7	Maturity
8	Decisiveness
9	Fairness

10	Well research(~ knowledge)
	**Experience
	**Knowledge
	**Fast Reaction

-As an example of “multimedia presentation” in which the audio component is the speaker’s voice and visual aids by PowerPoint projection, I made a short presentation on “What Do Engineers Do?”

-We gave a closer look at the ten engineering fields the teams are working on by finding the **older/younger and parents/daughter relationships** between them:

As responded by the class:
-Oldest field: Civil Engineering (CiE), a set of techniques in building and constructions worth to transmit to the next generation, evolves into a discipline.
-Daughter of CiE: Geological/Geophysical Engineering (GGE), as construction projects get sophisticated into skyscrapers, longer bridges, or the need to build on water, geological and geophysical techniques get sufficiently sophisticated they evolve into a separate body of knowledge.
-Next oldest: Mechanical Engineering (ME), after houses and buildings to live and work in, people need machines to help perform their work, gears and levers, etc. Then automobiles, locomotives, ships that contributed to the Industrial Revolution. Knowledge on how to build ships and navigate evolves into Naval and Marine Engineering (NME). As well as knowledge on how to build machines that can fly or travel to the outer space evolves into Aeronautical and Aerospace Engineering (AAE).
-Next oldest: Electrical Engineering (EE), with the discovery of electricity and implementation of electrical networks, Power Engineering evolves as a group of technologies to extract electricity from hydraulic power plants and deliver it to towns and cities. The other branch of EE, signal processing is more recent. Within EE a group of technologies related to computer hardware evolved into the discipline of Computer Engineering (CE).
-Next oldest: Chemical Engineering (ChE), needed for water and sewage treatment as the world population exploded. Daughters are Materials Science and Biomedical Engineering.

Most Important Discoveries in the Twentieth Century , as suggested by teams

Team Number	Discovery	Engineering Field related.
1	Automobiles	Mechanical
2	Electricity	Electrical
3	Nuclear tech.	Nuclear
4	Prosthetics	Biomedical

5	Fusion/hydrogen bomb	Nuclear
6	Computers	Mechanical/electrical
7	Space Shuttle	Aerospace/mechanical
8	Internet	Computer
9	Fiber optics	Electrical
10	Semiconductors	Electrical/material

-Grading criteria for Project 0 presentations are listed in the Project 0 specifications, linked from the e-syllabus.

-Suggested conclusions to record in the Engin 103 logbook:
1) Explain in your own words what is a brainstorming process? Write in one paragraph the results of a brainstorming session of your own or with your team on what information to include in the 5 minute presentation on your assigned engineering field that would be of interest to the class.
2) Write the results of a brainstorming exercise of your own or with your team on what project as related to your assigned engineering field and what details about that project would be of interest to the class

Items due next class (Sept 14, 2006)

-Presentation on the assigned Engineering field by each team, 5 minute maximum.

-In-progress work for Part II of project 0: having identified a project that engineers in your assigned field would perform, and knowing what details to present next Tuesday. Work from team members as coordinated by the group leader is required.

- Logbook entries as suggested above

-Getting textbooks from on-line providers

What do engineers do?

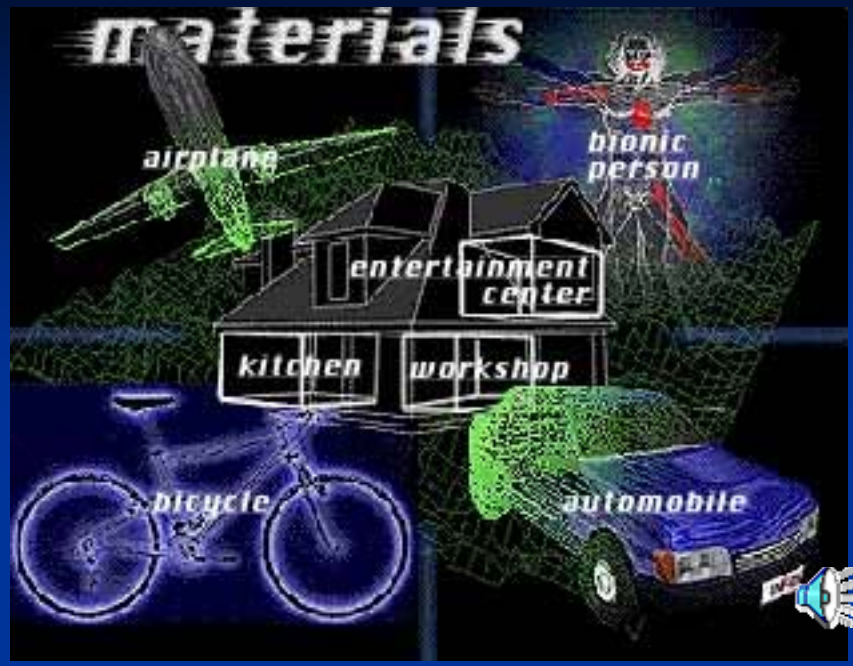
$$E = mc^2$$

$$\oint \vec{E} \cdot d\vec{l} = -\frac{d\Phi_B}{dt}$$

$$\oint \vec{B} \cdot d\vec{l} = \mu_0 \varepsilon_0 \frac{d\Phi_E}{dt}$$

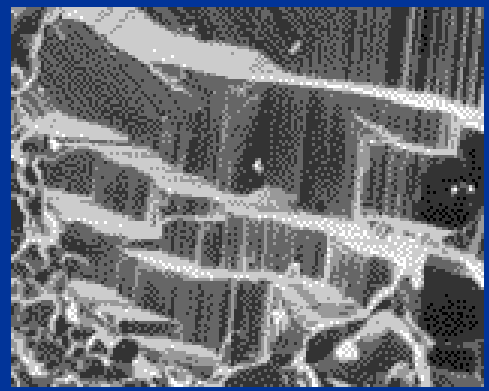
Scientists → New laws → Engineers → New devices And technologies → Civilization

Stacey 0:51

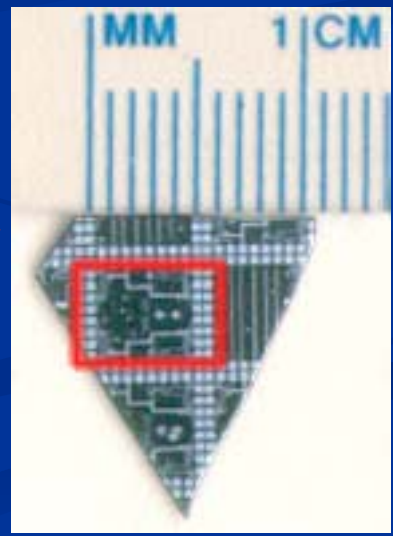


Artificial shoulder

Alumina ceramic

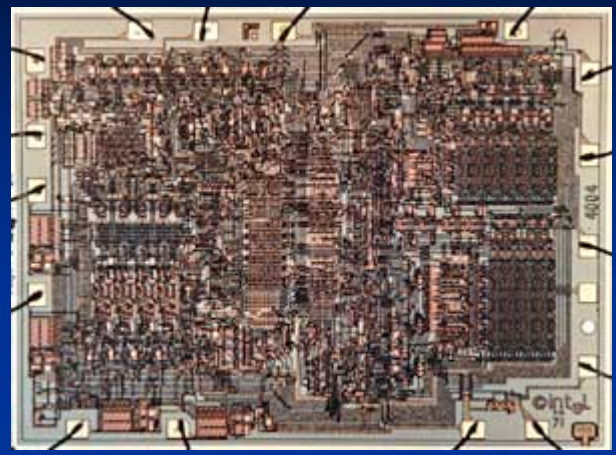


Integrated circuit etching



ENIAC computer

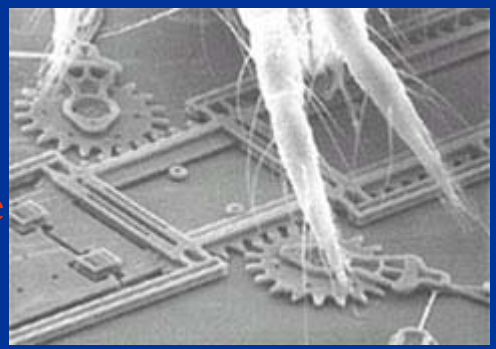
Intel 4004 with 2300 transistors



Moore on 1st transistor

Moore on how many transistors

Spider mite on a nanostructure



Organic LED's

Empire State building

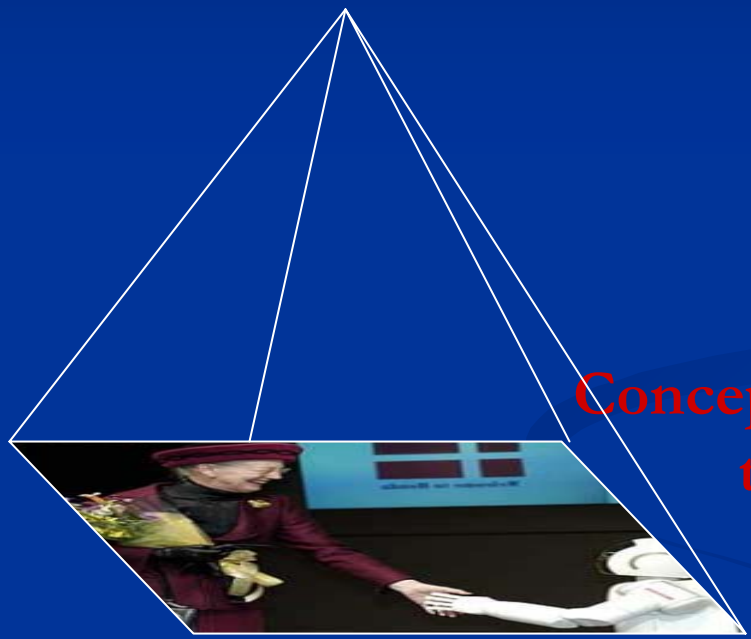
Euro-tunnel

Golden-Gate bridge

Kansai floating airport

How do they do it?

Goals



People-related tools

Concepts-related tools

Computer-related tools

Tools

Right tools

People-related	Concepts-related	Computer-related	Physical tools
Teamwork	Calculus	MatLab	GPS
Brainstorming	Linear algebra	Mathematica	DSP
Logbook	Differential eqs.	MathCad	MEM
Estimation	Statistics	LabVIEW	Molecular motors
Time management	Physics	PSPICE	…
	Chemistry	SolidWorks	
	Strength of Materials	AutoCad	
	Circuit Theory	Spreadsheets	
	Quantum Physics	Data modeling	
	Existing technologies: GPS, GIS, DSP, MEM, Molecular Motors, etc	and prediction	

How do I get there?

Use your tools to get more tools

Abstract concepts in context

Spreadsheets to manage data

Teamwork

Complicated subject or problem

Time management

Good textbooks and notes

Find help when needed

Have/Build A table of formulas

Dedicate to solving problems

Have solutions to check

How do I get there?

Right tools with a right focus

Goals

Attitude

Planning

There is no success without hardship

Responsibility

Time management

Persistence

Teamwork

Belief

Desire