

# Topics since last test

- Recursion
- Sound
- Graphics
- Software design
  - Object-oriented
  - Copyright issues
- Computer systems
  - Hardware
  - Architecture
  - Operating Systems
  - Security
- Computer Science Theory
  - Performance of algorithms
  - Complexity
  - Computability
- Debate Topics

# The exam

- Thursday, Dec 15, 2pm-5pm in B101 LSRC
- Open book/open note
- ~40% multiple choice/short answer
- Cumulative
- By Monday, December 12 at 5pm:
  - All grades up (except final project)
  - All solutions out
  - Grade problems:  
Submit through Eclipse assignment name issues
- Final grades up Monday, Dec. 19 morning

# Review Sessions

1. T 12:30-1:30
2. W 5:15-6:30

In D106 LSRC

# Current great ideas in CS

- Primes are in P
- Biomolecular computing
- Nanologic
- **Portable computing**
  - Lithium Batteries
  - Fuel-cells
- **Security**
  - **Patriot Act and possible Domestic Security Enhancement Act**
  - **Cyber-War?**

# Essential concepts

There is beauty at all levels of sophistication and all levels of abstraction.

- David A. Blackwell

If life were really fair, algebra would actually come in handy

- Amstel Light commercial

# On programming and deadlines

Observe that for the programmer, as the chef, the urgency of the patron may govern the scheduled completion of task, but it cannot govern the actual completion. An omelet, promised in two minutes, may appear to be progressing nicely. But when it has not set in two minutes, the customer has two choices -- wait or eat it raw. Software customers have the same choices..

- Fred Brooks

We don't have time to stop for gas -- we're already late.

- Old software project planning proverb via Mike Cleron

I love deadlines. I like the whooshing sound they make as they fly by.

- Douglas Adams

# Why is programming fun?

What delights may its practitioner expect as a reward?

First is the sheer joy of making things

Second is the pleasure of making things that are useful

Third is the fascination of fashioning complex puzzle-like objects of interlocking moving parts

Fourth is the joy of always learning

Finally, there is the delight of working in such a tractable medium. The programmer, like the poet, works only slightly removed from pure thought-stuff.

Fred Brooks

# On education

The college you attend does not determine the scope and possibility of your life's achievements. It will have some influence, no doubt. What is more important is the encouragement that we, as parents and friends, offer these prospective students as they explore their own educational trail. In the end, the experiences they encounter and the depth of character they build along the way will mean far more than the name of the institution on their diploma.

- **John Hennesy**

Education is not filling a bucket but lighting a fire.

- **William Yeats**

# On education

An education isn't how much you have committed to memory, or even how much you know. It's being able to differentiate between what you know and what you don't.

- Anatole France

The best way to have a good idea is to have lots of ideas.

- Linus Pauling

If there is no struggle, there is no progress

- Frederick Douglass

The ability to quote is a serviceable substitute for wit.

- W. Somerset Maugham

# Laws governing computer science

- **Moore's Law (1965)**
  - The number of transistors per area on a chip double every 18 months
  - Density of transistors => more functionality and speed
- **How about multiple computers?**
- **Amdahl's Law (1967)**
  - Given: fraction ( $s$ ) of work to be done is serial (i.e. isn't parallelizable)
  - Maximum speedup with infinite number of processors is  $1/s$

# What are computers for?

- **Simulation**
- **Communication among people**
  - **Storage = communication across time**
- **Control**
  - **Get physical**
  - **Get real (time)**
  - **Get mobile**

# Application

- **Simulation**
  - Models of the real world (e.g. planets, cities, molecules)
- **Communication among people**
  - Information at your fingertips
  - Telepresence
  - Home
- **Control**
  - Robots
  - Software agents

# What's next

- **CompSci 4**
  - **Robots**
  - **Video games**
  - **Java**
- **CompSci 6**
  - **Assumes knowledge of loops & arrays**
- **Seminars**
  - **Animation and virtual worlds**
  - **History of Communication**