CS312 Course Introduction

"Computers are good at following instructions, but not at reading your mind."
- Donald Knuth, Tex p. 9

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Who Am I

- Lecturer in CS department since 2000
- Undergrad Stanford, MSCS RPI
- US Navy for 8 years, submarines
- 2 years Round Rock High School

What We Will Do Today

- Introductions and administrative details
- Discuss what computer science is
- Look at some examples of what computer scientists do

- I am participating in the College of Natural Science Faculty lunch program. Monday, 11:30 am - 12:30 pm I will be in Jester City Limits for lunch. Please join me.

Startup

- www.cs.utexas.edu/~scott/cs312/handouts/startup.htm
- Request CS department account – https://apps.cs.utexas.edu/udb/newaccount/
- Read the syllabus and look over the schedule.
- Explore the class web page
- Sign up for the class discussion group on Piazza
- Register iClicker (not on Blackboard)
Startup

- Software if working at home
- Practice It Account
- Get the textbook

Clicker Question 1

Which of these best describes you?
A. First year at UT and first year college student
B. First year at UT, transferring from another college or university.
C. In second year at UT.
D. In third year at UT.
E. Other

Graded Course Components

- clicker participation
  - 43 lectures with clicker, 1 point each: 43 points total
- Discussion section quizzes
  - 11 quizzes, 10 points each: 110 points total
- Programming projects
  - 12 projects, 1st 10 points, rest 20 points: 230 points total
- Two Midterms: 150, 200
  - 7 - 9 pm. Wednesday 10/2 and Wednesday 11/13
  - conflict? email me ASAP
- Final: 300 points, Day and Time TBD

Grades and Performance

- Final grade determined by final point total and a 900 – 800 – 700 – 600 scale
  - plusses and minuses if within 25 points of cutoff: 875 – 899: B+, 900 – 924: A-
- historically my programming 1 classes
- 72% C- or higher:
  - 33% A's, 26% B's, 13% C's
- 15% D or F
- 13% Q or W (drop)

Grades posted to Grade Center on Blackboard
Assignments

- Start out easy but get much, much harder
- Individual – do your own work
  - okay to share tests you write
- Programs checked automatically with plagiarism detection software
- Turn in the right thing - correct name, correct format or you will lose points / slip days
- Slip days
  - 6 for term, max 2 per assignment
  - don’t use frivolously

Succeeding in the Course

- Randy Pausch, CS Professor at CMU said:
  - "When I got tenure a year early at Virginia, other Assistant Professors would come up to me and say, 'You got tenure early!?!?! What's your secret?!?!?' and I would tell them, 'Call me in my office at 10pm on Friday night and I'll tell you.' "
  - Meaning:
    Some things don't have an easy solution.
    Some things simply require a lot of hard work.

Succeeding in the Course

- Whole course is cumulative!
- Material builds on itself
  - failure to understand a concept leads to bigger problems down the road, so …
  - do the readings
  - start on assignments early
  - get help from the teaching staff when you get stuck on an assignment
  - attend lecture and discussion sections
  - participate on the class discussion group
  - do extra problems (Practice It! http://practiceit.cs.washington.edu/)
  - study for tests using the old tests
  - study for tests in groups
  - ask questions and get help when needed

- Cannot succeed via memorization.
- The things I expect you to do are not rote.
- Learn by doing.
- If you are brand new to programming or have limited experience I strongly recommend you do lots and lots of practice problems.
  - practice it web site
Common Mistakes

- Not registering clicker at iClicker website
- Assuming final date and time already set
- Section number / unique id from UTDirect, not Blackboard
- Not turning in the correct thing on programming assignments
- Going to the wrong section

Course Materials and Procedures

- Software
  - can work in CS department microlab, 1st and 3rd floor of Gates, north wing (GDC)
  - login via CS account name and password
  - work on your own system if you wish
  - Java.
    - Web page has details under Software. - JDK 7.0
  - Optional IDE.
    - Recommended IDE is BlueJ or Eclipse, also free

Residential Halls Study Groups

Tutoring & group study for CNS majors:
- Intro Chemistry
  - including Organic
- Intro Math (Pre-Calculus and Calculus)
- Intro Biology
  - including Genetics
- Intro Computer Science

Convenient Locations and Times:
- Kinsolving & Jester West dorms
- Sunday - Thursday nights: 7:30 - 10:30 PM
- Questions? rhsg@cns.utexas.edu
- Website: http://cns.utexas.edu/community/resident-hall-study-groups

Programming is like Legos...
Legos and Programming

- With Legos and Programming you have a small number of primitives. (basic tools or pieces)
- But you build huge, elaborate structures out of those simple pieces.

A Brief Look at Computer Science

- This class, like most first classes in Computer Science, focuses solving problems and implementing those solutions as computer programs.
  - you learn how to program
- ... and yet, computer science and computer programming are not the same thing!
- So what is Computer Science?
What is Computer Science?

- Poorly named in the first place.
- It is not so much about the computer as it is about Computation.
- “Computer Science is more the study of managing and processing information than it is the study of computers.”
  - Owen Astrachan, Duke University
- learn to program
  - programming a key tool in later courses

Computer Programming and Computer Science

- Generally the first thing that is studied in Chemistry is stoichiometry.
  - Why? It is a skill necessary in order to study more advanced topics in Chemistry
- The same is true of problems solving / programming and computer science.

“What is the linking thread which gathers these disparate branches into a single discipline? ...it is the art of programming a computer. It is the art of designing efficient and elegant methods of getting a computer to solve problems, theoretical or practical, small or large, simple or complex.”
  - C. A. R. Hoare
- Sir Tony Hoare. Turing Award Winner. Inventor of the quicksort algorithm

“Programming is unquestionably the central topic of computing.

In addition to being important, programming is an enormously exciting intellectual activity. In its purest form, it is the systematic mastery of complexity. For some problems, the complexity is akin to that associated with designing a fine mechanical watch, i.e., discovering the best way to assemble a relatively small number of pieces into a harmonious and efficient mechanism. For other problems, the complexity is more akin to that associated with putting a man on the moon, i.e., managing a massive amount of detail.

In addition to being important and intellectually challenging, programming is a great deal of fun. Programmers get to build things and see them work... What could be more satisfying? “
  - John V. Guttag, Professor at MIT research in AI, medical systems, wireless networking
Computer Programming

- a skill and tool that are applied to all other areas of computer science
  - artificial intelligence, networks, cpu architecture, graphics, systems
    (programming languages, operating systems, compilers), security, and on and on ...
- We will be using solving problems and implementing solutions in a programming language called Java
- problem solving and computational thinking are key

What do Computer Scientists do?

- Computer Scientists solve problems
  - creation of algorithms
- Some examples
  - you
  - Kurt Dresner, Intersection Control
  - Austin Villa, Robot Soccer
  - Doug and Steve, the TRIPS processor

You!

- Encryption and Decryption
- Ever entered your credit card number to a website? game company?

After a Little Computation:

Apply some human smarts:
Kurt Dresner – Intersection Control

- Former PhD student in UTCS department
  - working at Google now
- area of interest artificial intelligence
- Multiagent Traffic Management: A Reservation-Based Intersection Control Mechanism
  - how will intersections work if and when cars are autonomous?
  - Simulator

Austin Villa – Robot Soccer

- Multiple Autonomous Agents
- Get a bunch of Sony Aibo robots to play soccer
- Problems:
  - vision (is that the ball?)
  - localization (where am I?)
  - locomotion (I want to be there!)
  - coordination (I am open! pass me the ball!)
- http://www.cs.utexas.edu/~AustinVilla/
- Video Video2

Doug and Steve

- Doug Burger and Steve Keckler
  - and many, many others ....
- TRIPS
  - what has happened to processor speeds the past 5 years?
  - what is a super computer?

- http://www.cs.utexas.edu/users/cart/trips/

The Trips Chip Prototype
Google Trends

- [http://www.google.com/trends](http://www.google.com/trends)
- Try these:
  - computer science
  - britney spears
  - computer science brittany spears
  - computer science, britney spears
  - binary search tree
  - recursion
  - linked lists, binary search tree
  - AP
  - super bowl

Goolge N Grams

- [http://books.google.com/ngrams](http://books.google.com/ngrams)