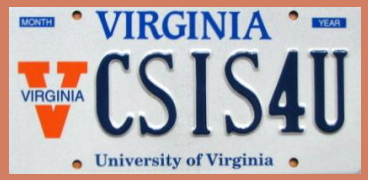
Chrestomathics

Jim Cohoon
Joanne McGrath Cohoon

www.cs1x.info

NSF BPC-DP grant 073925

Rethinking CS1



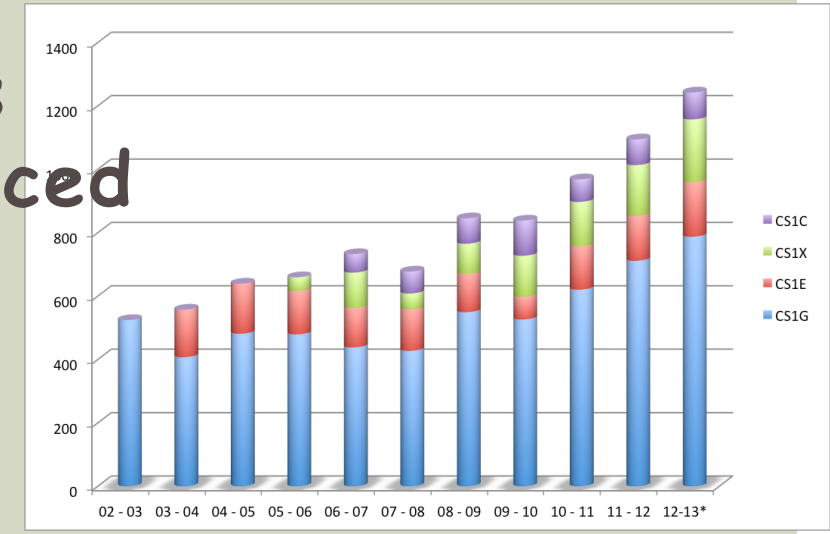
Executive Summary

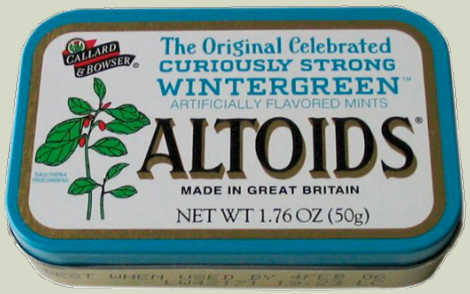
CS1 that attracts and retains diverse students in computing

- Under-represented minorities routinely match demographics
- Women's percentages rose from 12% to 18%
    - Peer university women's percentage near 12%

The curious course CS 1

- Intro to programming for all Engr students
- Enrollment more than doubled over last ten years
- Range of experience
  - Women and minorities usually least experienced

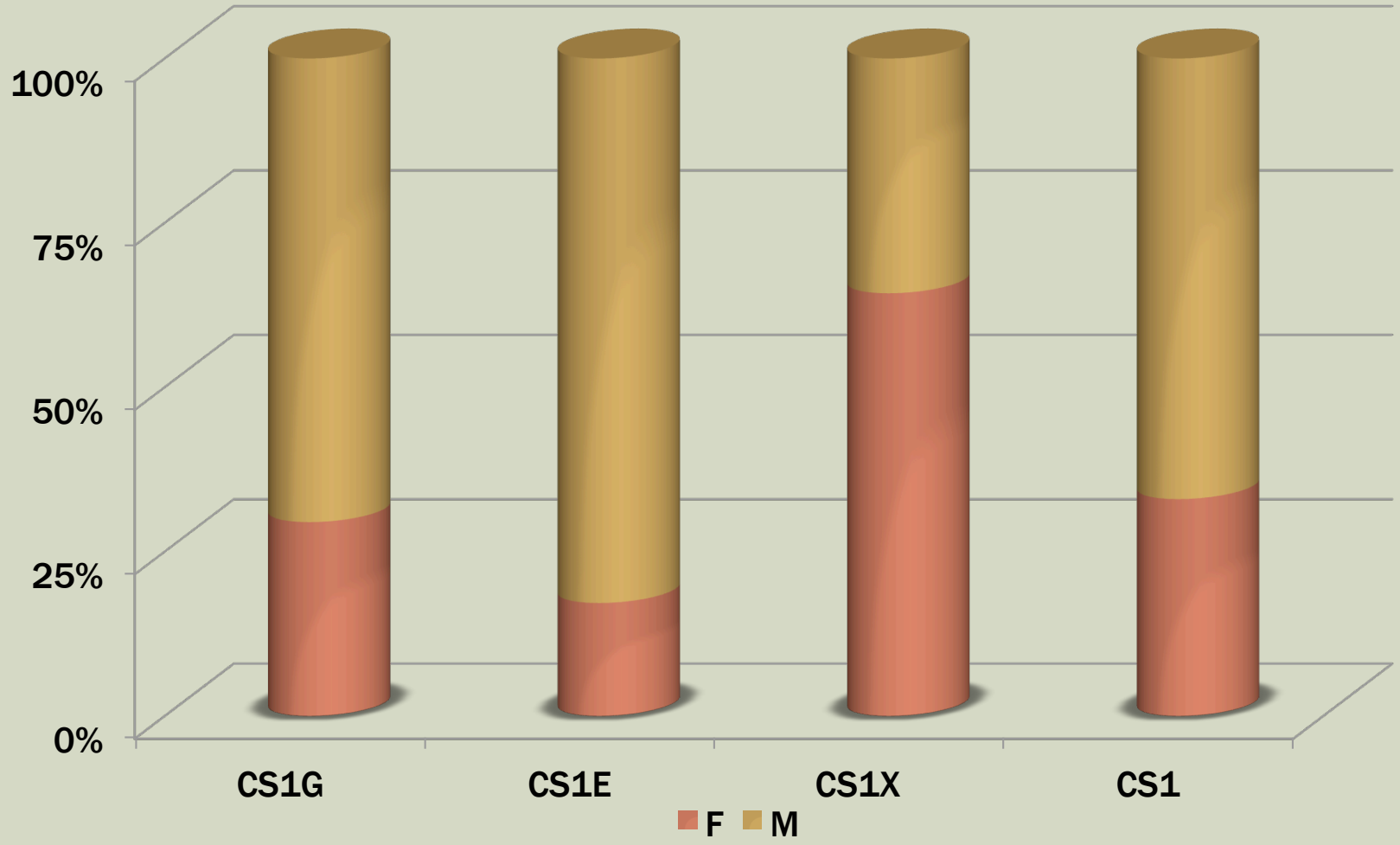




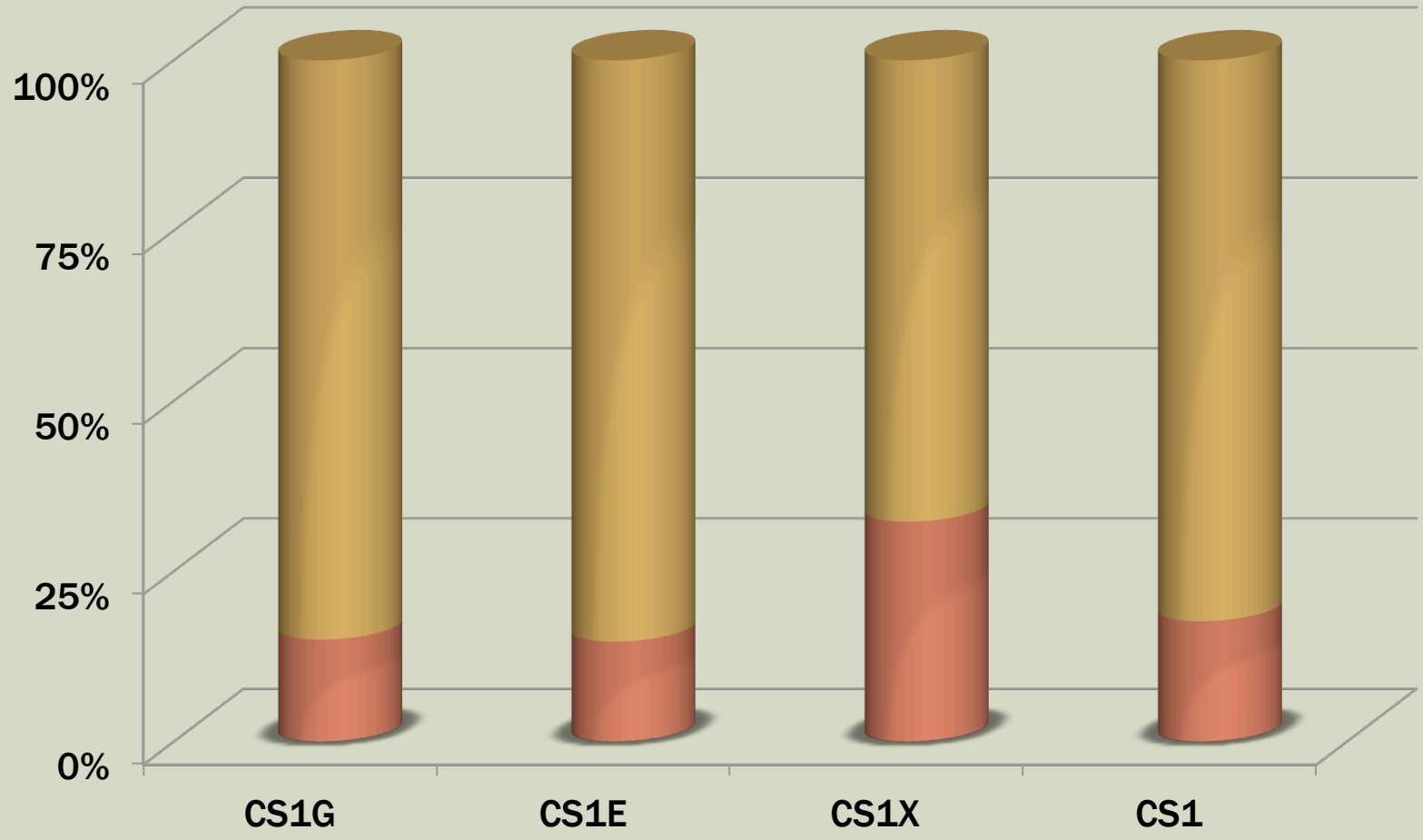
Multiple pathways

- CS1G – open to all
- CS1E – open to experienced
- CS1X – open to inexperienced
- CS1C – computational thinking for A & S

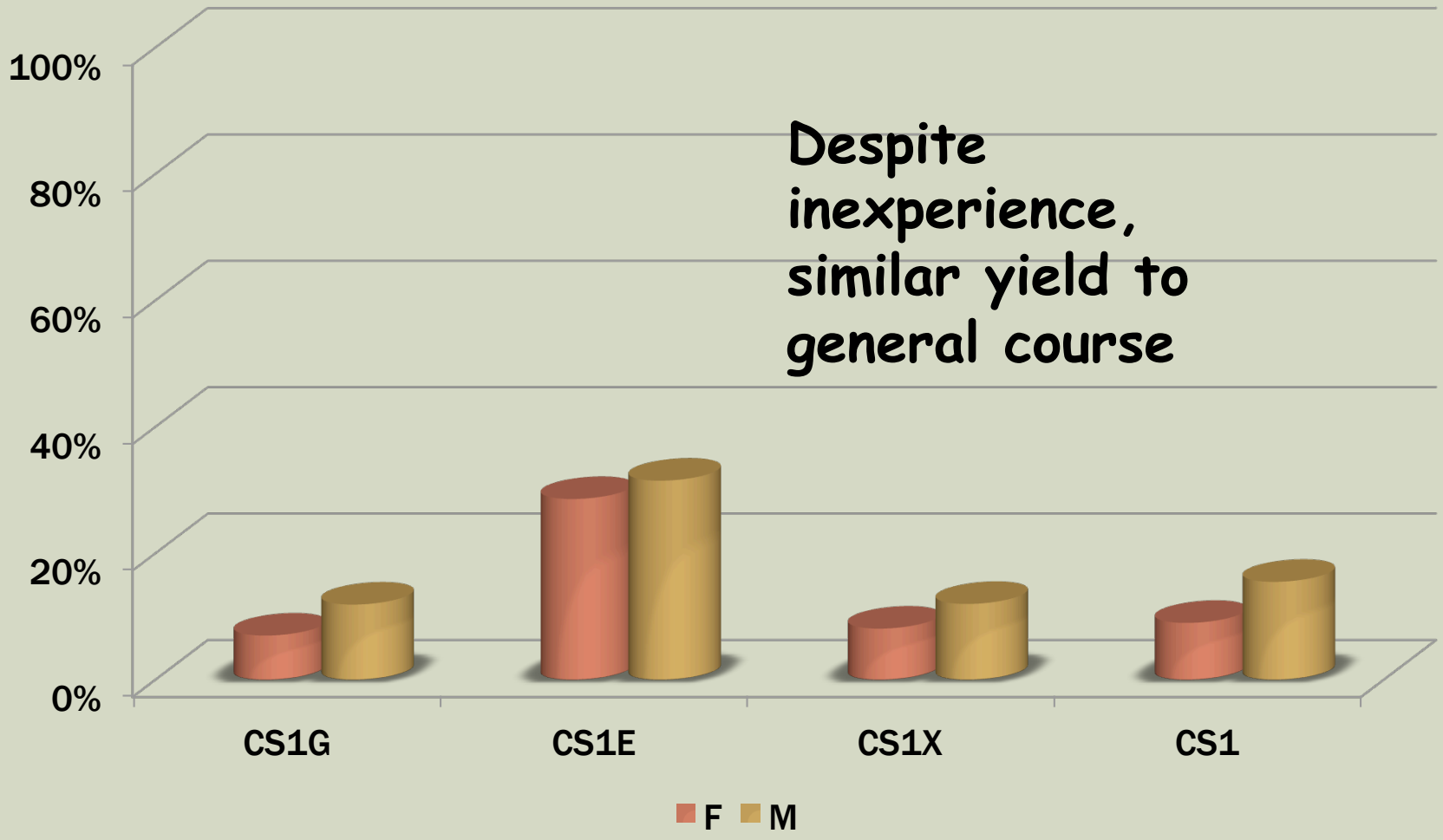
UVA CS1 Enrollments by gender



UVA CS1 Enrollments by Ethnicity



UVA COMPUTING MAJOR YIELD BY GENDER



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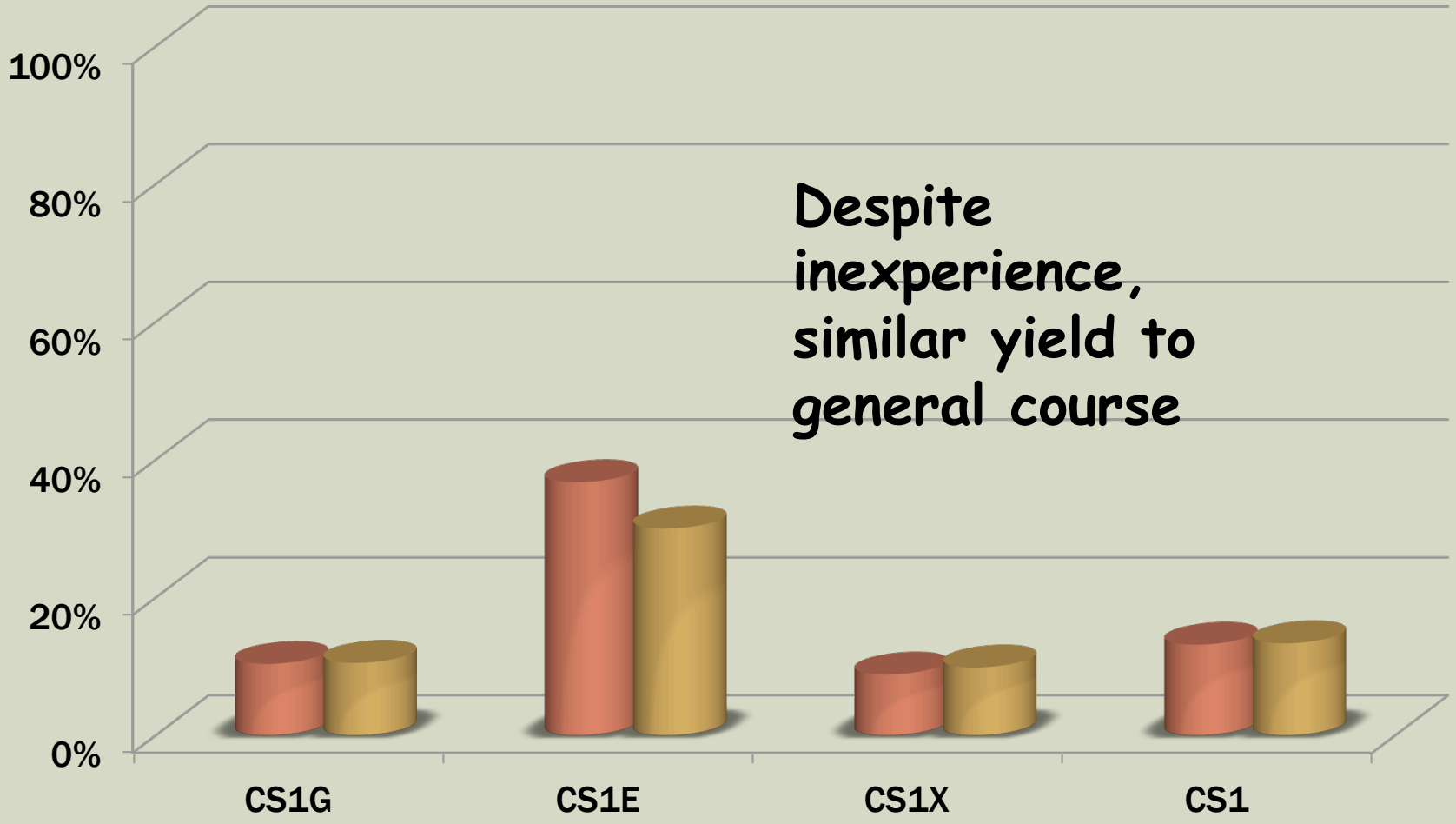


CS1X Achievement & Persistence

Performance on first exam CS 2

More than 90% retention to graduation

- An ABD in CS at Vanderbilt
- Leadership roles

Course designed to promote

Interest

Confidence

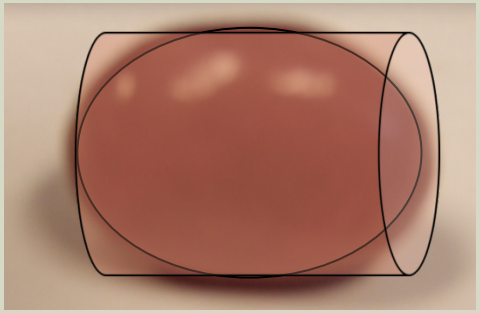
Belonging

Identity

Ignite students' interest

CS1X – CHRESTOMATHICS

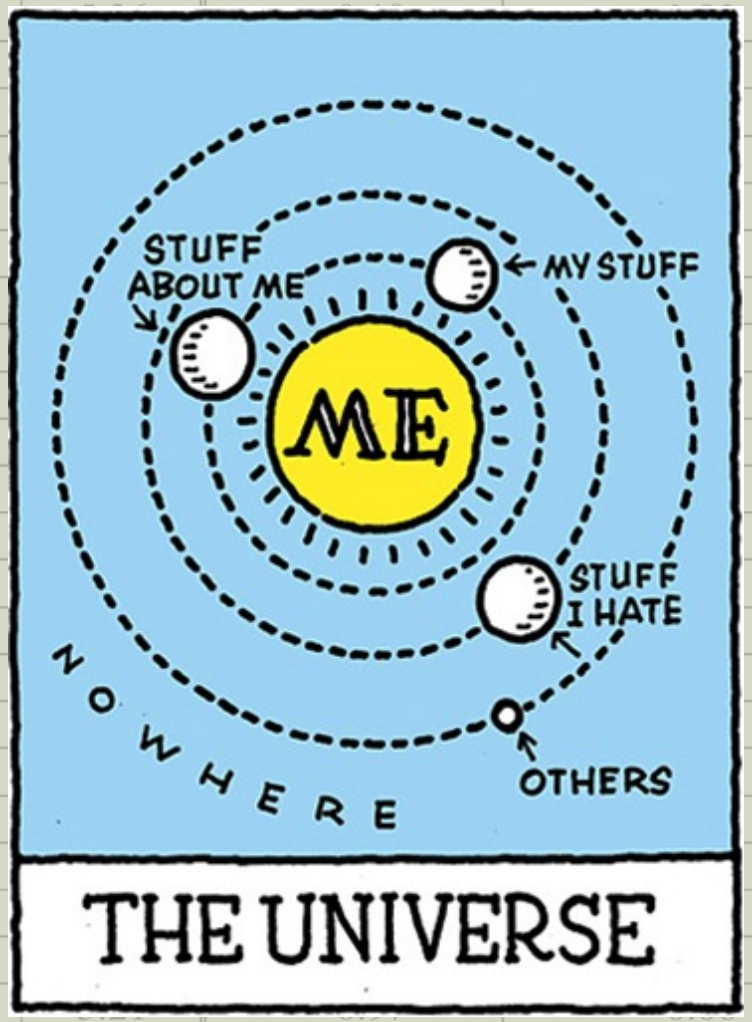
Study and application of useful things and processes



$5 \cdot \pi \cdot a \cdot b \cdot c \,/\, 24$

Mutual interest

5.71	Encryption
5.50	Instant messaging
5.50	Password security
5.39	Engineering
5.38	Card games
5.33	Virus protection
5.21	Fractals
5.21	Predator-prey
5.21	Smart appliances
5.17	Music player
5.17	Connect four
5.04	Daily jumble
5.04	Medical diagnosis
5.04	Photo manipulation
5.04	Science applications
5.00	Routing



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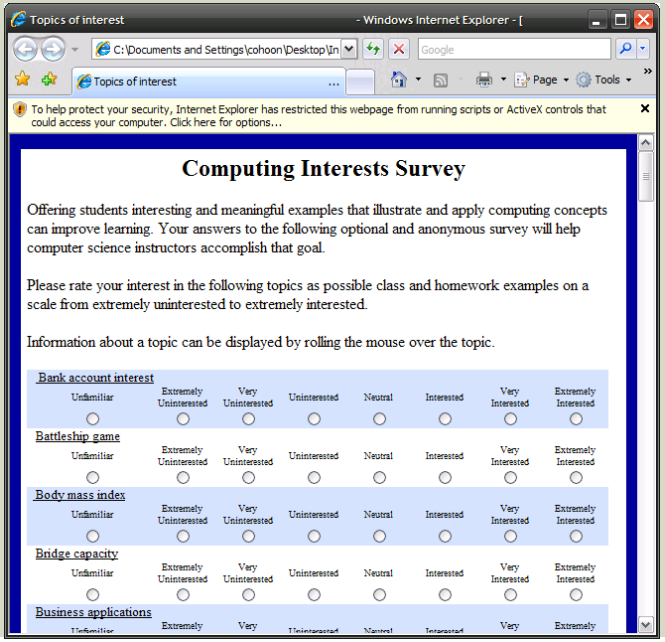
Sudoku
Connect four
Language translation
Personality typing
Daily Jumble
Tic-Tac-Toe



Messages that spark interest

Inform and demonstrate

- Flexibility: industry, geography
- Socially relevant
- Work with others
- Job projections
- High salaries
- Satisfied professionals

Build Students' Confidence

Successes

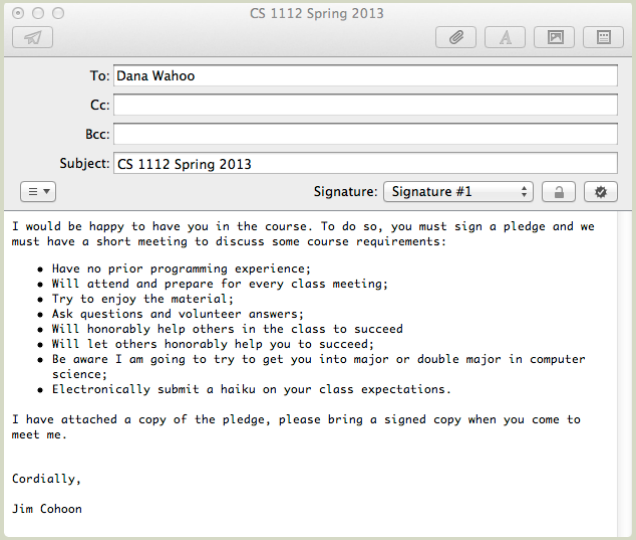
- Pedagogy

Encouragement

Peer role models

CS 1X – MEANS

- Active and collaborative learning
- Guided discovery
- Integrated lab – instructor and TAs always there
- Regular acknowledgement
  - Culture of success
- Encouraging pedagogy and examples



CS 1112 Spring 2013

To: Dana Wahoo

Cc:

Bcc:

Subject: CS 1112 Spring 2013

Signature: Signature #1

I would be happy to have you in the course. To do so, you must sign a pledge and we must have a short meeting to discuss some course requirements:

- Have no prior programming experience;
- Will attend and prepare for every class meeting;
- Try to enjoy the material;
- Ask questions and volunteer answers;
- Will honorably help others in the class to succeed
- Will let others honorably help you to succeed;
- Be aware I am going to try to get you into major or double major in computer science;
- Electronically submit a haiku on your class expectations.

I have attached a copy of the pledge, please bring a signed copy when you come to meet me.

Cordially,

Jim Cohoon

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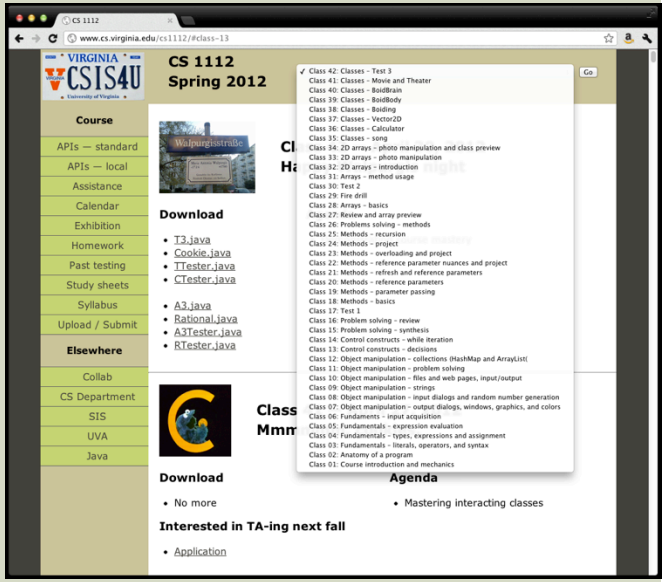

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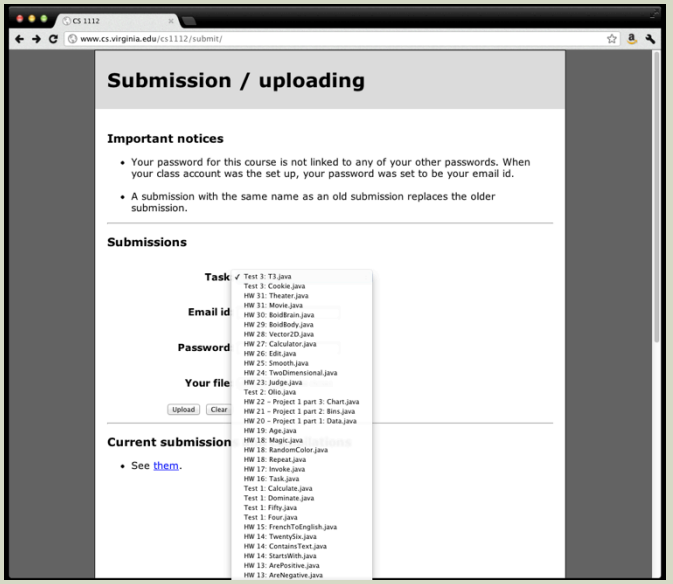

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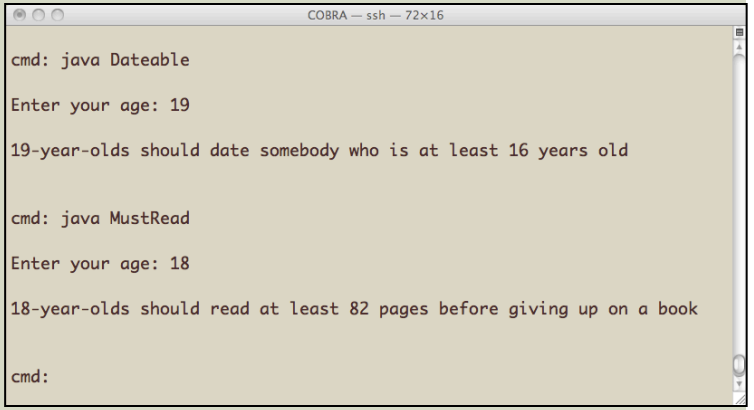

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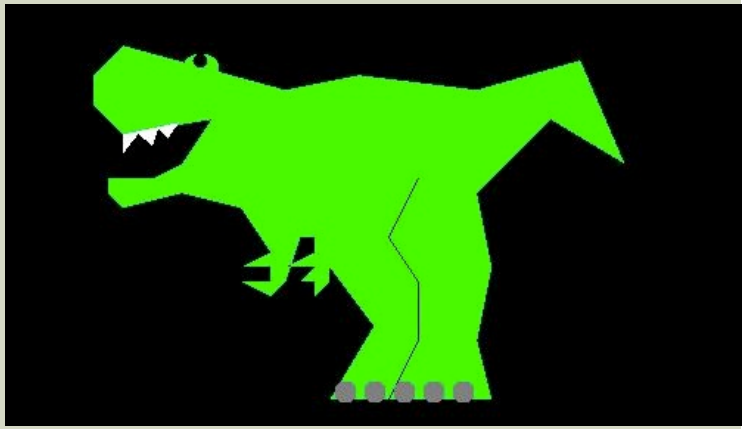

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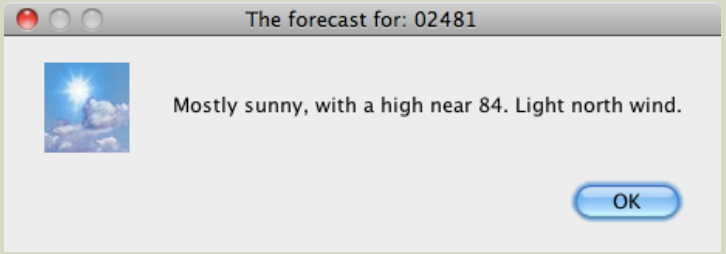

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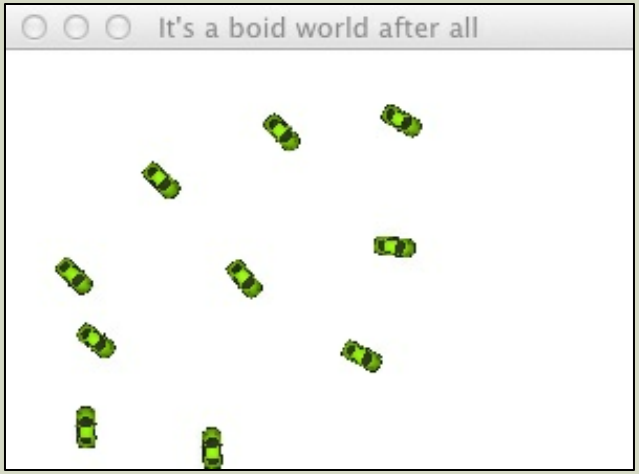

Promote belonging

These are my peeps

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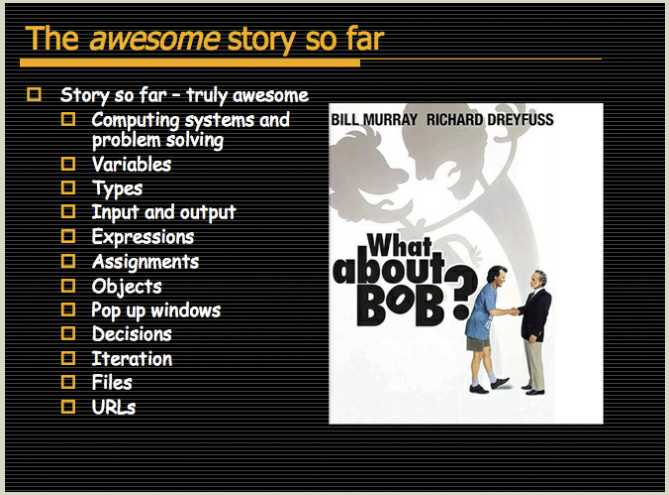

INCLUSIVE LANGUAGE

Identity

Try on the role of a computing person

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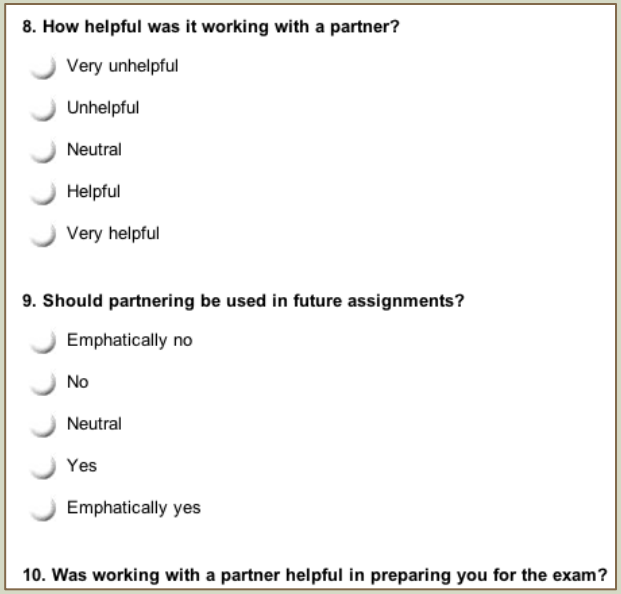

8. How helpful was it working with a partner?

- Very unhelpful
- Unhelpful
- Neutral
- Helpful
- Very helpful

9. Should partnering be used in future assignments?

- Emphatically no
- No
- Neutral
- Yes
- Emphatically yes

10. Was working with a partner helpful in preparing you for the exam?

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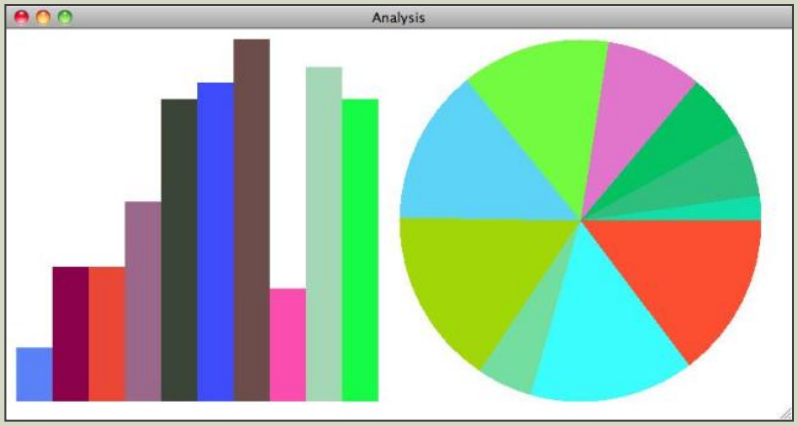

CS1X – www.cs1x.info

- Attractive to under-represented groups
- More likely to choose computing
- Attraction comparable to demographics
- Brought up to comparable levels
- More than comparable persistence to graduation

Other contributors and resources

Luther Tychonievich
Mary Lou Soffa

www.cs1x.info

NSF BPC-DP grant 073925

TAG PROJECT – TAPESTRY FOR ALL

Tapestry 3-day summer workshop geared for HS CS teachers and educators who want expand CS instruction

Workshop components

- Demonstrate effective CS pedagogical practices for all students
- Recruiting strategies
- Provide materials that attendees can use to influence their schools and districts

BeanCount.java

```
public class BeanCount {
    public static void main( String[] args ) {
        Scanner stdin = new Scanner( System.in );

        System.out.print("Enter jelly bean length (cm): ");
        double a = stdin.nextDouble();
        System.out.print("Enter jelly bean width (cm): ");
        double b = stdin.nextDouble();
        System.out.print("Enter jelly bean height (cm): ");
        double c = stdin.nextDouble();
        System.out.print("Enter jelly bean loading factor (%): ");
        double loading = stdin.nextDouble();
        System.out.print("Enter jar size (mL): ");
        double jar = stdin.nextDouble();

        int count = (int) ( jar * loading / ( 5 * Math.PI * a * b * c / 24 ) );
        System.out.println("beans: " + count);

    }
```