CONTEXTS OF COMPUTING EDUCATION

Deepak Kumar
Bryn Mawr College
dkumar@cs.brynmawr.edu

The Big

"I think there is a world market for about five computers."

—*Thomas J. Watson, 1943*
(Chairman of the Board of IBM)

The Big

"…over 1 billion PCs in use today."

—*The Economist,*

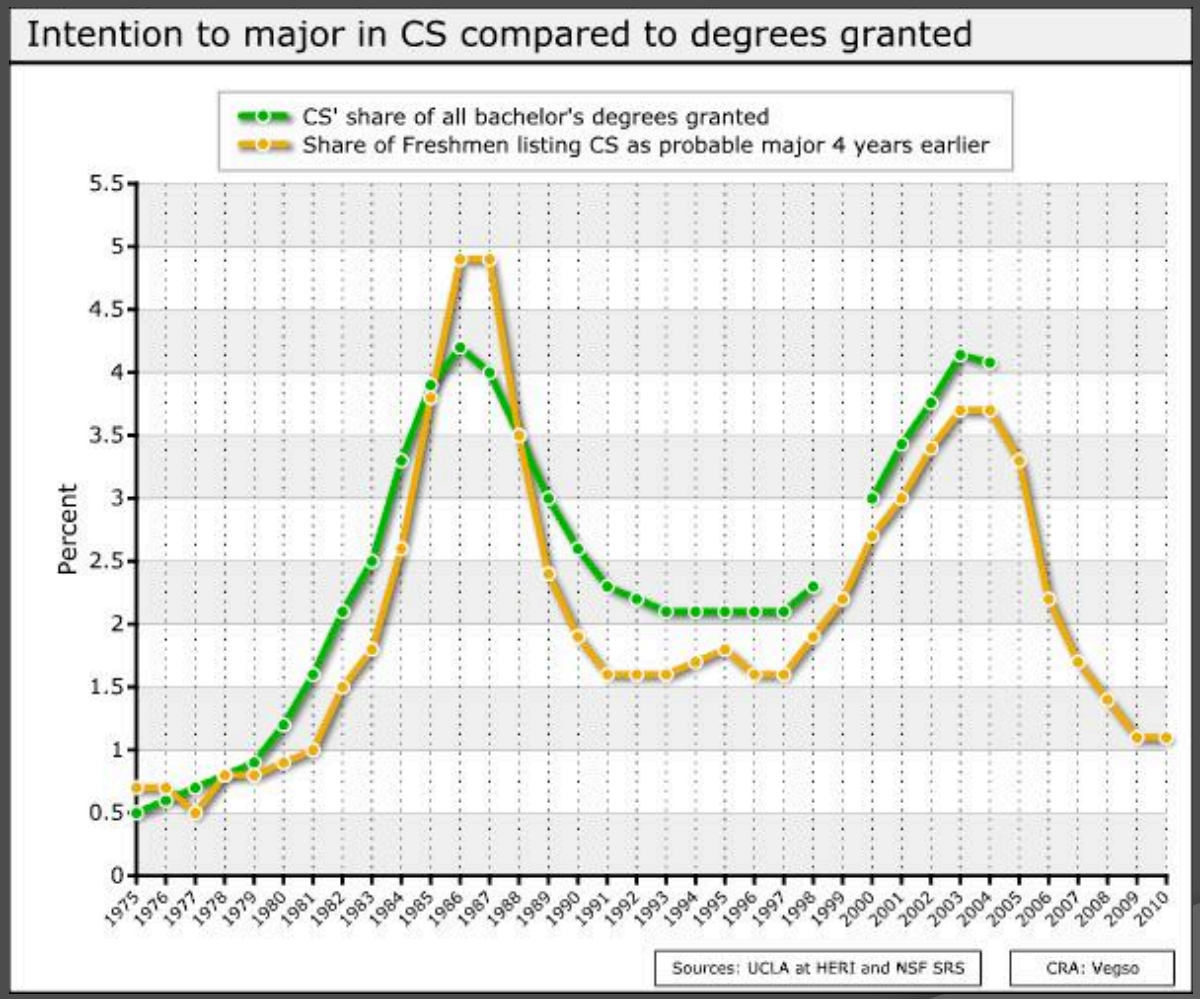
June 28-July4, 2008.

The Big

"Today, there are more computers than people on your campus."

— Deepak Kumar, 2007.

Educational Context: Interest



From: Freshmen Interest in CS and Degree Production Trends, CRA Bulletin, 10/1/2007.

Perspective: CS as a

- Goal: To produce women who have a full grasp of modern technology, the role it plays, and its implications in society, regardless of their discipline of study.
- Implication: CS has emerged beyond its traditional perception as a subset of Math and Engineering to the very core of a liberal arts education.

Curriculum Design

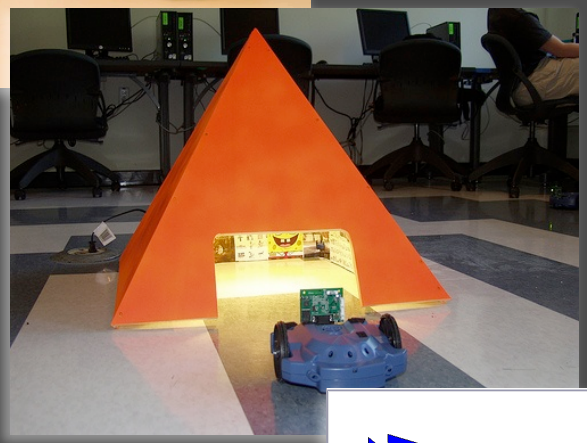
- Less prescriptive
- More student-centered
- More interdisciplinary electives
- Flat pre-requisite structure

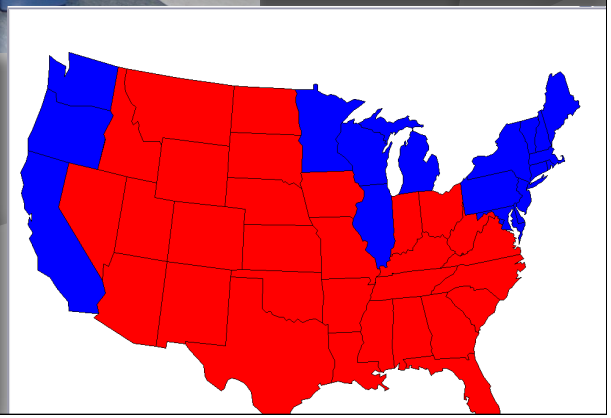
X + CS

- **Minor in Computational Methods**
- Accessible to *any* student on campus
- 4 CS courses (CS1, CS2, Disc. Math, +1)
  2 computational courses outside CS
- Requires buy-in from Dept. X!

Computing Contexts in CS1 &

- Robots
- Multimedia
- Visualization
- Games
- Social Networking
- Others





Contextual Courses

- CS1 with Robots & Multimedia
  IPRE initiative www.roboteducation.org

  Seven course offerings at Bryn Mawr and GeorgiaTech since Spring 2007

- CS1 with Visualization
  Two course offerings (2006, 2008)

- Elective on Game Design & Programming
  Included non-majors (2006, 2008)

Contextual Approaches to CS1

- Contexts make learning experience more engaging and exciting
- Still learn core CS concepts
- View CS as a type of logic and problem solving; requiring patience and thought
- Discover that CS is applicable to the real world

Gender Issues

- Differences in male and female interests
- Inherent obsession for speed & efficiency
- Social relevance of computing/software
- Introducing gaming into the curriculum has a real danger of discouraging female enrollment
- Significant student frustration over software and tools

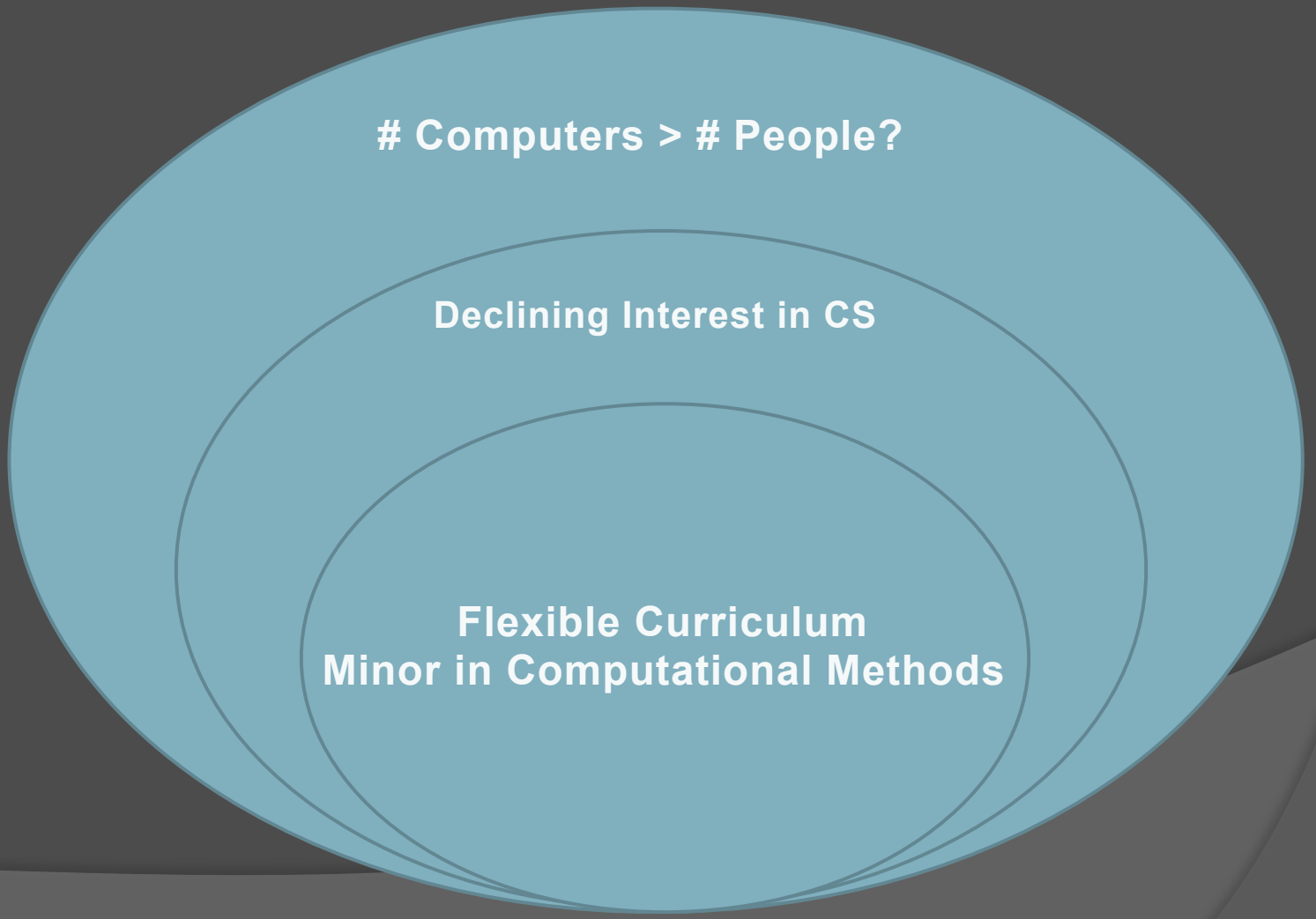
Contexts of Computing

Computers > # People?

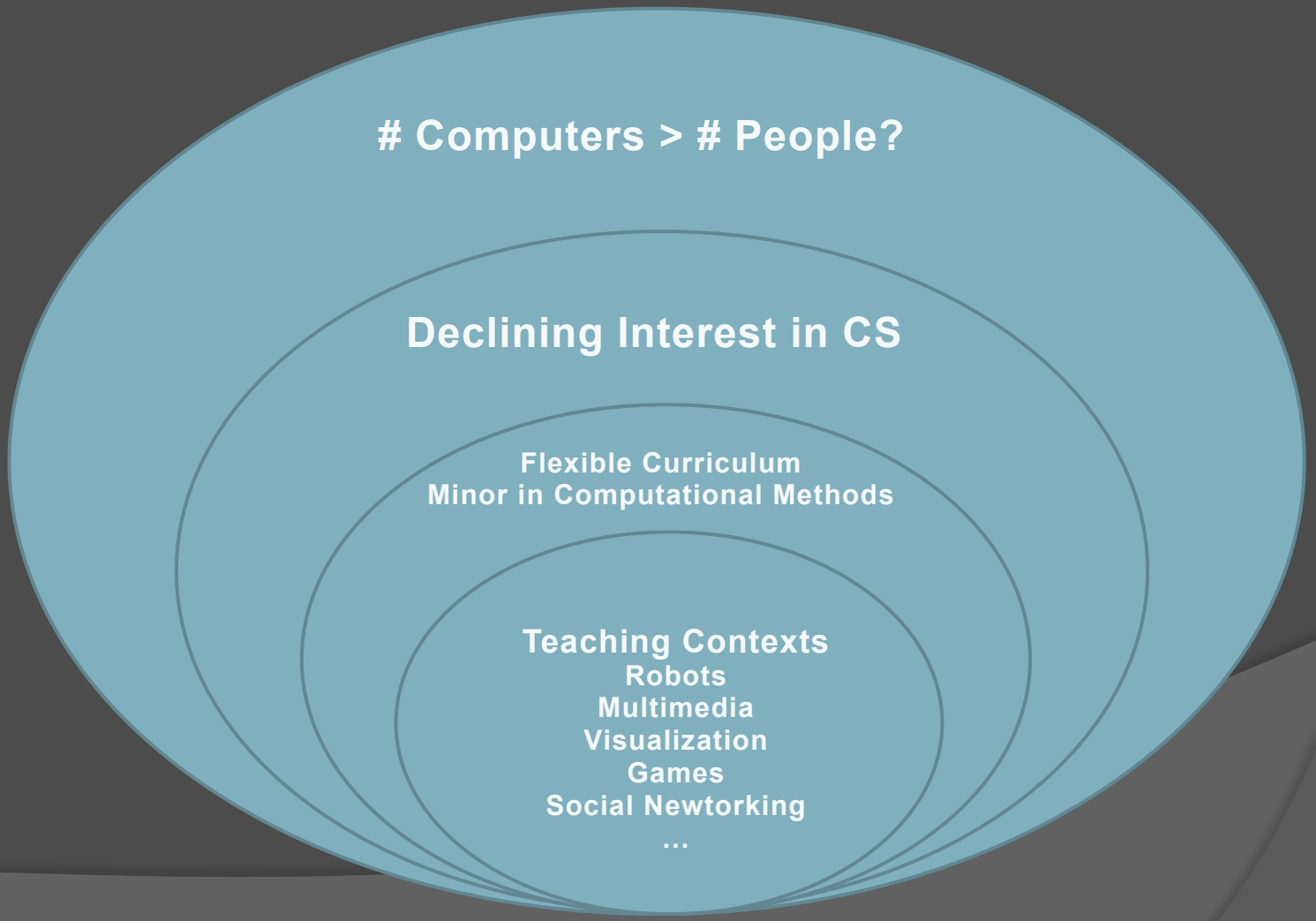
Computers > # People?

Declining Interest in CS

Contexts of Computing



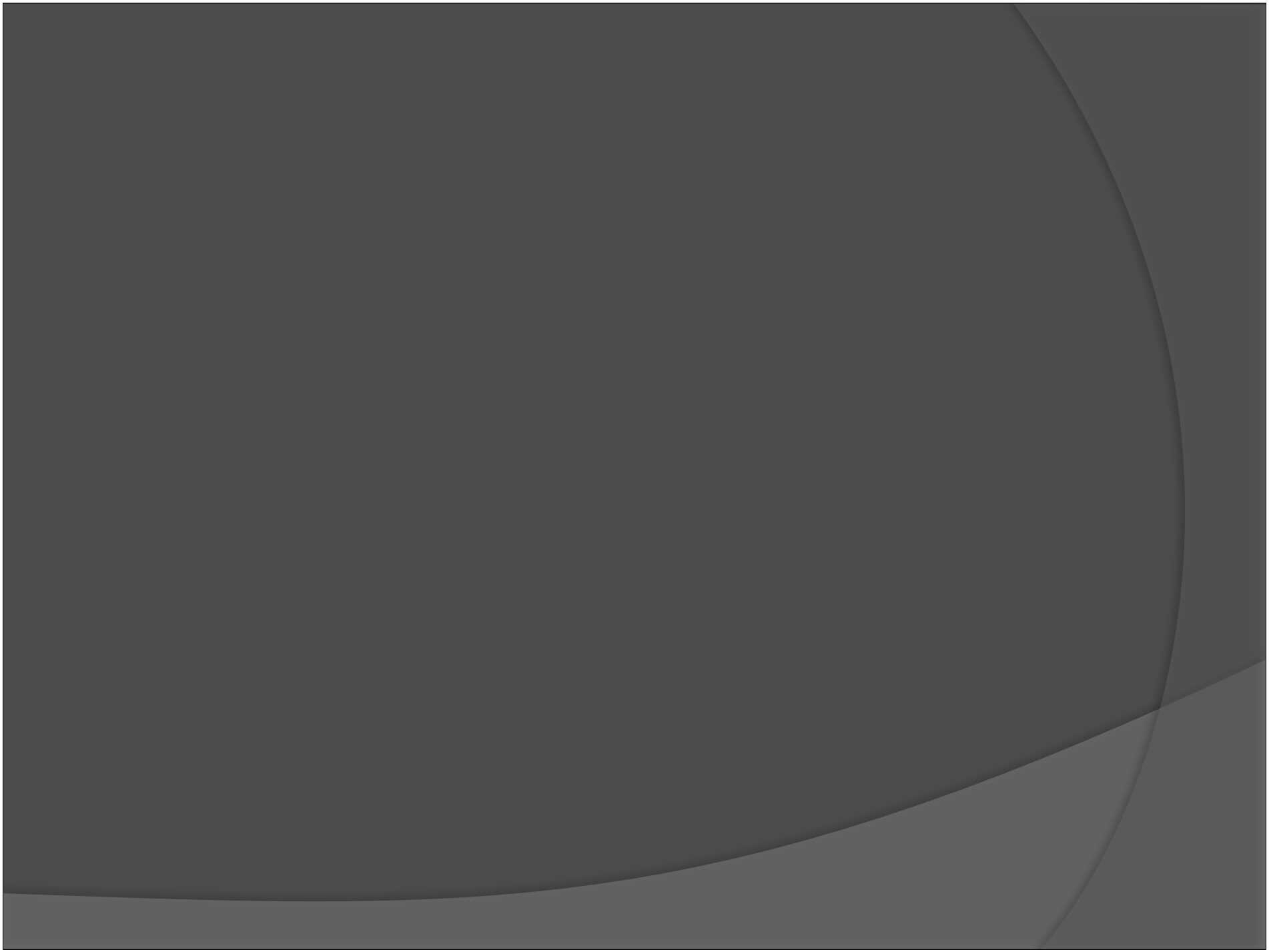
Contexts of Computing



Other important

- CS != Programming
- Computing as a medium for creativity
- Computing as a social activity
- Performances *vs* Competitions
- Nature of examples, assignments, projects
- Create accessible, engaging environments for new, diverse population of students

Example CS1 Exercise

Example Elective

- Computational Models
- Computational Linguistics
- Emergence
- Game Design & Programming
- Search Engines and Information Retrieval
- Geographical Information Systems
- Recent Advances in CS (topics vary)