IN4MATX 148: Ubiquitous Computing Prototyping and Projects

Week 5: Design Crit 3, Animated sequence, Location-aware systems

30 April 2012
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On Deck for Tonight

- Part I: Design Crit 3
- Part II: Animated Sequence
- Part III: Location-aware systems
  - *Your Exercise for the Week*
- Part IV: Group Project poster session

Course Logistics

- Hybrid & physical sketches exercise (2) graded
  - *Opportunity to play with* weight *and* scale
  - Submissions need to be evident to the grader!
- Storyboard exercise (3) due at the end of tonight's crit
  - *Graded and available for pick-up by Thursday morning*
- Group Projects: Poster session later tonight
  - *Informal but professional presentations of your work*
- EEE is up-to-date (includes initial participation scores)
- NO LECTURE NEXT WEEK
- Questions? Comments? Concerns?

Part I: Design Crit 3

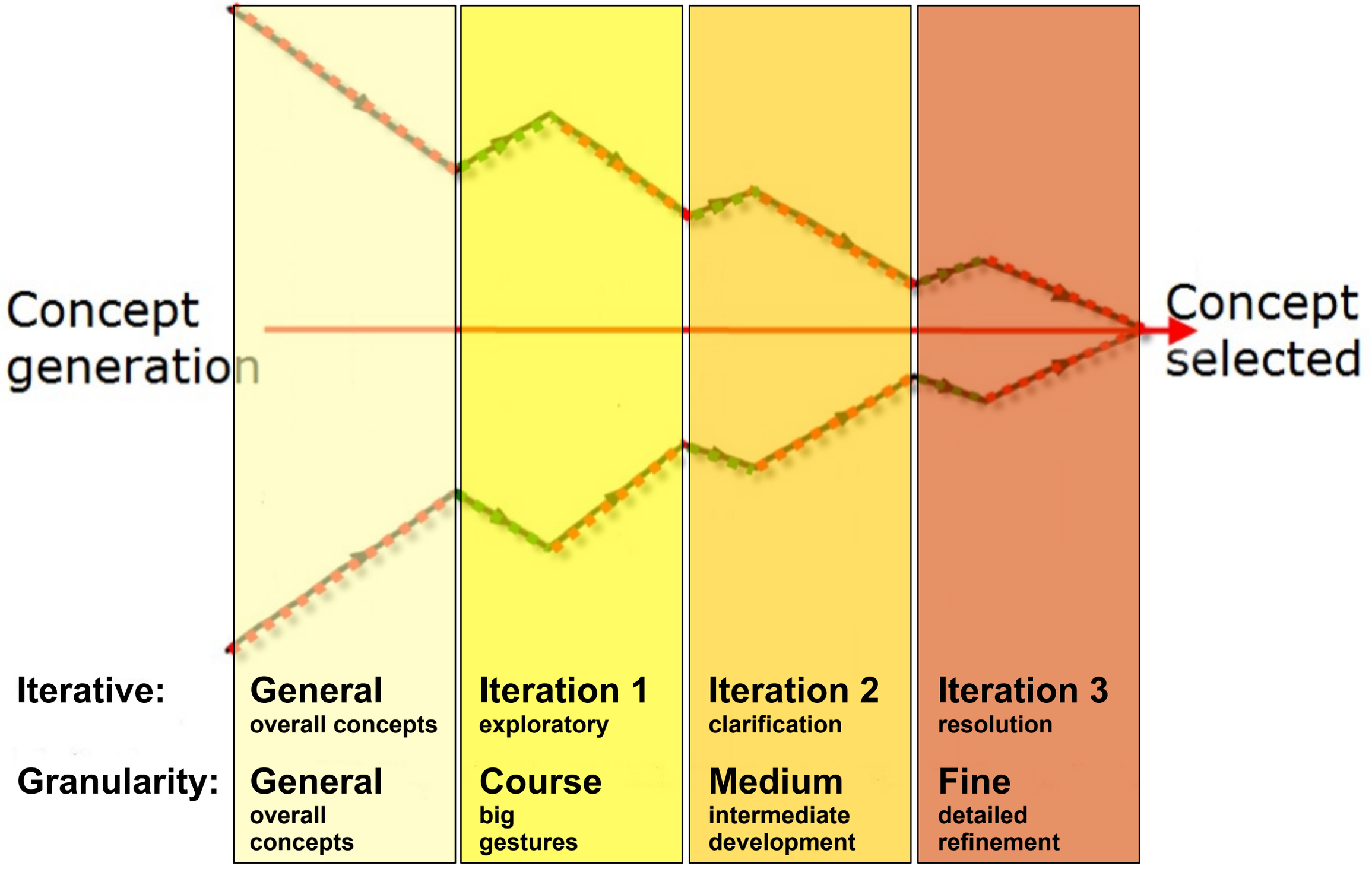
Design Crit 3

- Presenters, explain by introducing: *~ 3 minutes*
  - What you produced and why
  - How you imagine the technologies would be used
  - What is novel about the idea
    (what boundaries are being pushed?)
- Critics, constructively interrogate the work: *~ 4 minutes*
  - *What is going on?*
  - *What is the flow of the interaction?*
  - *What can be changed to make it more original?*
- (Politely) Push to make the designs clearer, stronger!

Part II: Animated Sequence

based on

Remember the Design Funnel



From Buxton. Modified from Pugh, S. (1990) Total design: Integrated methods for successful products engineering. Addison-Wesley. P. 75

From Sketches to Prototypes

Early design

Brainstorm different ideas and representations

Choose a representation

Rough out interface style

Task centered walkthrough and redesign

Fine tune interface, screen design

Heuristic evaluation and redesign

Usability testing and redesign

Limited field testing

Alpha/Beta tests

Multitude of sketches

Sketch variations and details

Sketch or low fidelity prototypes

Low to medium fidelity prototypes

High fidelity prototypes

Working systems

Late design

http://pages.cpsc.ucalgary.ca/~saul/wiki/uploads/HCILectures/Pres-581-SketchMethods-SlideShows-part1.ppt

Part III: Location-Aware Systems

based on Hazas, Scott & Krumm (2004, Feburary). Location-Aware Computing Comes of Age. *IEEE Computer 37* (2), 95–97.

Situating Location Awareness

- Sub-genre of context-aware computing
- Sensing and reacting to dynamic environments
- Focused on *determination of physical location*
- Major questions:
  - Accuracy
  - Coverage
  - Frequency of location updates
  - Cost of installation and maintenance
  - *Battery consumption*

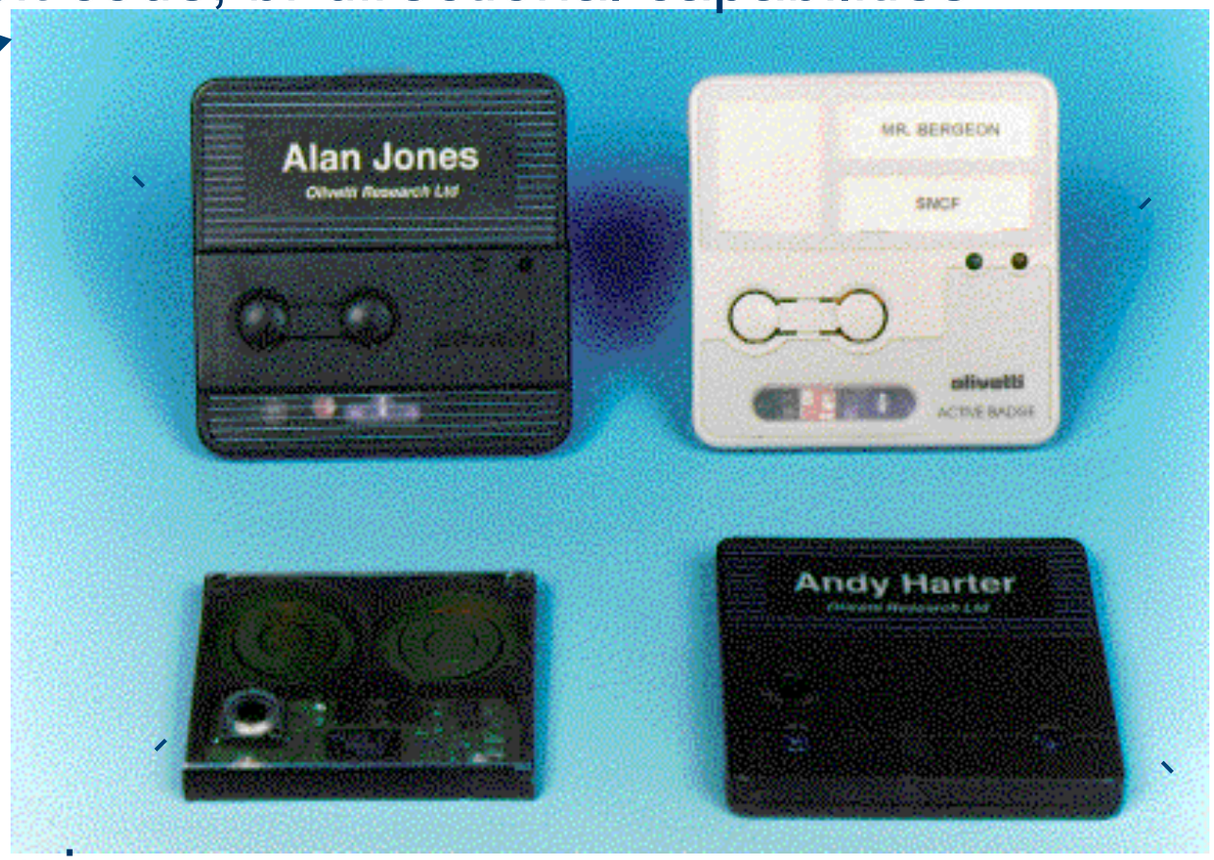
Accuracy

- Coarse-grained (rooms, accuracy in meters)
  - GPS (dGPS improves accuracy)
    - Only works well outdoors
    - “Canyons” cause signal loss problems
  - Infrared
    - Room-scale location ID (e.g., Active Badges)

Olivetti Active Badges (1989–1992)

The third, current version
With a 48 bit code, bi-directional capabilities

On-board 87C751 microprocessor



The first version
With a unique five bit code

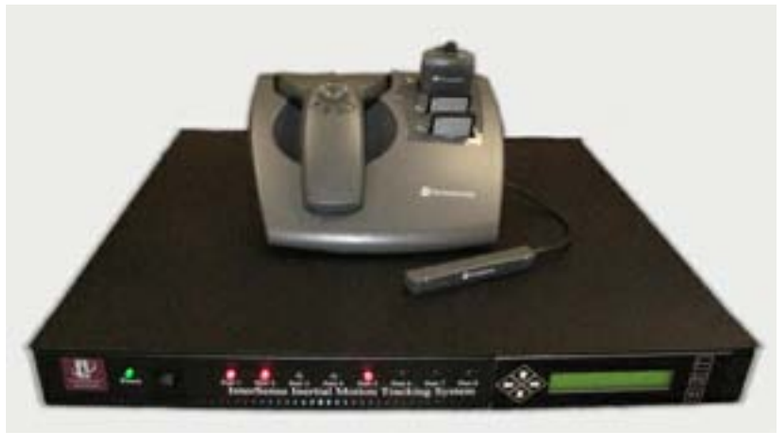
The second version
With a ten bit code

Accuracy

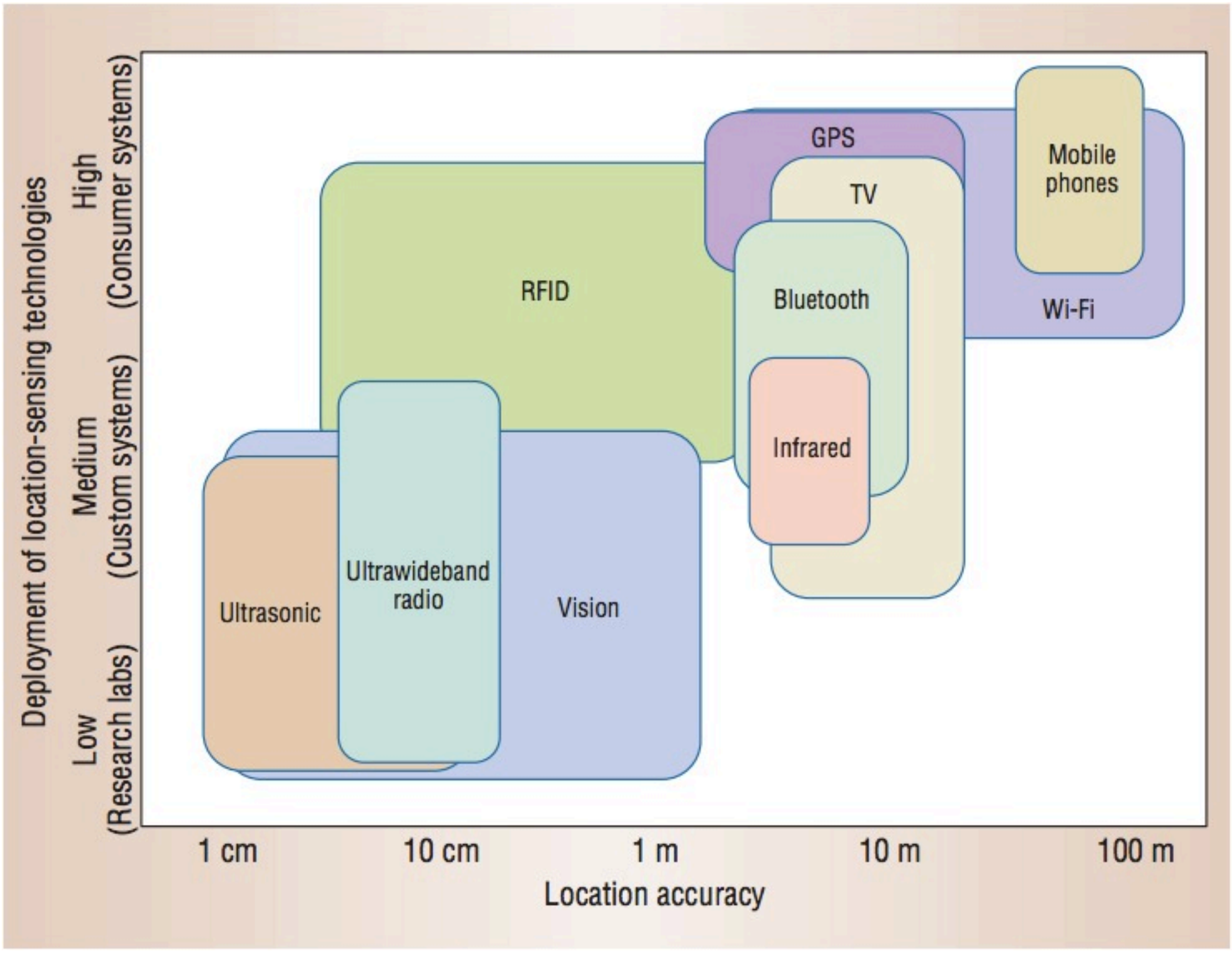
- Coarse-grained (rooms, accuracy in meters)
  - GPS (dGPS improves accuracy)
    - Only works well outdoors
    - “Canyons” cause signal loss problems
  - Infrared
    - Room-scale location ID (e.g., Active Badges)
  - RF triangulation
    - Wi-Fi access points, signal strength (~100m)
    - Bluetooth object presence, signal strength (~10m)
    - RFID tags (induction/radio range) (~10m)

Accuracy

- Fine-grained systems (accuracy in centimeters)
    - Ultrasound *(think sonar!)*
        - can be combined with intertial trackers (dead reckoning systems) to improve accuracy futher
    - Magnetic fields
    - Computer vision
    - Ultrawideband radio



Location-Awareness Coverage/Availability

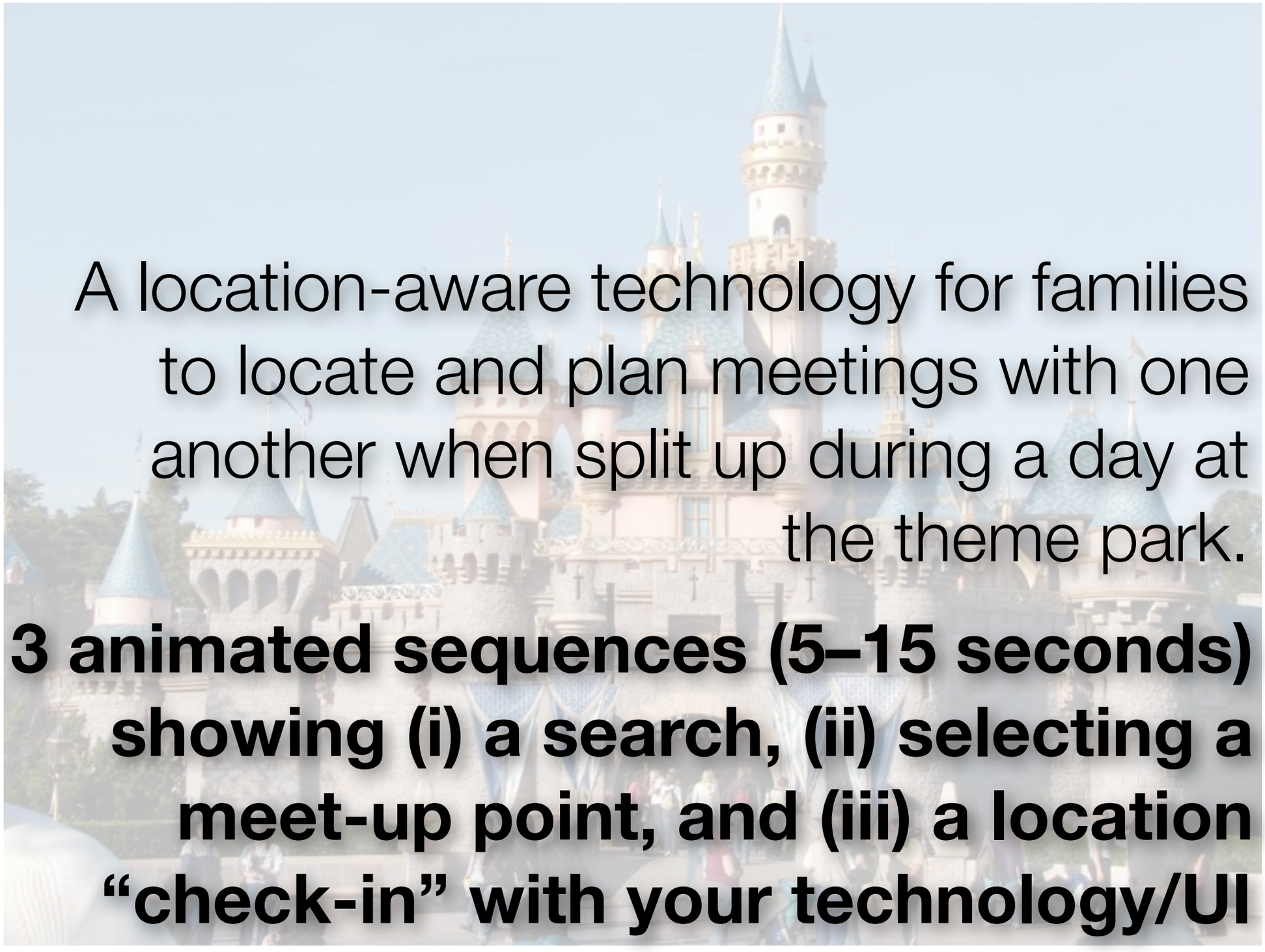


Abstracting Location

- Combine multiple technologies and *fuse* then together
  - Can select different data sources in different contexts
  - Can improve accuracy of any single data source
  - Use machine learning techniques (Bayesian inferencing, Kalman filters, HMMs, dynamic Bayes nets, particle filters) to deal with uncertainty
- Representations of place
  - Coordinates?
  - Address?
  - Relative location/distance?

Issue: PRIVACY

YOUR EXERCISE FOR THIS WEEK



Part IV: Project Group Poster Session

Group Project Poster Session Guidelines

- Each group divide in half: two 30-minute sessions
- Presenters, explain by introducing:
  - What you produced and why
  - How you imagine the technologies would be used
  - What is novel about the idea
    (what boundaries are being pushed?)
- Non-presenters, visit each of the other posters:
  - *What is going on?*
  - *What is the flow of the interaction?*
  - *What can be changed to make it more original?*

IN4MATX 148: Group Project Mid-term Presentation

Group Name:

Group Members:

Group Member Attendance/Participation	**Subtotal:**	**/ 30**
Visual Presentation (Sketch Board)		
Quality of sketches presented (aesthetics)		/ 15
Communicative effectiveness of sketches		/ 15
Organization of sketch board (clarity of presentation)		/ 15
Diversity of ideas represented (demonstrated breadth/experimentation)		/ 15
Progression/refinement of ideas/concepts illustrated (demonstrating forward progress)		/ 15
	Subtotal:	**/ 75**
Oral Presentation (Q&A)		
Clearly articulate design problems/constraints		/ 15
Provide reasonable justifications for design choices represented in sketches		/ 15
Provide reasonable justifications for prototyping techniques utilized		/ 15
	Subtotal:	**/ 45**
Overall Score	**Total Points:**	**/ 150**


16
14
12
11
10
9
8
8
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DOOR

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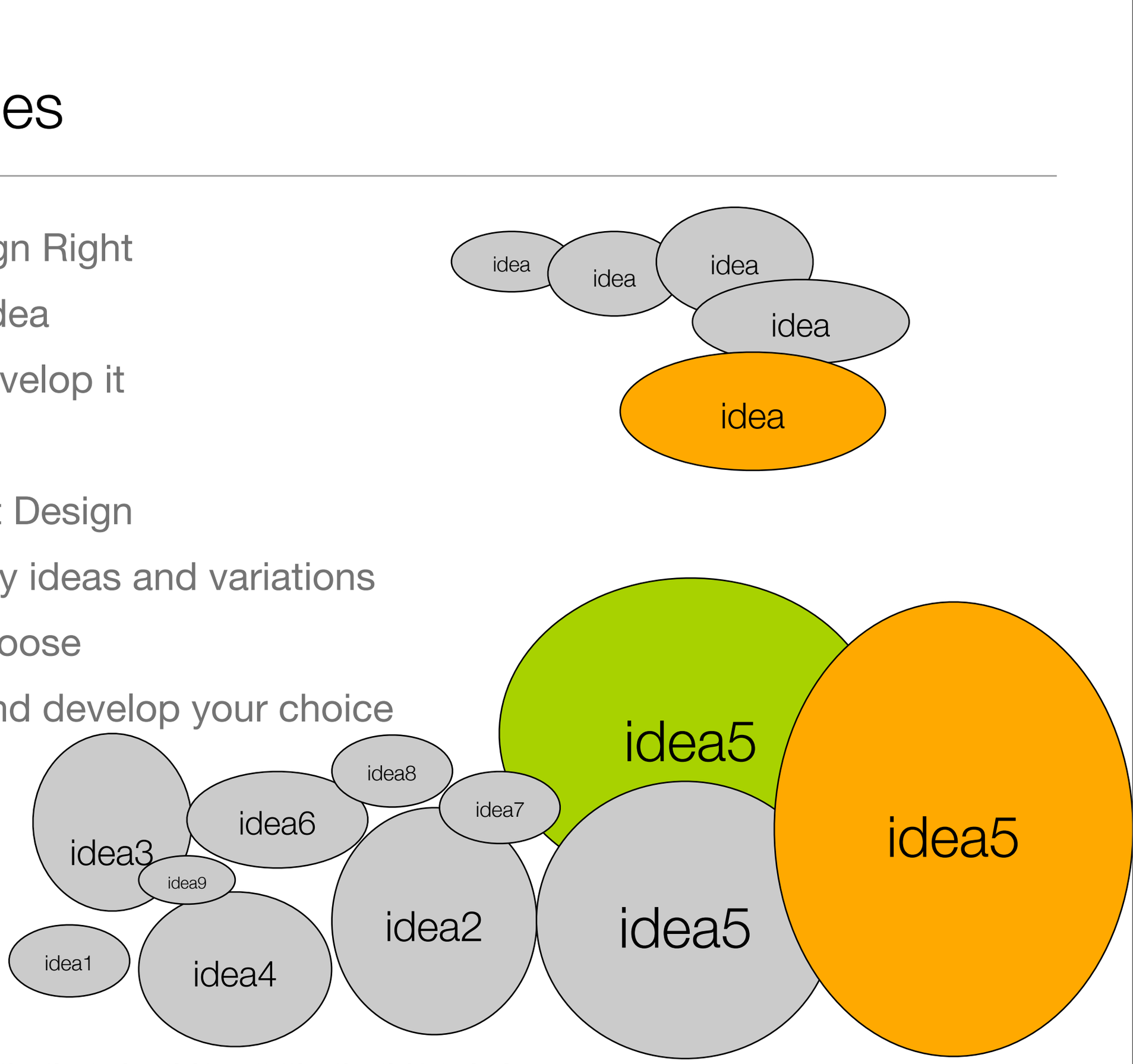
Next Week

- **NO LECTURE** (CHI 2012 conference)
- Think of this as your catch-up week
  - **Intensive** group project work based on feedback from tonight, meeting with your mentor
    - *(Hint: meet with your mentors this week!)*
  - Start thinking about your individual projects and assembling your final portfolios (half-way to the end!)

Why Sketches

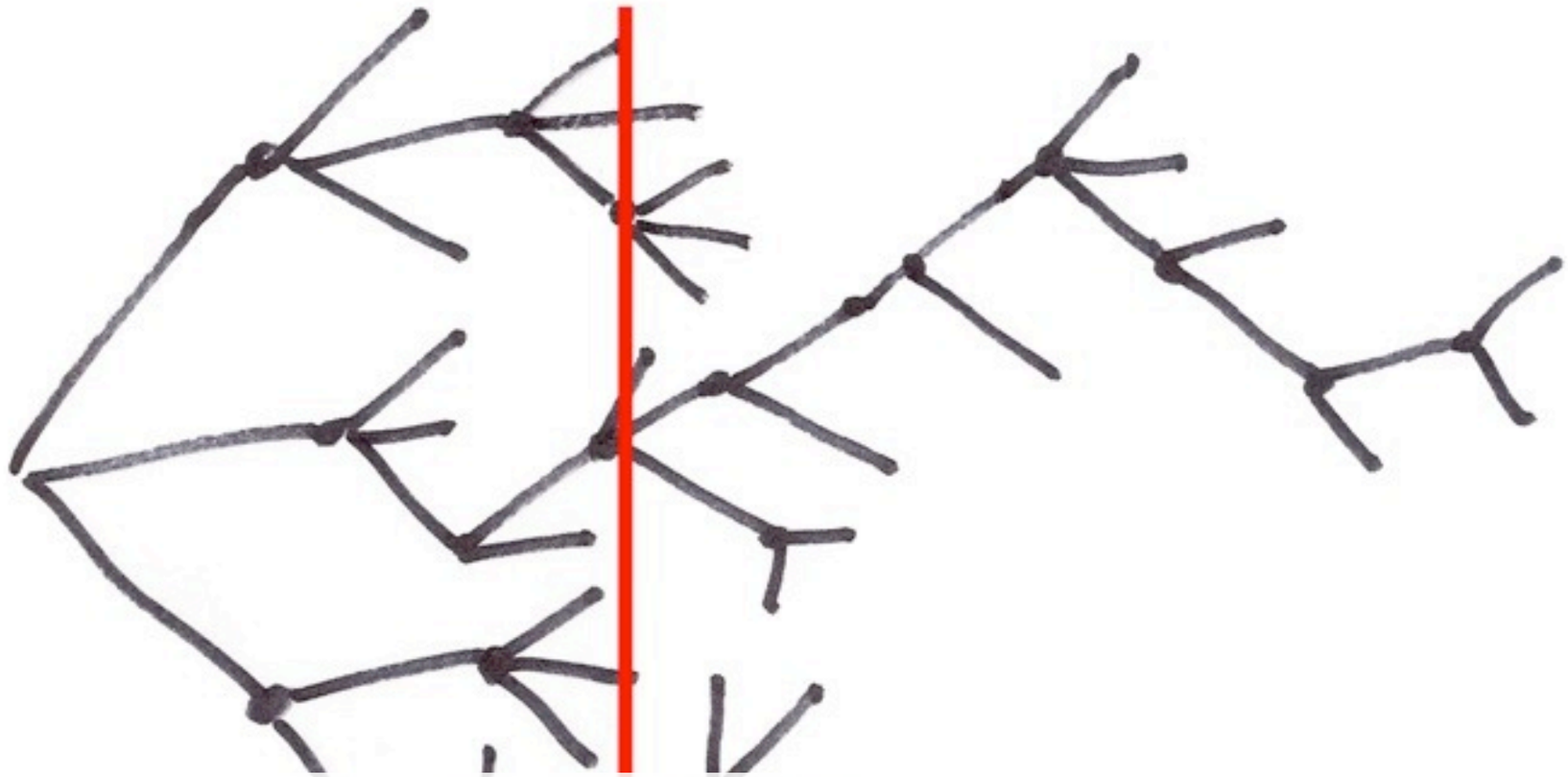
- Getting the Design Right
  - generate an idea
  - iterate and develop it

- Getting the Right Design
  - generate many ideas and variations
  - reflect and choose
  - then iterate and develop your choice



Bill Buxton coined the expression 'Getting the Design Right *vs.* Getting the Right Design'

Exploration of Alternatives



… a designer that pitched three ideas would probably be fired. I'd say 5 is an entry point for an early formal review (distilled from 100's) … if you are pushing one you will be found out, and also fired … it is about open mindedness, humility, discovery, and learning. If you aren't authentically dedicated to that approach you are just doing it wrong!

Alistair Hamilton
VP Design
Symbol Technologies

Slide contributed by Bill Buxton

In TWO Weeks

- Animated sequence + location-aware systems assignment **Due**
- Design crits, take four
  (last time for presenting/critiquing a sketching exercise!)
- Role-playing and video sketches
- Intro to mobile gaming
- *Don't forget your readings!*