

Panel: Using App Inventor in Introductory CS Courses

Meimei Gao

*Mercer County
Community College*

Julie Johnson

*Vanderbilt
University*

Dale Reed

*University of Illinois
at Chicago*

Cate Sheller

*Kirkwood
Community College*

Lyn Turbak

*(Moderator)
Wellesley College*

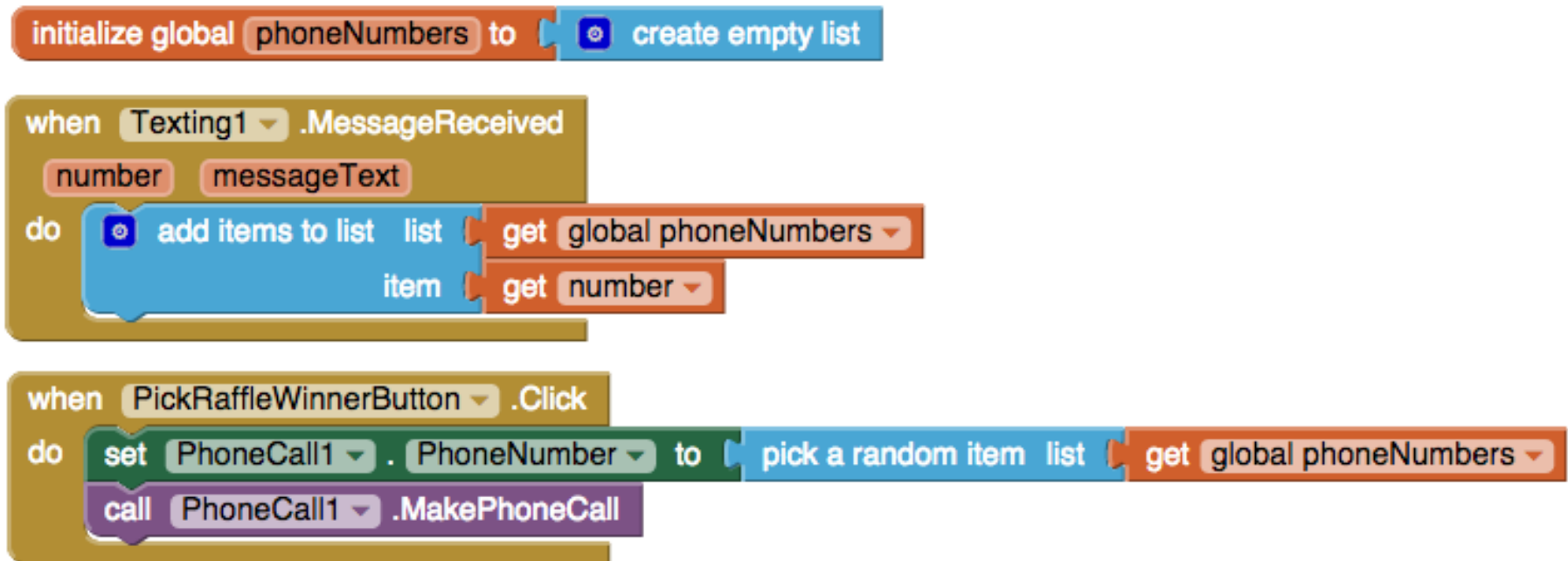
Panel Overview

- App Inventor and the NSF-funded *Computational Thinking through Mobile Computing* project
- Panelists: how they used App Inventor in their introductory courses
- Questions/discussion with audience

MIT App Inventor

A visual blocks-based, cloud-based programming environment that democratizes the creation of apps for Android Mobile devices.

Example: here are all the blocks for a raffle app that we'll run at tomorrow's App Inventor breakfast (7:00-8:15am in 2502B)



Computational Thinking Through Mobile Computing

NSF Grant Team



Franklyn Turbak
Wellesley College



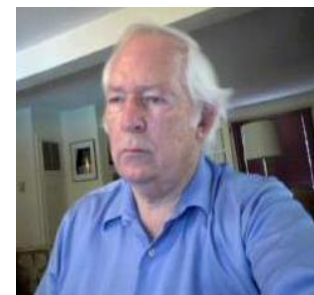
Eni Mustafaraj



Ralph Morelli
Trinity College



Dave Wolber
U. of San Francisco



Larry Baldwin
BIRC



Hal Abelson



Shay Pokress
(emerita)
MIT



Josh Sheldon



Fred Martin



Mark Sherman



Karen Roehr

University of Massachusetts Lowell



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Teaching Computational Thinking

Mobile

- algorithms as computational recipes
- divide/conquer/glue problem solving
- control and data structures
- abstraction & modularity
- algorithmic complexity
- digital representations
- ...

1. Leverages features that situate apps in the world.
2. Hinges on event-oriented behavior.
3. Emphasizes useful programs embedded in a social context.
4. Takes advantage of the larger informational ecosystem.
5. Involves design, engineering, and entrepreneurship.

App Inventor & Mobile Computational Thinking

1. High-level abstractions for mobile device features facilitate creating fully functional situated apps
2. Simple approach to event handling makes it easy to specify app behavior.
3. Visual blocks language, cloud-based environment, and live programming with connected device lower barriers to programming.

Mobile CT Project Resources

nsfmobilect.wordpress.com

- **Online curricular materials that use App Inventor to teach computational thinking in a mobile context:**
whole courses, course modules, tutorials, videos, concept & maker cards, live coding quizzes
- **Techniques for assessing computational thinking:**
pre/post course surveys, rubrics for student projects.
- **Dissemination and community building:**
App Inventor educators site, workshops, and publications.

Workshops

3-hour workshops: SIGCSE 2013 & 2014, CCSCNE 2014



3-day workshops: summers 2013 and 2014 (UMass Lowell)



APP INVENTOR

BREAKFAST

CURIOUS ABOUT TEACHING WITH APP INVENTOR?
WANT TO SHARE YOUR EXPERIENCES ABOUT TEACHING WITH APP INVENTOR?



3/7 SAT.
7:00-8:15AM

ROOM
2502B



ALL ARE WELCOME TO THIS FREE EVENT

THIS EVENT IS SPONSORED BY THE NSF COMPUTATIONAL THINKING THROUGH
MOBILE COMPUTING TUES GRANTS (DUE 1225680, 1225719, 1225745, 1225976, AND 1226216)



Using App Inventor in Introductory CS Courses

Meimei Gao
Mercer County Community College, NJ

About the Course

- **Get start from Fall 2013**
- **A new course**
- **Name: Introduction to Programming with Mobile App Development**
- **Can be a substitute for CS 0 (Alice)**

Students' Majors

Major	Degree	# of Students
Computer Information Systems	AS	14
Computer Information Technology	AAS	13
Personal Development		12
Computer Science	AS	11
Game Programming	AAS	3
Digital Media Art	AAS	2
Liberal Arts	A.A.	2
Web Design	AAS/Cert	2
Architecture	AS	1
Aviation	AAS	1
Business Administration	AS	1
Computer Graphics	AAS	1
Database Administration	Cert	1
Electronic Engineering Technology	AAS	1
Networking Engineering Technology	Cert	1
non-decided major		1
Total		67

Course Schedule

	Topics
1	Overview of computer concepts, programming languages, operating systems and development environments
2	Get started, Event-driven programming
3	Properties of components, Variables
4	Creating animation applications, Procedures
5	Conditionals, Procedures
6	Test#1 & Lists
7	Lists, Activities, Web pages/applications
8	Repetitions; Persistent Data – TinyDB
9	Texting & Location-aware Apps
10	Midterm Project and Term Project Discussion
11	Persistent Data – TinyWebDB
12	Web APIs
13	Test#2 & Term Project
14	Introduction to Android app development using Java
15	Term Project Presentation

Format: Hybrid

50% face-to-face meeting and 50% online activities

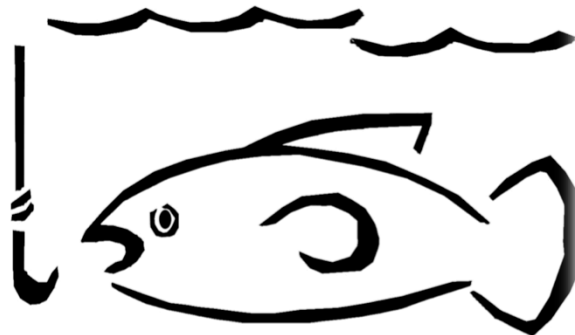
- Online activities (before class):
 - reading, watching tutorials, building apps
- Face-to-face Meeting:
 - students' demos, discussing problems, going through the key concepts, reviewing self-review questions, building apps
- Online activities (after class):
 - reviewing, projects, working on self-review questions

Emulator or Devices

- **We use both**
 - Devices are not required for the course.
- Devices
 - 6 tablets (about \$1200) in classroom/lab
 - 5 tablets (about \$1000) in library

Using App Inventor in a short-course

Get 'em hooked



*Julie Johnson
Vanderbilt University*

Students

- Freshmen Engineering Majors
- CS/non-CS/undecided mix
- 14 class meetings (1 hour)
- Introduction to what CS is



CS is not...

- just CS1
- programming alone
- recreating a program as described by your instructor



Although these are critical learning milestones in CS1, this is not a good snapshot of what the CS career field is all about

*Just like practicing piano scales is
necessary...*

...that's not what being a pianist is
all about

But how can we get to the
creative, fun, sexy side of CS
without them?

Class schedule

- Reading Code
- Interacting with user (input/output)
- Variables, lists
- Animation (sprites)
- If statements
- Loops
- Database storage
- Web access
- Multiple screens



Project

- In groups of 3
- Begins in Lecture 5
- Focus is on creativity
- Introduce Software Engineering process
- Identify user group
- Create Problem Statement
- Brainstorm
- Prototype (not in AI)
- Build



Creativity is the focus

- Computational Thinking
- Constructs, flow
- Teamwork
- Usability
- Marketability





Photo: www.facebook.com/UICGraduateCollege, 3/3/15

Using App Inventor in **CS 100: Discovering CS**

Dale Reed
University of Illinois Chicago (UIC)

UIC:

- Public Research University with ~26,000 students
- 9th most diverse campus in the U.S.
- CS Dept. has 600 students



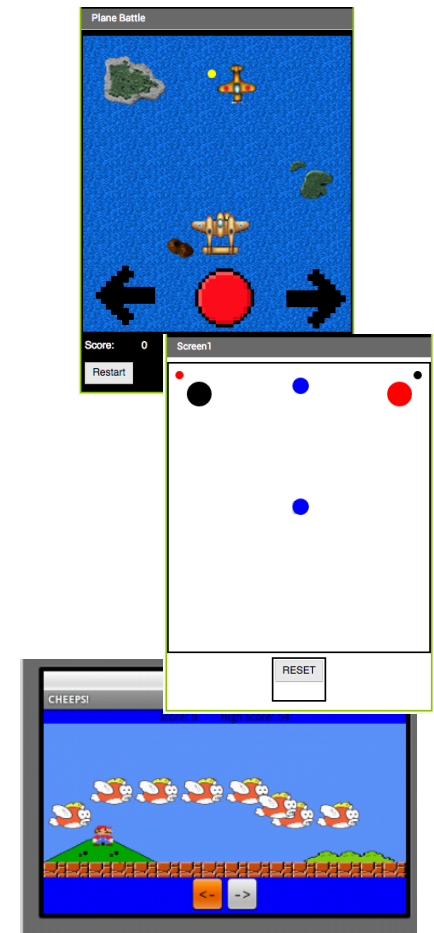
Photo: Wikipedia user Hied5 03:21, 19 March 2008

CS 100:

- Breadth-first introduction of CS to non-majors
- AP CSP equivalent course
- ~50 students each semester since Spring 2013
- ~15% of students are nursing students
- bit.ly/cs100

App Inventor in CS 100

- About 25% of course is App Inventor:
 - 9 of 15 labs are in AppInventor
 - 3 of 10 assignments are in AppInventor
- Topics: Intro. to programming:
Variables, loops, decision statements; handling text, TinyDB, TinyWebDB
- Programs: Games or Utilities
- Logistics:
 - We use the emulator in lab.
 - About 30% of students have Android
 - We have a “library” of 10 Android devices for loan from Chicago CSTA



Apps: Gabriel Palomino (F'14),
Filip Radzikowski (F'13),
Anthony Ochoa (F'14)

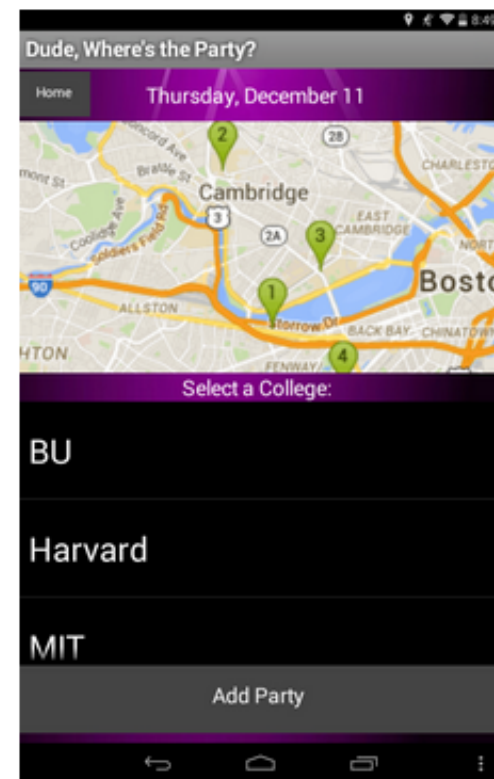
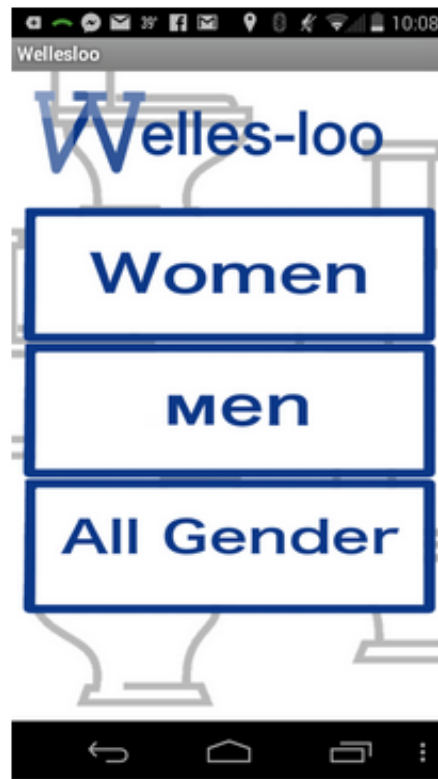
Results

- “When I go to parties and people talk about technology, I can join in the conversation.”
- Though not the goal, a few students (1-2 each semester) do end up pursuing CS
- Students understand they can be producers and not just consumers of technology.
 - App to count animal observation for biology field work in Australia
 - Games

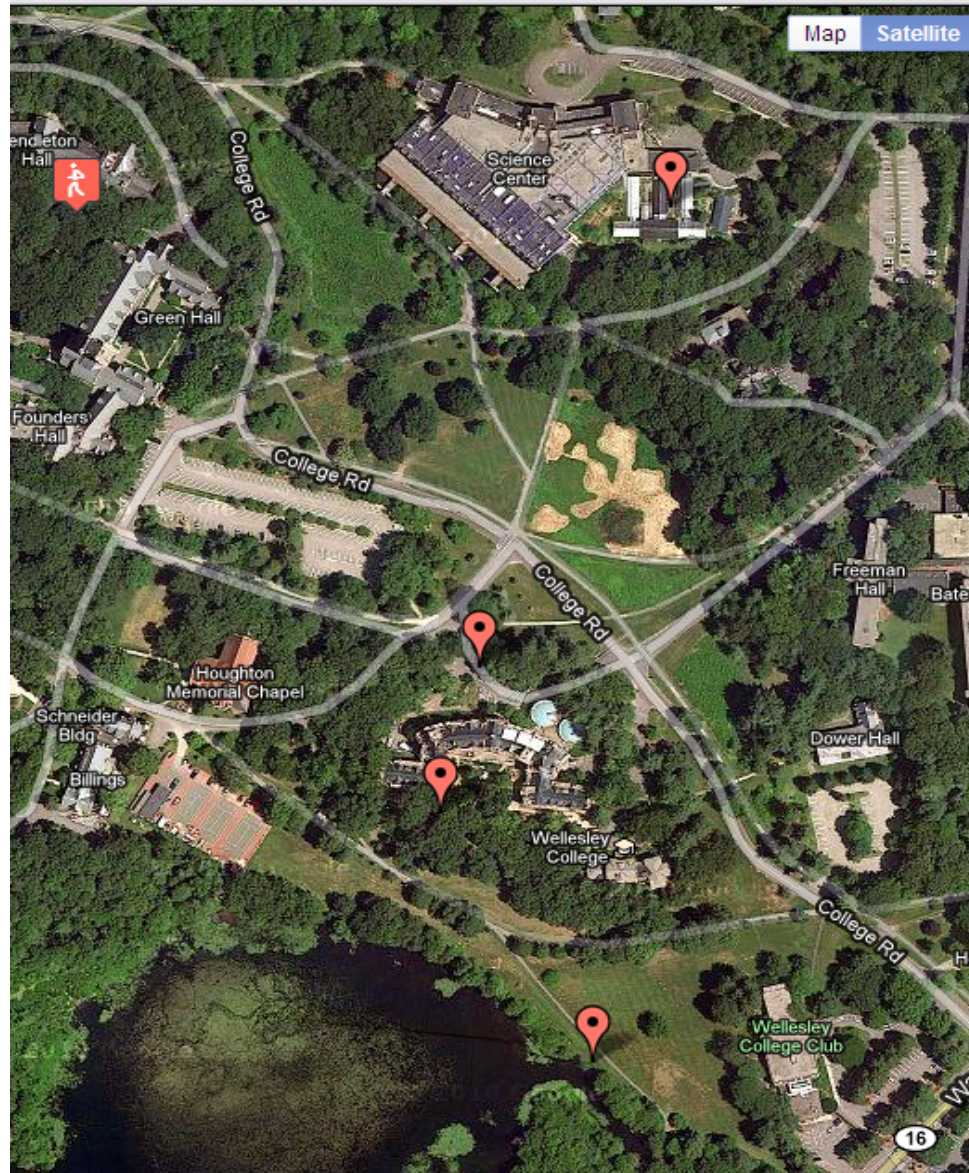
Wellesley *CS117 Inventing Mobile Apps*

- Full semester **CS0** course based entirely on App Inventor, similar to Dave Wolber's USF course
- Focus on app design and implementation
- Learn computational thinking concepts in context
- Five projects:
 1. App using randomly chosen (1) user interface (2) media, and (3) sensor components.
 2. Game app
 3. Sound recorder app
 4. Location-based app
 5. Web database app

Sample 2014 CS117 Apps



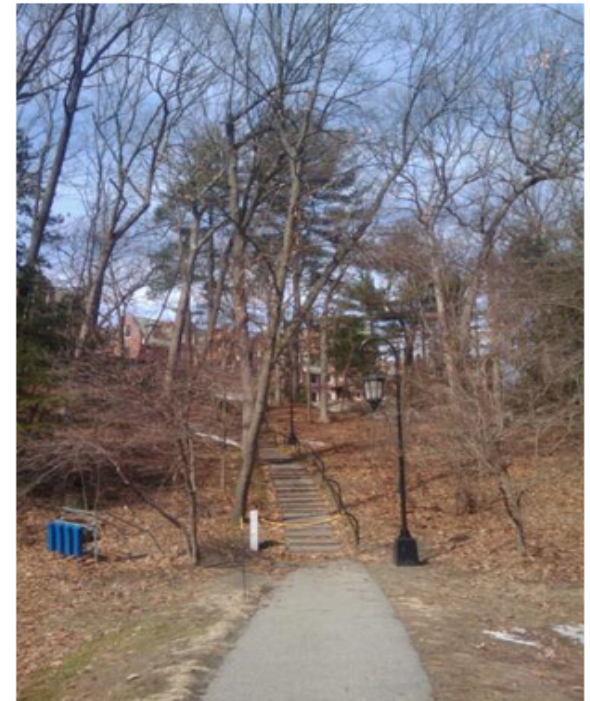
Web Mashups Course (Eni Mustafaraj)



Guess the Wellesley Places!

Here are the points you just played. Click on the markers to review the **Wellesley Places** you've visited today!

Clear Map and Return



Questions/Discussion

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