POGIL in CS II

What, Who, When, Where, How

NSF TUES Type I Project
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http://cspogil.org

PAPOGAPIL apin Cape Apes II

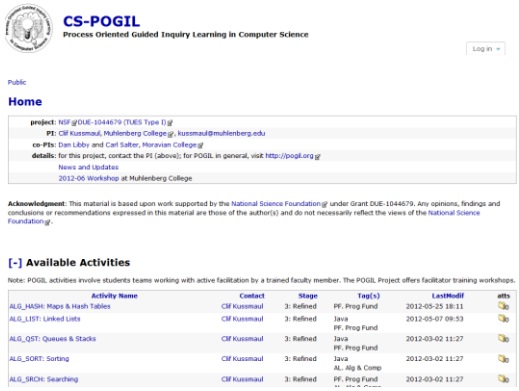
Whapat, Whapo, Whapen, Whapere, Hapow

Clapif Kapussmapaul

Mapuhlapenbaperg Capollapege
Allapentapown, Pape Apay

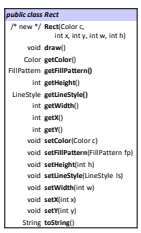
What?

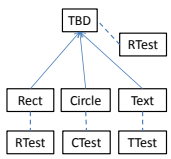
- 3 year NSF TUES Type I project
  - develop, validate, & disseminate POGIL activities
    - data structures & algorithms
    - software engineering (project management)
  - foster a POGIL community within CS via talks, workshops, etc.
- also exploring
  - other areas within CS
  - overlapping disciplines, e.g. business, engineering
  - patterns of questions & question types
  - effective uses of technology – e.g. Moodle, video
- http://cspogil.org

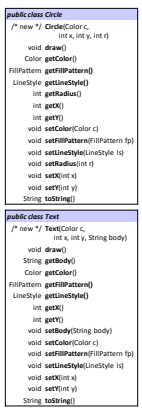


A *Very Simple* CS Model

1. **Star** duplicate method signatures. **(E)**
2. **Define** a new class for these methods. **(E)**
3. This is an **abstract superclass**. **(I)**
4. **Refactor** to eliminate duplication. **(A)**
5. **Define** a unit test suite. **(A)**







Intro Activity: Searching

Hi-Lo is a **number guessing game** for two players – A and B.
A **thinks** of a number from 1 to 100.
B **guesses** a number.
A **responds** with "too high", "too low", or "you win".
B and A **continue** to guess & respond until B wins (or gives up).

1. **Play the game** until everyone understands the rules.

2. Describe **different guessing strategies** that Player B could use. List them in the first column of a table.

Activity: Searching

3. Evaluate each strategy by how **quickly** it will find the answer, by ranking from 1 (least guesses) to 5 (most guesses). Add the rankings to the table in a column labeled **Quick**.

4. Evaluate each strategy by how **easy** it is to describe or specify, by ranking from 1 (easiest) to 5 (hardest). Add the rankings to the table in a column labeled **Easy**.

5. In complete sentences, **describe the relationship** between the two sets of rankings.

Who?

- **co-PIs**: Dan Libby, Carl Salter, Moravian
- **faculty**: Muhlenberg, Chestnut Hill, Haverford, Moravian, Nassau CC, Puget Sound, Rose-Hulman, Western New England, Westminster
- **students**: Muhlenberg, Haverford, Moravian, Penn
- **HS teachers**
- **faculty in India**: Int'l Institute of IT – Hyderabad, Amrita U., et al
- **other**: literature, math, neuroscience, religion, academic support, library

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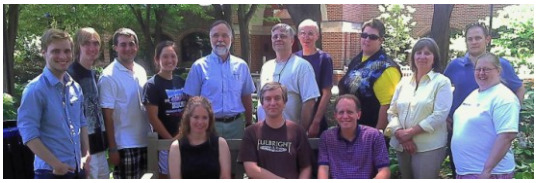
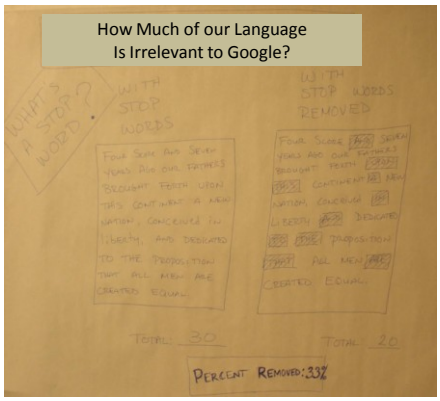
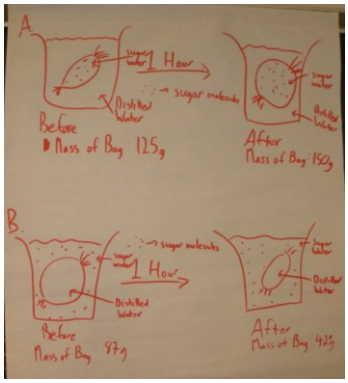
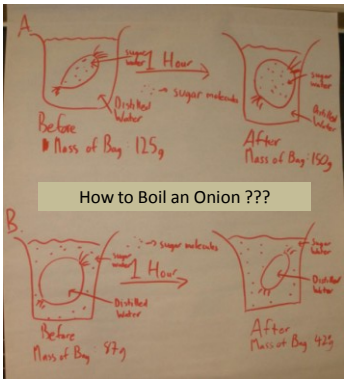
- **generous (non-$$$) support from POGIL people like you**









When?

(PA = POGIL Activity)

When	PI & co-PIs	CS Collaborators
2011 Summer	plan create & refine PAs	POGIL training review PAs
2011-12	pilot & refine PAs talks	review/pilot PAs evaluate (qual)
2012 Summer	create & refine PAs	POGIL training review/refine PAs
2012-13	refine PAs talks & workshops	evaluate (qual & quant)
2013 Summer	create & refine PAs	create/refine PAs
2013-14	refine PAs talks & workshops	evaluate (quant) pilot/refine PAs

Where?

- ACM Special Interest Group in CS Education (SIGCSE): *Raleigh*
  - tutorial, paper, poster, NSF Showcase
- Consortium for Computing Sciences in Colleges (CCSC): *Juniata, Western New England, Quinnipiac*
- American Society for Engineering Education (ASEE): *San Antonio*
- Computer Science Teachers' Association (CSTA): *Irvine, Philadelphia*
- National Collegiate Inventors & Innovators Alliance (NCIIA): *San Francisco*
- IEEE Technology for Education (T4E): *Hyderabad, India*

How?

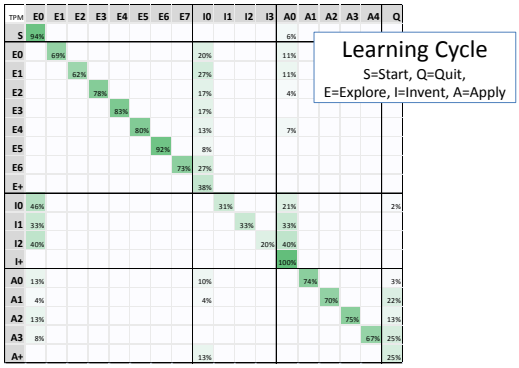
Goal: Enhance…		Assessed using…
Students	Learning outcomes.	Grade distributions. Qualitative assessment of work.
	Affective outcomes.	Existing (e.g. SIR-II TDS), & custom instruments.
	Recruiting & retention.	Majors & course enrollments.
Faculty	Activity quality.	Activity reports, peer reviews, interviews.
	Affective outcomes.	Reflection, interviews.
	Supporting technology.	Activity reports, peer reviews, interviews.
	Talks, papers, workshops.	Activity reports, interviews.
	CS-POGIL community.	Attendance & evaluation forms.

Seeking more advice & connections!

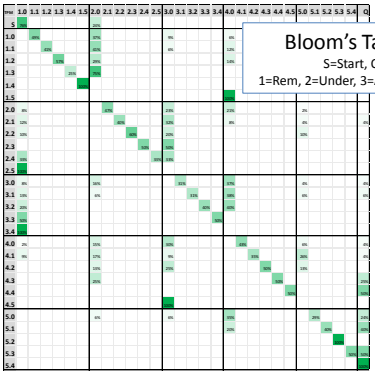
- Clif Kussmaul clif@kussmaul.org
  http://cspogil.org

POGIL Patterns Project
with Erica Wenzel '14

- **Patterns** capture effective practices, e.g.
  - "light on two sides of every room"
  - Learning Cycle: Explore, Invent, Apply
  - Team Roles: Manager, Recorder, Speaker
- Analyzed & categorized **358 Qs** in **17 activities**
  - calculus (3), HS chem (5), analytical chem (2), CS (7)
- To explore possible patterns, computed **transition probability matrices (TPMs)** to show prob(type *I* → type *J*)



Learning Cycle
S=Start, Q=Quit,
E=Explore, I=Invent, A=Apply



Bloom's Taxonomy
S=Start, Q=Quit,
1=Rem, 2=Under, 3=App, 4=Ana, 5=Syn

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