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

(PA = POGIL Activity)

<table>
<thead>
<tr>
<th>When</th>
<th>PI &amp; co-PIs</th>
<th>CS Collaborators</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011 Summer</td>
<td>plan</td>
<td>POGIL training review PAs</td>
</tr>
<tr>
<td></td>
<td>create &amp; refine PAs</td>
<td></td>
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<tr>
<td>2011-12</td>
<td>pilot &amp; refine PAs</td>
<td>review/pilot PAs evaluate (qual)</td>
</tr>
<tr>
<td>2012 Summer</td>
<td>create &amp; refine PAs</td>
<td>POGIL training review PAs</td>
</tr>
<tr>
<td>2012-13</td>
<td>refine PAs &amp; workshops</td>
<td>evaluate (qual &amp; quant)</td>
</tr>
<tr>
<td>2013 Summer</td>
<td>create &amp; refine PAs</td>
<td>create/refine PAs</td>
</tr>
<tr>
<td>2013-14</td>
<td>refine PAs &amp; workshops</td>
<td>evaluate (quant) pilot/refine PAs</td>
</tr>
</tbody>
</table>

**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 $I \rightarrow$ type $J$)


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

Seeking more advice & connections!

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