Pair programming – Something for everybody

Jim Cohoon
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Pair programming works

• Successful learning strategy for improving student problem solving and programming skills where two people *continuously collaborate side by side on the same design and algorithm*

Laurie Williams
Mark Sherriff

• Effective professional software development practice
Pair programming works

- Motivates interest for *all* types of students
- Produces favorable outcomes for *all* types of students
- Software artifacts are *more* robust
• Pair programming software development is a *structured collaborative* technique where a *two-member* team works *together* throughout a software development process
Structured and collaborative

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  - Pair programming is not the same as group work
Structured and collaborative

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      • Mentality of how to approach the assignment

          – Not divide and conquer, but do it together
Structured and collaborative

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  – Pair programming is *not* the same as group work
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• *Must* communicate this perception
Agile software development

• Pair programming software development is a structured collaborative technique where a two-member team works together throughout a software development process
  – Pair programming is a form of agile software development

www.agilealliance.org
Structured roles

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  • One team member is the driver
    – Controls the computer
    – Talks through what is happening
Structured roles

- Pair programming software development is a structured collaborative technique where a two-member team works together throughout a software development process.
  - One team member is the driver
    - Controls the computer
    - Talks through what is happening
  - The other team member is the navigator
    - Actively follows the driver with constant communication
Frequent role reversal

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Using a single keyboard, single screen
Role reversal

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Nothing is done independently.
Role reversal

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    - Talks through what is happening
  - The other team member is the navigator:
    - Actively follows the driver with constant communication

Frequent role reversal
Benefits
Check it out

Strengthening the case for pair programming
• Williams, Kessler, Cunningham, and Jeffries
• IEEE Software
• July 2000

Pair programming improves student retention, confidence, and program quality
• McDowell, Werner, Bullock, and Fernald
• Communications of the ACM
• August 2006

The effectiveness of pair programming: a meta-analysis
• Hannay, Dybå, Arisholm, and Sjøberg
• Information and Software Technology
• July 2009

In their own words: gender differences in student perceptions of pair programming
• Ying, Pezzullo, Ahmed, Crompton, Blanchard, and Boyer
• ACM SIGCSE 2019
Need a book

- Pair programming illuminated
  - Williams and Kessler

- Extreme Programming Explained
  - Andres and Beck
What a wonderful world it would be

- On average works for all kinds of people, be it differing
  - Ethnicities
  - Genders
  - Levels of experience

- Outcomes
  - Enhanced motivation
  - Increased confidence and satisfaction
  - Improved communication skills

- Improved quality
  - Less buggy
  - More robust
  - Faster delivery
Implementing
Issues

• Setup
  – Teaching the technique
  – Course incorporation
  – Ensure cooperation
  – Environment – must have a space along with people to enforce precepts
  – When to adopt

www.ncwit.org/pairprogramming
www.realsearchgroup.org/pairlearning
Issues

• How do you create partners?
  – Random, friendships, perceived experience, confidence
  – Is there a preferred method of assignment
    • Yes, no, maybe
• Role switching
• Replacement, re-assignment
  – Needs to be a possibility
Issues

• Assignments
• Pair evaluation
  – Single submission
  – Self and peer evaluation
  – Instructor solution evaluation
Preparing your students

- Watch *Fun with pair programming*, Williams, 2008 at
  [www.youtube.com/watch?v=rG_U12uqRhE](http://www.youtube.com/watch?v=rG_U12uqRhE)
Reflection

• What did you think?
Coda
Thanks

• Rick Stillings – a much-skilled member of our departmental Systems Staff and photographer extraordinaire