Pair Programming

Oct 31st, Fall 2002

Example – was prep for the midterm

- Example: (demo of Treemap of the NCI data model)
- Given an n-ary tree, we want to draw a graph so that the size of the node maps to the number of descendants each node has. We already have a graph drawing program that will do the drawing and position the nodes for us, but we need to calculate the number of descendants for each node
- We also need to add iterators to our program that will calculate the order of the nodes in our layout

Exercises….

- Our create a tree method was very simple (just two levels) – create a tree recursively with a given branching factor and a given number of levels
- See if you can add a level order iterator to the code, what about printing out the euler tour?

KNOWLEDGE IS commonly socially constructed, through collaborative efforts towards shared objectives or by dialogues and challenges brought about by different persons' perspectives.

G. Salomon (book: *Distributed Cognitions: Psychological and Educational Considerations)*

Exercise….

- Take a sheet of paper (or an overhead and overhead pens) and draw a “scary” face…..
- Spend about 2 mins drawing two scary faces…..

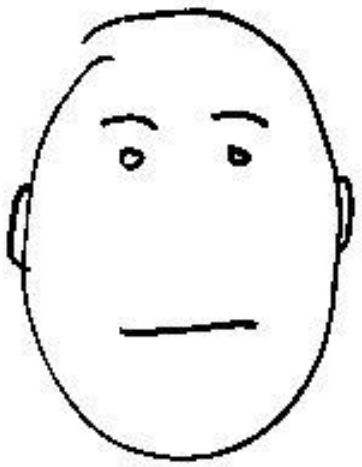
Exercise as a pair….

- Pair up with a partner
- Take a sheet of paper (or an overhead and overhead pens) and a different colour each…..
- Spend about 2 mins drawing two faces…..

Hand in your drawings (indicate which are solo/pair) to get a candy!

Debriefing……

- How did you feel when you were drawing solo vs. drawing as a pair
- Which of the drawings are more artistic or original?
- Did you find yourself concentrating more or less during the pair drawing?
- Was it more fun to draw alone or as a part of a pair
- What did you like, what didn't you like about drawing alone or as part of a pair
- Did you find yourself mirroring your partner?
- Would you expect that people get better over time drawing as part of a pair?



Solo Drawing

Pair Drawing

What is pair programming?

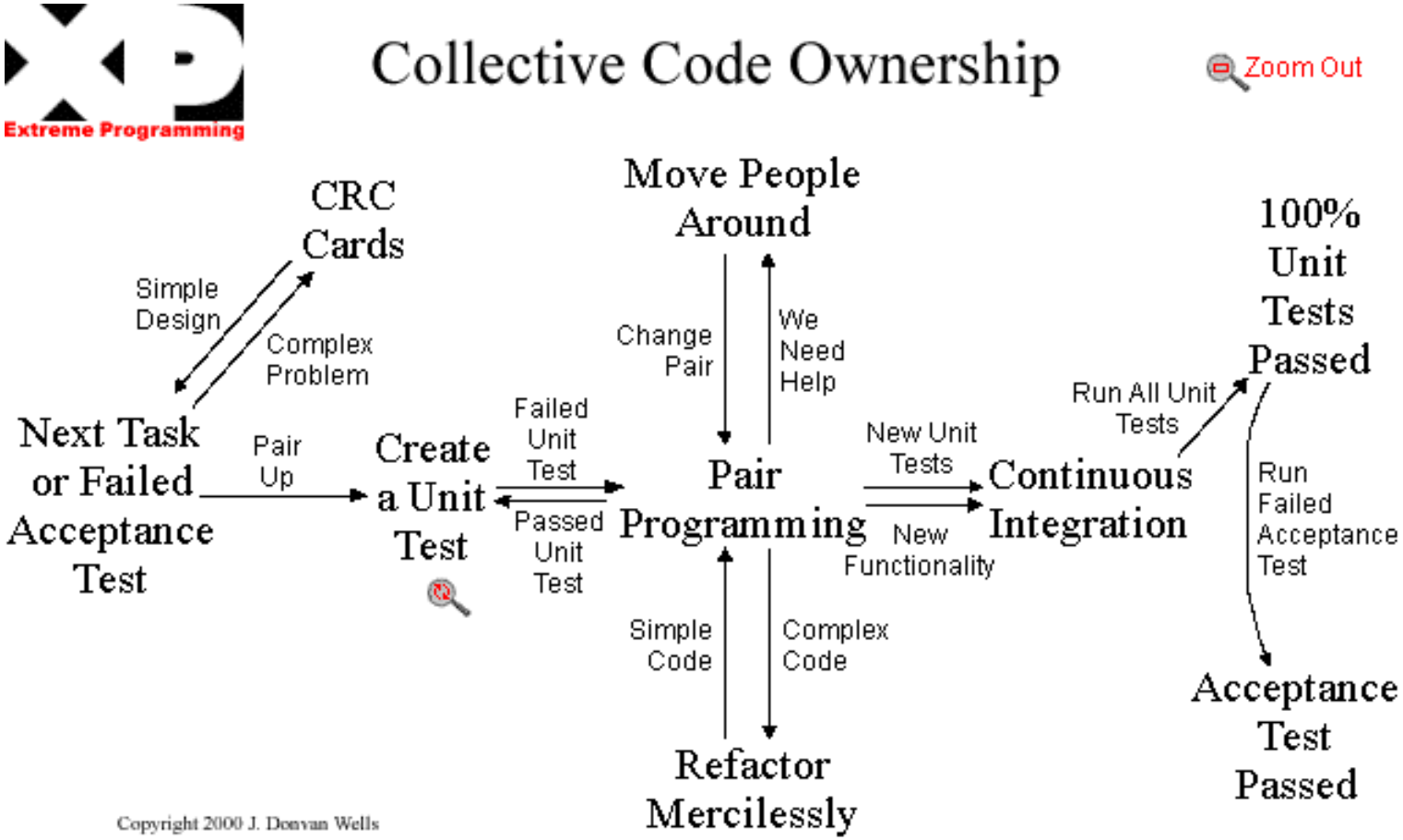
TWO programmers working side-by-side, collaborating on the same design, algorithm, code or test. One programmer, the driver, has control of the keyboard/mouse and actively implements the program. The other programmer, the observer, continuously observes the work of the driver to identify tactical (syntactic, spelling, etc.) defects and also thinks strategically about the direction of the work. On demand, the two programmers can brainstorm any challenging problem. Because the two programmers periodically switch roles, they work together as equals to develop software.

-- **Laurie Williams**
North Carolina State University Computer Science

What is pair programming cont.

- Think of a good pair driving across the country. One will drive, the other navigate (thinking tactically and strategically)
- Often used as a part of extreme programming

Collective Code Ownership



Pair programming exercise….

- Write the code for the TreeNode class (see next slide)
- Do the following:
  - Designate the driver (will switch turns next time) – this person has the pencil
  - The other continuously and actively observes the work of the driver:
    - Watching for defects
    - Thinking of alternates
    - Looking up resources
    - Thinking of the implications of decisions made

Part 1: TreeNode class

- Fill in the code for the following interface:

```
public class TreeNode:
        public TreeNode ( );
        public void addChild(TreeNode child);
        public Vector getChildren( );
        public TreeNode getParent( );
        public void setParent(TreeNode parent);
        public int getData( );
        public void setData(int data);
        public String toString( );
            // creates a string that outputs the nodes in the
            // tree as a preorder traversal

        // add a main method to test your code!
```

Part 2: Switch drivers….

- Next design a recursive class called RecursiveTree that creates a tree using recursion given the number of levels in the tree and the branching factor (it will use the TreeNode class you wrote)
- Add a main method to test your class
- It should have the following interface:

```
public RecursiveTree(int levels, int branching) ;
```

Some quotes from pair programmers…

"When I explained an idea to my partner, I concentrated on what I was saying, and carefully made things clear and logical because I did not want to confuse my partner and I wanted him to understand what I was talking about. It helped me better understand the problem I was addressing. It also helped me discover some mistakes I had made but did not notice before I talked with my partner."

Some quotes from pair programmers…

"One problem with single programming is that you can forget what you are doing and easily get wrapped in a few lines of code, losing the big picture. Your partner is able to constantly review what you do, making sure that it is in line with the product design. He/she can also make sure that you are not making the problem too difficult. Many times, these two items alone can waste a lot of time. When it comes down to it, wouldn't you rather just get the job done correctly and quickly? Collaborative programming will help you do just that."