Testing and Improving a New Text for Teaching Computer Science

Phase Two Overview

Background

Most Traditional Computer Science Texts are:
- Long and Imposing
- Out of touch with student needs
- Out of touch with industry

Problem

Create an Effective Text:
- Assess and improve the text
- Create teaching tools
- Create new problem sets

Objectives

- Text itself (Surpassed objective)
  - Revise or rewrite all 8 chapters
- Teaching Tools (Met objective)
  - Create and test lecture notes
- Problem Sets (Met objective)
  - Test and revise for all 8 Chapters

Results

- One entirely new book edition
- Numerous edits based upon real results
- A complete set of lecture notes
- Problems rearranged, edited, and recreated based on student feedback

Phase One (Create original book draft)

- Last semester's IPRO was given a bare bones draft of a Ruby textbook provided by Prof. Frieder and Prof. Grossman
- They accomplished the following tasks:
  - Improved & edited the text itself
  - Developed 20-30 exercises per chapter and solutions for every problem.
  - Developed 5-6 programming examples per chapter
  - Created figures
  - Created two Model Eliciting Activities
- The book was not perfected and needed a large scale revision phase, Phase Two – this semester of IPRO 328

Phase Two (Test and Revise)

At the end of Phase Two we have accomplished all of the following:
- We completely revised 7 of the chapters and created 3 entirely new chapters.
- 9 of the chapters have lecture slides, and they have all been successfully tested.
- Problems from most chapters were revised and many new problems were created.

To do this, we employed the following innovative method:
- Returning members from last years IPRO created lecture slides based upon the book and taught the class the contents of the book.
- Homework was assigned to class and graded by members of the Technical Team.
- Used iGroups and Google Docs to track all our data, which we used to drive changes to the book.
## Results Summary

### Code of Ethics

**Overarching Standard**
- All team members will:
  - Submit only original work
  - Never lose sight of the best interest of the consumers
  - Fulfill all requirements set forth by the client
  - Never act unfairly toward fellow members

**Paradigm of Code of Ethics**
- The book uses multicultural examples and exercises such as driving or making sandwiches.
- All of our content is original and created with our audience in mind.

### Project Plan

<table>
<thead>
<tr>
<th>Deliverables</th>
<th>Start</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Plan</td>
<td>1/25/2008</td>
<td>2/22/2008</td>
</tr>
<tr>
<td>Final Report</td>
<td>4/21/2008</td>
<td>5/2/2008</td>
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<tr>
<td>IPRO Day Presentation</td>
<td>4/20/2008</td>
<td>5/2/2008</td>
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<tr>
<td>Website</td>
<td>4/18/2008</td>
<td>4/25/2008</td>
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<td>Meeting Minutes</td>
<td>1/25/2008</td>
<td>4/18/2008</td>
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<td>CD-ROM</td>
<td>4/25/2008</td>
<td>5/2/2008</td>
</tr>
<tr>
<td>Team Debriefing</td>
<td>5/5/2008</td>
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### Meeting Structure

1. Monday 2.75 hour face-to-face meeting
2. Thursday IRC online chat
3. Other sub-team meetings throughout the week

### Time Spent

<table>
<thead>
<tr>
<th>Team</th>
<th>Hours (start)</th>
<th>Hours (end)</th>
<th>Total Hours</th>
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</thead>
<tbody>
<tr>
<td>Allen, David</td>
<td></td>
<td></td>
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<tr>
<td>Nicholas Bathum</td>
<td></td>
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<td>Katherine Hammes</td>
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<td>Seon Jeong</td>
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<tr>
<td>Leland Johnson</td>
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<tr>
<td>Roman Kopman</td>
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<tr>
<td>Noh Hyup Kwak</td>
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<tr>
<td>Vivek Patel</td>
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<tr>
<td>Phillip Rymek</td>
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<td>Peter Schmitz</td>
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<td>Michael Tilatti</td>
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<td>Harry Tran</td>
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| Total        | 1100.9        | 112.6       | 122.6       |

### Work Results

#### Book Results
- **Revised Chapters**: 7
- **Completely New Chapters**: 3
- **Total Chapters**: 10

#### Exercise Results
- **Exercise Changes**
  - **Insertions**: 497
  - **Deletions**: 518
  - **Total Changes**: 1015

### Exercise Difficulty

<table>
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<tr>
<th>Exercise Difficulty</th>
<th>Easy</th>
<th>Medium</th>
<th>Hard</th>
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### Chapter Comments Score Board

<table>
<thead>
<tr>
<th>Team Member</th>
<th>Major</th>
<th>Chapters</th>
<th>Average Chapter</th>
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<tbody>
<tr>
<td>Allen, David</td>
<td>Non-CS</td>
<td>10</td>
<td>12.2</td>
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<tr>
<td>Bathum, Nicholas</td>
<td>CS</td>
<td>8</td>
<td>4.8</td>
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<tr>
<td>Jeong, Seon</td>
<td>Non-CS</td>
<td>10</td>
<td>7.9</td>
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<td>Johnson, Leland</td>
<td>CS</td>
<td>10</td>
<td>4.3</td>
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<tr>
<td>Kwik, Noh Hyup</td>
<td>Non-CS</td>
<td>10</td>
<td>8.5</td>
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<tr>
<td>Pavel, Vivek</td>
<td>Non-CS</td>
<td>10</td>
<td>6.8</td>
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<td>Schmitz, Peter</td>
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<td>4.1</td>
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<td>Tiatti, Michael</td>
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<td>Hammes, Katherine</td>
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<td>5.0</td>
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<td>Kolm, Roman</td>
<td>CS</td>
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<td>5.0</td>
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<tr>
<td>Tran, Henry</td>
<td>Non-CS</td>
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<td>6.5</td>
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<tr>
<td>Rymek, Phil</td>
<td>CS</td>
<td>2</td>
<td>5.5</td>
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### Project Deliverables

- **Midterm Report**: Grade: 16/16
- **Code of Ethics**: Grade: 16/16

### Book Changes

- **Revised Chapters**: 7
- **Completely New Chapters**: 3
- **Total Chapters**: 10

### Lecture Slide Results
- **Chapters w/ Slides**: 9
- **Total Slides**: 197
- **Avg Slides / Chapter**: 21.9

### Test Results

- **Average Time Spent**
  - **Chapters 1 - 4 and Midterm Report**
    - **Total Chapters**: 41.5
  - **Chapters 5 - 9**
    - **Total Chapters**: 83.0
  - **Midterm Report**
    - **Total Chapters**: 110.0
  - **Final Report and Deliverables**
    - **Total Chapters**: 112.0
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IPRO 328 Team Member Breakdown

**Editing Team 1: Katherine Hammes, Roman Kofman, Phillip Rymek, Harry Tran**
- Created new versions chapters 1 through 8
- Edited chapters 1 through 8 based upon others' comments
- Commented on chapters 9 and 10

**Editing Team 2: Nicholas Bathum, Peter Schmitz**
- Created new versions of chapters 9, 10
- Edited chapters 9 and 10 based upon others' comments
- Commented on chapters 1 through 8
- Initially helped the exercise team

**Exercise Team: David Allen, Nicholas Bathum, Seon Jeong, Noh Kwak, Vivek Patel, Peter Schmitz, Michael Tilatti**
- Responsible for learning Ruby and all concepts presented in the book.
- Completed all homework to test effectiveness of the book.
- Commented on every chapter of the new book.

**Technical Team: Leland Johnson, Phillip Rymek**
- Created lecture slides
- Taught the book in a lecture format
- Graded all the homework
- Commented on every chapter

**Exercise Fixing Team: David Allen, Seon Jeong, Noh Kwak, Vivek Patel, Michael Tilatti**
- Modified, deleted, and created problems for the book.
- Populated new chapters with problems
- Commented on every chapter

Three Week Development Cycle

- **Begin Chapter**
  - Technical Team: Lectures chapter
  - Editing Teams: Begin new chapter

- **Exercise Team**
  - Begins homework
  - Comments on new chapter

- **Editing Teams**
  - Modify new chapter
  - Technical Team: Grades homework

- **Exercise Fixing Team**
  - Updates exercises

- **Chapter Complete**