

Planning

1	Project Organization
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Project Progress – Fall 2007

Dr. Ophir Frieder and Dr. David Grossman have completed a draft manuscript for an introductory book on Computer Science. The impulse behind this book is dissatisfaction with the way introductory computer science is currently taught. To our knowledge, there has yet to exist a text that focuses on semantic and algorithmic issues, rather than purely syntactical. Most students get bogged down by the intricacies of the programming language itself, which hinders their problem solving development. This book, in contrast to its many predecessors, will use the Ruby programming language. The language offers some good pedagogical aspects and this is couple with the fact that it is also becoming extremely popular in industry (e.g. 37Signals, as featured in BusinessWeek). By using Ruby, the team aims to aid students in learning semantic and algorithmic issues rather than the syntactical problems they face when learning other languages such as C++ and Java.

In Fall 2007, the IPRO developed problem sets with solutions for the book, improved its examples, and developed sidebars. This semester, the IPRO will focus on testing the book with students new to computer science.

Project Plan – Spring 2008

The students who helped developed the textbook in this IPRO the previous semester will prepare course materials and presentations for each chapter in the book. Each week, the technical students will explain the concepts in various chapters to the non-technical students. Not only will this produce a full set of course notes for each chapter that can be used for teaching in class, it will also allow the students to practice their presentation and teaching skills.

The weekly IPRO meetings will be treated like a classroom lecture where the non-technical students will learn the concepts contained in the textbook. As previously mentioned the technical team will explain, present and teach the materials in each chapter of the book. Specifically, these non-technical (not CS, CPE, EE or Math) will provide suggestions to the course materials and identify weaknesses in the text. The level of experience for each student learning from the textbook varies allowing the team to examine the effectiveness of the text on students with different backgrounds in computer science. The ultimate goal of this process is to improve each chapter and including more content so that the chapters flow better making it easier for students to learn.

After the presentations, the students will be assigned the exercises at the end of each respective chapter. The purpose of these exercises is to collect data on their effectiveness. Students will report how

long it takes to do each problem and rank them from easy-medium-hard. The grading team will analyze the data collected on the exercises and modify them to ensure that they are all possible. The exercises will be used to drive changes to the chapters.

In addition to the general text and concepts in the book, the non-technical students will be exposed to the three Model-Eliciting Activities (MEAs) developed in IPRO 328 in the fall semester of 2007. To solve an MEA, students go through a development phase, similar to software engineering including 1) understanding the problem, 2) express / test / revise different models for a solution, 3) evaluate the working model, and 4) document the working model. MEAs focus on developing models conveniently alongside the book which emphasizes algorithmic models. Additionally, students must work in teams to collaborate, think and make decisions. Therefore, MEAs offer a taste of how real-world problem solving is done in addition to offering a setting to cultivate interpersonal skills require in any project. This will essentially test the usefulness of the MEA's built the previous semester.

The weaknesses in the book and MEA problems will be exposed and the team will work together to identify the best means to fix these weaknesses. Weaknesses in the book can be identified during the lecture; if a concept in the book is too difficult to explain, then it is a weakness. Another way to identify weaknesses is to have the students proofread one chapter each week and presenting any problems, errors and other concerns to the group at each Monday session. At these sessions, the group will discuss ways to improve the text based on their concerns. The students will essentially read, critique and edit each chapter until the text has been optimized for the purpose of teaching computer science. All criticisms and suggestions will be directed toward the chapter editing team which will analyze the suggestions, outline the chapters and, if necessary, rewrite the chapters. The chapters may be rewritten to improve the way the material and concepts are presented or to improve the structure of the text in general. At the end of the semester, a new stronger version of the book will be completed.

2	Task Definition
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• **2.1 – Work Breakdown Structure**

<u>Name</u>	<u>Start</u>	<u>Finish</u>	<u>Assigned To</u>
IPRO Deliverables	01/25/2008	05/02/2008	
Project Plan	01/25/2008	02/22/2008	Harry
Midterm Report	03/03/2008	03/14/2008	Vivek
Midterm Presentation	03/03/2008	03/14/2008	David, Michael
Final Report	04/21/2008	05/02/2008	Nick
IPRO Day Presentation	04/20/2008	05/25/2008	TBD
IPRO Day Poster	04/21/2008	04/25/2008	Seon, Noh
Code of Ethics	02/15/2008	03/07/2008	Nick
Website (including book portion)	04/18/2008	04/25/2008	Harry
Abstract	04/21/2008	04/25/2008	Pete
Meeting Minutes	01/25/2008	04/18/2008	Harry
CD-ROM	04/25/2008	05/02/2008	Phil
Team Debriefing	05/05/2008	05/16/2008	TBD
Book Review	02/04/2008	04/25/2008	
Chapter 1 Editing	02/04/2008	02/25/2008	Harry, Katherine, Roman Phil
Chapter 2 Editing	02/11/2008	03/03/2008	Harry, Katherine, Roman Phil
Chapter 3 Editing	02/18/2008	03/10/2008	Harry, Katherine, Roman Phil
Chapter 4 Editing	02/25/2008	03/16/2008	Harry, Katherine, Roman Phil
Chapter 5 Editing	03/03/2008	03/31/2008	Harry, Katherine, Roman Phil
Chapter 6 Editing	03/10/2008	04/07/2008	Harry, Katherine, Roman Phil
Chapter 7 Editing	03/24/2008	04/14/2008	Harry, Katherine, Roman Phil
Chapter 8 Editing	03/31/2008	04/21/2008	Harry, Katherine, Roman Phil
Chapter 9 Editing	04/07/2008	04/21/2008	Harry, Katherine, Roman Phil
MEA Problems	01/25/2008	04/25/2008	
MEA Problem Editing	02/04/2008	03/31/2008	Leland, Phil
MEA Problem Revisions	03/31/2008	04/25/2008	Leland, Phil
Milestones	03/14/2008	05/02/2008	
Chapters 1-4 & Midterm Report	02/04/2008	03/16/2008	All
Chapters 5-9 & MEA Editing	03/14/2008	04/28/2008	All
Final Report and Deliverables Finished	03/14/2008	05/02/2008	All

• 2.2 – Summary Tasks Defined

- Proofread all chapters in the book
- Test and improve all Model-Eliciting Activities
- Publish a website to both satisfy IPRO requirements and support the book, including instructor solutions and other resources
- Submit IPRO deliverables
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• 2.3 – Individual Tasks Defined

Due to the structure of the book, certain tasks will be repeated for each chapter. As such, for all of the chapters, the team will complete the following:

- Prepare presentation materials
- Improve and edit the text
- Solve exercises at the end of the chapter
- Improve exercises at the end of the chapter

To improve and edit the text, each chapter will undergo a three-week cycle of editing with seven phases:

- Day 1: The chapter will be presented and the team will agree to a general outline of the chapter
- Day 6: The exercise team will be assigned exercises at the end of the chapter
- Day 8: The exercise team will provide feedback on the exercises at the end of the chapter
- Day 11: The grading team will grade the exercises done by the exercise team and provide feedback on their performance. The editing sub-team will begin rewriting the chapter based on provided comments
- Day 17: The editing sub-team will finish rewriting the chapter make minor changes if necessary. The entire team will then begin looking at the final product and make minor suggestions
- Day 21: The final draft of the chapter will be completed

In order to improve the MEA problems, the team will:

- Have non-technical students complete the activities
- Have students provide feedback on problems
- Refine the MEAs

The website will feature:

- Files for problems
- Further information and links
- Information on the IPRO

The following IPRO deliverables will be submitted:

- Syllabus
- Project Plan

- Midterm Report
- Midterm Presentation
- Website (will include book website)
- Weekly Reports
- IPRO Day Presentation
- IPRO Day Poster
- CD-ROM
- Final Report
- Meeting Minutes
- Code of Ethics
- Abstract

• 3.1 – Start and End Dates for Tasks Listed

- Jan. 21 – Project Started
- Jan. 25 – Project Plan Started
- Feb. 4 – MEA Problem Testing Started
- Feb. 4 – Chapter 1 Editing Started
- Feb. 11 – Chapter 2 Editing Started
- Feb. 15 – Code of Ethics Started
- Feb. 18 – Chapter 3 Editing Started
- Feb. 22 – Project Plan Completed
- Feb. 25 – Chapter 1 Editing Completed
- Feb. 25 – Chapter 4 Editing Started
- Mar. 3 – Chapter 2 Editing Completed
- Mar. 3 – Chapter 5 Editing Started
- Mar. 3 – MEA Problem Testing Completed
- Mar. 3 – Midterm Presentation Started
- Mar. 7 – Code of Ethics Completed
- Mar. 10 – Chapter 3 Editing Completed
- Mar. 10 – Chapter 6 Editing Started
- Mar. 14 – Midterm Report Completed
- Mar. 14 – Midterm Presentation Completed
- Mar. 24 – Chapter 4 Editing Completed
- Mar. 24 – Chapter 7 Editing Started
- Mar. 31 – MEA Problem Testing Completed
- Mar. 31 – MEA Problem Revisions Started
- Mar. 31 – Chapter 5 Editing Completed
- Mar. 31 – Chapter 8 Editing Started
- Apr. 7 – Chapter 6 Editing Completed
- Apr. 7 – Chapter 9 Editing Started
- Apr. 14 – Chapter 7 Editing Completed
- Apr. 18 – Meeting Minutes Completed
- Apr. 18 – IPRO Day Poster Started
- Apr. 18 – Website Started
- Apr. 20 – IPRO Day Presentation Started
- Apr. 21 – Chapters 8 and 9 Editing Completed
- Apr. 21 – Final Report Started
- Apr. 25 – Abstract Completed
- Apr. 25 – IPRO Day Poster and Presentation Completed
- Apr. 25 – Website Completed

- Apr. 25 – CD-ROM Started
- Apr. 25 – MEA Problems Revisions Completed
- May 2 – CD-ROM Completed
- May 2 – Final Report Completed
- May 1 – Rehearse Presentation
- May 2 – Project Ended, IPRO Day
- May 5 – Team Debriefing Started
- May 16 – Team Debriefing Completed

• 3.2 – Hours Estimated for Tasks

Book Elements, per Chapter:

- Text Editing: 30 hours
- Problems and Solutions: 2 hours each, 20-30 problems
- Examples: 2 hours each, 5-6 examples
- Presentation Materials: 10 hours

Resulting in ~100 hours, or 800 hours for the first eight chapters

Editing Sub-Team Meeting:

- Weekly on Wednesdays: 5pm-6pm

Resulting in 1 hour for 10 weeks = 10 hours

MEA Problems:

- Teaching and Solving MEA Problems, 100 hours
- Refining the Three Topics, 100 hours

For a total of 200 hours

IPRO Deliverables:

- Project Plan: 30 hours
- Midterm Report: 20 hours
- Midterm Presentation: 10 hours
- IPRO Day Presentation and Rehearsals: 50 hours
- IPRO Day Poster: 10 hours
- Final Report: 30 hours
- CD-ROM: 5 hours
- Abstract: 5 hours
- Code of Ethics: 5 hours
- Website Development: 30 hours

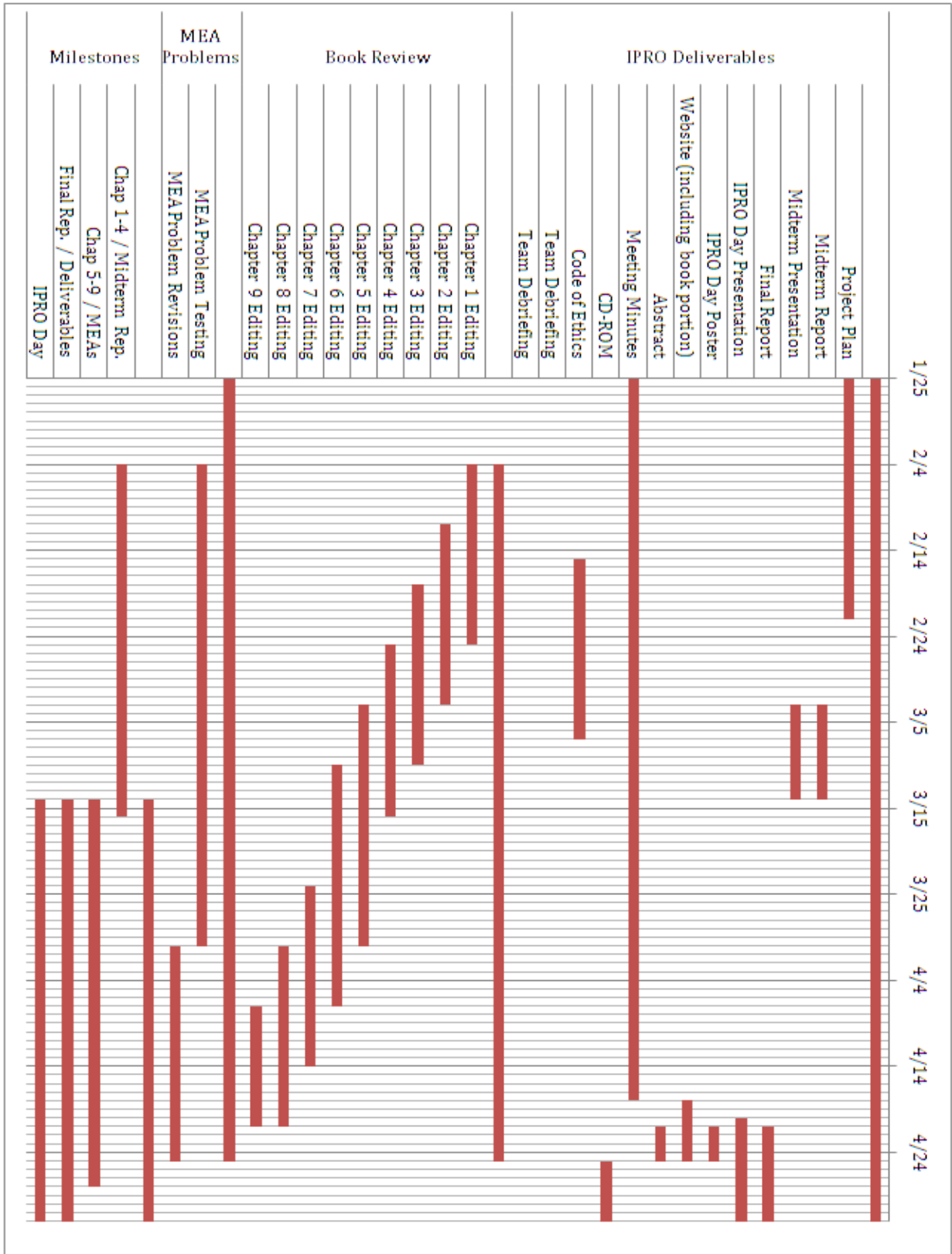
For a total of 195 hours

As can be seen, approximately, 1205 hours have been delegated. The team has 11 weeks to finish the project, and each member is expected to work 10 hours outside of class per week. This yields $12 \times 10 \times 11 = 1320$ total hours. The 135 hours not yet accounted for will be used for peer reviews, meetings, etc.

• 3.3 – Tasks Assigned to Individuals

- Book work and website development will be assigned according to sub teams (see Section 5.1)
- MEA improvement will be a collaborative project involving everyone
- IPRO deliverables will be assigned as follows:
 - Project Plan: Harry, David, Michael
 - Midterm Report: Vivek
 - IPRO Day Poster: Noh, Seong
 - Final Report: Nick
 - Meeting Minutes: Harry
 - Abstract: Nick
 - CD-ROM: Phil
 - Code of Ethics: Nick
 - The IPRO Day Presentation will be a collaborative project involving the entire team, and Weekly Report

• 3.4 – Gantt Chart or Equivalent



Organizing

4	Team Members
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Name	Major	Skills/Strengths	Roles/Tasks
David Charles Allen dallen11@iit.edu	Political Science (5 th Year)	Writing Research Papers, C++	Midterm Presentation, Project Plan
Nicholas Bathum nbathum@iit.edu	Computer Science (3 rd Year)	Object Oriented Programming, C, Java, OCaml	Final Report
Katherine Hammes khammes@iit.edu	Chemical Engineering (3 rd Year)	Chemistry, Math, Engineering, Writing, Leadership	Meeting Minutes, Chapter Editing and Rewriting
Seon Jeong sjeong7@iit.edu	Mechanical Engineering (4 th Year)	Car Mechanic Technician, Graphic Designer	Poster Exhibit Design
Leland Johnson johnlel@iit.edu	Computer Science (4 th Year)	Professional Software Engineer, Ruby, Book Contributor, Public Presentations, Fall IPRO 328	MEA Problems, Grading, Presentation Materials
Roman Kofman kofmrom@iit.edu	Computer Science (4 th Year)	Computer Science Teacher's Assistant, PHP, Python, Databases, Fall IPRO 328	MEA Problems, Grading, Chapter Editing, Presenting
Noh Hyup Kwak nkwak@iit.edu	Electrical Engineering (4 th Year)	Java, MATLAB	Poster Exhibit Design
Vivek Patel vpatel72@iit.edu	Biochemistry (3 rd Year)	Biology, Chemistry, Math	Midterm Report
Phillip Rymek prymek@iit.edu	Computer Science (3 rd Year)	Object Oriented Design and Programming, Fall Semester IPRO 328	MEA Problems, Grading, Presenting
Peter Schmitz pschmitz@iit.edu	Computer Science (3 rd Year)	C/C++, Java, Object Oriented Programming Languages, Card Games, Puzzles	Abstract, CD-ROM
Michael Tilatti mtilatti@iit.edu	Aerospace Engineering (3 rd Year)	Basic Computer Skills, Soccer, Tutoring	Project Plan, Midterm Presentation
Harry Tran htran8@iit.edu	Biomedical Engineering (3 rd Year)	Biology, C++, Java, PHP, Python, Circuits and Systems	Project Plan, Chapter Editing

Advisors	
David Grossman grossman@iit.edu	Associate Professor of Computer Science Illinois Institute of Technology
Yacin Nadj ynadj@iit.edu	Student Advisor Illinois Institute of Technology (3 rd Year Computer Science)

• 5.1 – Sub Teams

Each individual member of each problem set team will be responsible for completing the exercises assigned to them at the end of each chapter. The technical team will be responsible for preparing presentation materials, explaining the concepts in each chapter and grading homework problems. The chapter editing team will be responsible for taking suggestions, outlining and rewriting the chapters in the textbook. The size of each team besides the Editing Team does not instill the need for team leaders. The team leaders on the Editing Team are responsible for organizing and leading the subgroup meetings.

1. Exercise Team
 - A. Nick, Vivek
 - B. Noh, Katherine
 - C. Seon, Pete
 - D. David, Mike
2. Grading Team
 - A. Leland, Phil
3. Website Development Team
 - A. Harry
4. IPRO Deliverables Team
 - A. Deliverables are assigned to different members accordingly
5. Editing Team
 - A. Katherine*, Roman*, Phil, Harry

* Denotes a sub-team leader

Controlling

6	Expected Results
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• 6.1 – Deliverables Described

This IPRO hopes to improve a computer science textbook seeking to teach introductory computer science that produces students proficient in problem solving, logic, and critical thinking, regardless of programming language.

The deliverables associated with this product include a complete revision of the textbook. The book will direct students through the problem solving process, starting with the logical processes and then branching out to Ruby syntax when necessary.

In addition, the team will improve the supplementary Model-Eliciting Activities designed with the same goal as the book. These MEAs will require students to think about larger scale problems, and will employ many different features of computer science. The team will research MEAs, publish findings, and create three such problems.

The MEAs and text supplements will be available on a website, also to be developed by the IPRO team.

• 6.2 – Milestones Identified

- 03/16/2008 : Chapters 1-4 Testing and Midterm Report Completed
- 04/28/2008 : Chapters 5-9 and MEA Testing Completed
- 05/02/2008 : Final Report and Deliverables Completed
- 05/02/2008 : IPRO Day

• 6.3 – Budget Provided

Because all work is original and produced by the IPRO team itself, there is no need for purchases, and as such, there is no financial budget for this project. In terms of budgeting time, each member of the IPRO is expected to devote ten hours per week to the project.

• 6.4 – Key Results Described

The results hoped to be achieved by this IPRO include the completion of all objectives described in Section 2, resulting in a stronger version of the text.

- **7.1 – Recording Meeting Minutes Assigned**

As mentioned in Section 3.3, Harry will take minutes for this IPRO.

- **7.2 – Filing and Organizing Weekly Timesheets Assigned**

These will be filled out by everyone. They will be compiled and organized for the final report by the IPRO Report Team.

- **7.3 – Preparing Weekly Task List Assigned**

Weekly tasks will be discussed at the end of each meeting by the entire group and will be put into minutes by Katherine.

- **7.4 – iGROUPS Coordination Assigned**

It is the responsibility of all members of the IPRO to coordinate with and utilize iGROUPS.