Internal Medicine Resident Scheduling System

Bit, Nibble, or Byte

Agenda

1. Introductions
2. Problem Background
3. Project Goals
4. Requirements
5. Project Plan
6. Immediate Future
7. Questions

Your MSD Team

Bit - Taylor Blackwell

- Master of Communications

Nibble - Daniel Fox

- Chief Facilitating Officer

Byte - Liam Kalir

- Lead Engineer

Problem Background

Residencies

- In the U.S., medical students must complete three years in a residency program, where they practice medicine in a rotation under the guidance of an MD.
- There are many different constraints and requirements on the rotation schedule e.g. continuity of care, vacation, electives, etc. that must be considered when preparing schedules.
- This is a cumbersome process that takes chief residents out of practicing medicine for up to 2-ish months.
- Every medical service, at every hospital, has their own residency framework and requirements.

Project Goal

Create an interface that allows resident schedulers to access the optimization model.

- Open-source
- Easy to use
- Allows data to be captured for research

Project Requirements

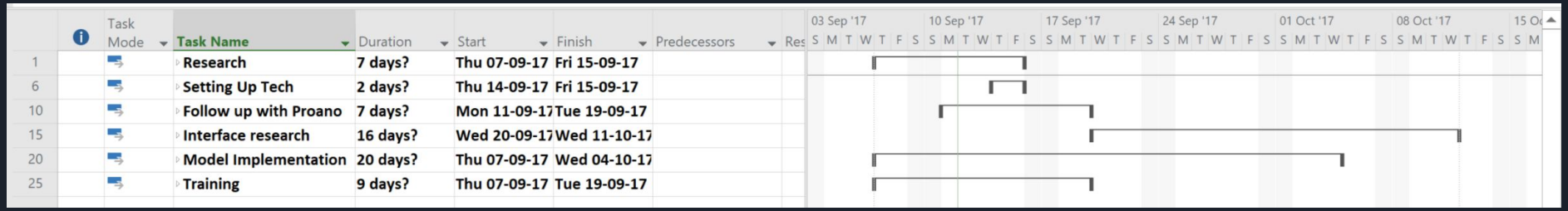
Customer Requirements

Customer Requirement	Importance
Provides valid schedule(s)	9
Open source	9
Easy to use with little training	9
Schedules are human readable	9
Cross Platform	9
Interview Requirements	9
Collect data for research	3
Improve model performance	3
Schedules are in common format	3
Data analysis	1

Engineering Requirements

Engineering Requirement	Metric	Target
Time to solve	time (days)	< 2 months
Concurrent scheduling tasks	boolean	capable of > 1 concurrent task
Cross platform interface	list of supported systems	Linux, MacOS, Windows, Web?, Mobile?
Average # of user errors while creating schedule	quantity	1-2
Server Uptime	percent	> 95%
Ease of Use	user poll (percent)	> 90% of users consider interface easy to use
Maximum time to proficiency	time (min)	< 5 min
Cost	$$$	$0

Project Plan



	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Res
1		Research	7 days?	Thu 07-09-17	Fri 15-09-17		
6		Setting Up Tech	2 days?	Thu 14-09-17	Fri 15-09-17		
10		Follow up with Proano	7 days?	Mon 11-09-17	Tue 19-09-17		
15		Interface research	16 days?	Wed 20-09-17	Wed 11-10-17		
20		Model Implementation	20 days?	Thu 07-09-17	Wed 04-10-17		
25		Training	9 days?	Thu 07-09-17	Tue 19-09-17		

Risks

Risk	Mitigation Strategy
Team writes poor code	Mitigate; Establish best practices, code reviews, unit tests, etc.
Failure to catch illegal inputs	Mitigate; Frequent code reviews on IO subsystems
Code breaks without symptoms and produces non-compliant schedules	Mitigate: Code maintenance/verification plan
Piracy	Mitigate; Well defined IP controls and licensing
No one is willing to maintain code at end of project	Transfer
Server isn't powerful enough to handle load	Accept
Users are not allowed to download software due to hospital policy	Accept
Information leaks about the resident's identifying information	Mitigate; Practice good cyber security, collect as little confidential information as possible
Cyberattacks: Denial of service	Accept

Immediate Future

Customer Interviews and Contacts

- Rubén Proaño
  - RIT Professor
- Dan Ornt M.D.
  - Dean of CHST
- Stephen Silver M.D.
  - RGH Internal Medicine Program Director
- Dr. Richard Alweis M.D.
  - RGH Associate Chief Medical Officer, Medical Education
- Krista Pike
  - URMC Internal Medicine Residency Program Administrator
- Rachel Smith M.D.
  - 5th year Pediatric Neurology Resident, CHoP
- John Kaemmerlen
  - Guide

Upcoming tasks

- Continue to interview relevant persons
- Further develop requirements
- Convert AMPL model to Pyomo
- Setup development server
- Train Dan and Taylor in the ways of software development

Questions?