User Stories and Tasks

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Goals

- Review material from Chapter 4 of Pilone & Miles
  - Tasks
  - Big Board & Burn Down Rate
  - Standup Meetings
- Supplementary Material
  - Agile Methods: Philosophy, Background, Techniques, & Extreme Programming

User Stories and Tasks

- Once you and your customer have
  - defined Milestone 1.0 (via user stories)
  - and agreed on a deadline
- And once you have
  - developed an iteration plan that keeps in mind the number of people on your team and team velocity
- You are ready to work!
  - This chapter discusses what can happen during the first couple of iterations and what practices you should be following

First Task? Create Tasks

- User stories are written from the customer point of view
  - This is great for developing a shared understanding with your customer but not so great for guiding design and development
- To make progress, each user story needs to be split into tasks
  - Each task then needs an estimate associated with it
  - The entire team should participate in breaking a user story into tasks; planning poker should be used to assign estimates

Disclaimer

- Note: the example application in this chapter concerns a "date planner" as in "Jack and Jane go on a date" not "Jack uses this application to plan his week"
  - The example assumes a U.S. perspective with respect to the norms associated with dating
    - And so may not be culturally sensitive (or even make sense) from the perspective of our international students
  - Note: this is not an apology, simply an acknowledgment
- As such, I will try to keep the discussion focused on software engineering issues as much as possible

iSwoon Example

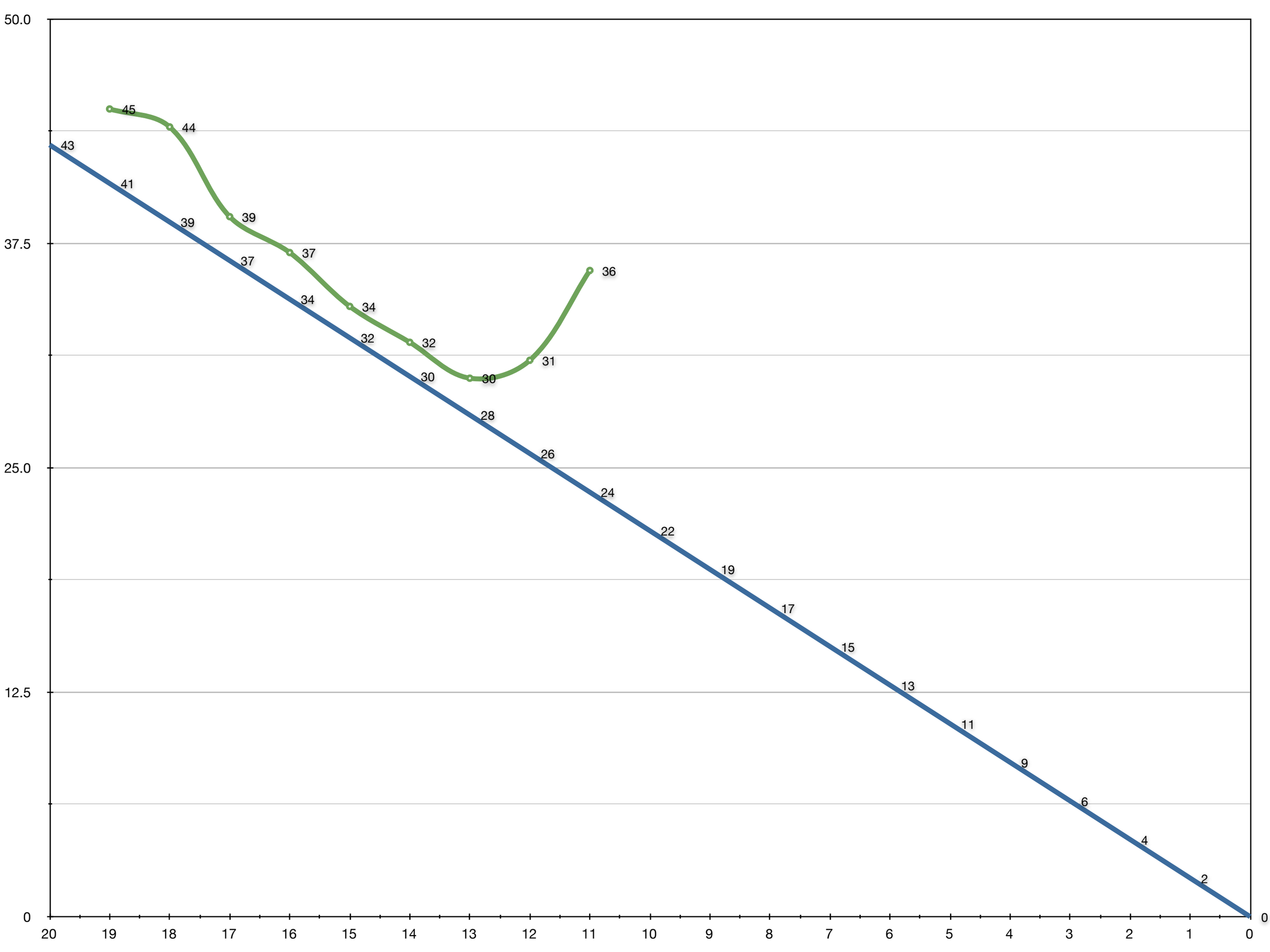
- User Story: Create a Date in the System
  - Estimate: 11 days
- Tasks
  - Create a date class that contains events: 3 days
  - Create user interface to create, view and edit a date: 5 days
  - Create the schema for storing dates in a database: 3 days
  - Create SQL scripts for adding/finding/updating dates: 2 days
- Total Task Time: 13 days!

Problem: Task ≠ Story

- Our task estimate did not equal our story estimate
  - The tasks are much more specific than the stories and may reveal additional work and/or assumptions in planning poker than the more abstract user story
- Now they tell us!
  - As a result, the book recommends that we
    - perform task decomposition during requirements gathering
    - always play planning poker with respect to tasks, not stories
- This will lead to more accurate estimates and iter. plans

Burn Down Chart

- Fortunately, the burn-down chart gives us a specific action item whenever an estimate changes or work gets done
  - Update the burn-down chart
- In the case of an estimate changing, calculate its impact on the work remaining and plot your status
  - In the book, the original estimate for the iteration was 43 days of productive work; a 2 day increase in the first story pushes the amount of work left to 45 days
    - and they spent a day working on task decomposition
- The following chart contains this info. plus more


50.0
37.5
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0
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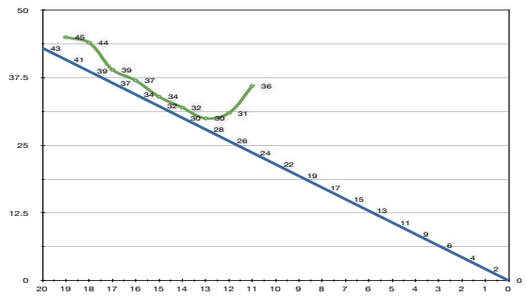
Big Board: How to Use?

- The Big Board is a major feature of your team's workspace
  - It is updated at least once per day during the stand up meeting (discussed next)
  - But could be useful to update it more often than that
- It is a one-stop shop for getting a "big picture" view of the current iteration

User Stories	In Progress	Complete	Burn Down
			
			Next
	Start with this…		
			Completed

Title: Show Current Deals

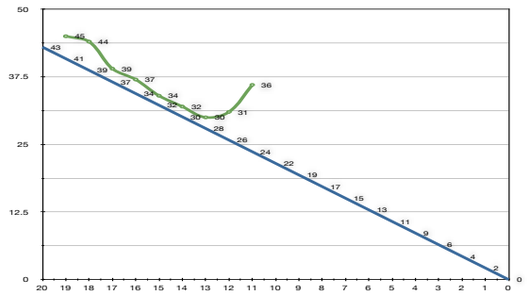
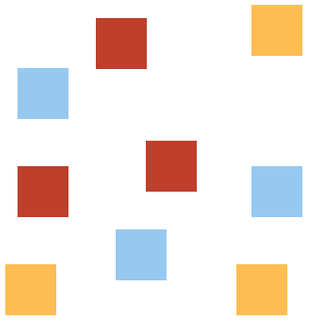
Description: The website will show current deals to Orion's Orbits users.

Title: Book package

Description: An Orion's Orbits user will be able to book a special package with extras online.

Title: Pay online

Description: An Orion's Orbits user will be able to pay for their bookings online.

User Stories	In Progress	Complete	Burn Down
Title: Book package **Description:** An Orion's Orbits user will be able to book a special package with extras online.			
Title: Pay online **Description:** An Orion's Orbits user will be able to pay for their bookings online.	And add user stories		**Next**
Title: Show Current Deals **Description:** The website will show current deals to Orion's Orbits users.	one per swim lane		
			**Completed**

User Stories

Title: Book package

Description: An Orion's Orbits user will be able to b[redacted]spec[redacted]ck[redacted]th e[redacted]nlin[redacted]

Title: Pay online

Description: An Orion's O[redacted]ser [redacted]ab[redacted]pay fo[redacted]boo[redacted]on[redacted]

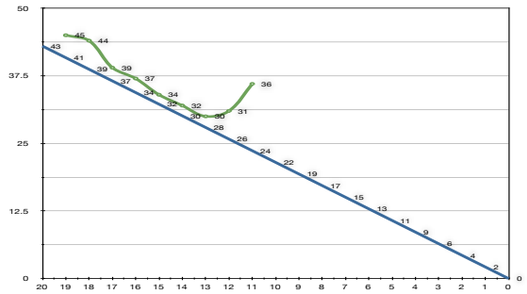
Title: Show Current Deals

Description: The website w[redacted]w cu[redacted]dea O[redacted]Orb[redacted]rs.

In Progress

Complete

Burn Down



Next

Completed

Now add tasks each with a description and estimate

User Stories

Title: Book package

Description: An Orion's Orbits user will be able to book a spec[redacted]ck[redacted]th extras onlin[redacted]

Title: Pay online

Description: An Orion's O[redacted]ser will be ab[redacted]pay fo[redacted]bookings on[redacted]

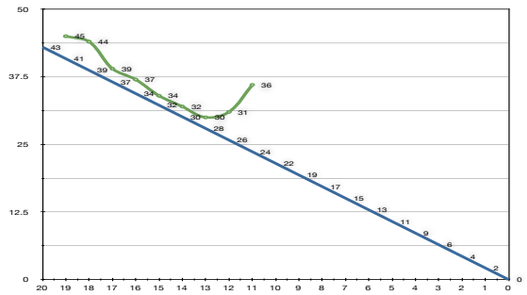
Title: Show Current Deals

Description: The website w[redacted]w cu[redacted]deals to O[redacted]Orb[redacted]rs.

In Progress

Complete

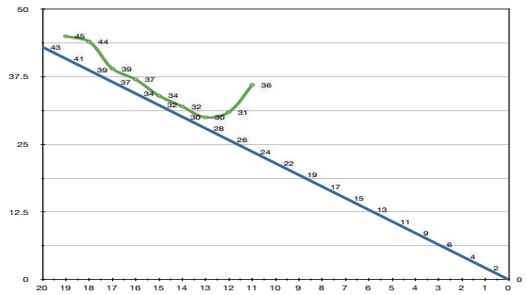
Burn Down

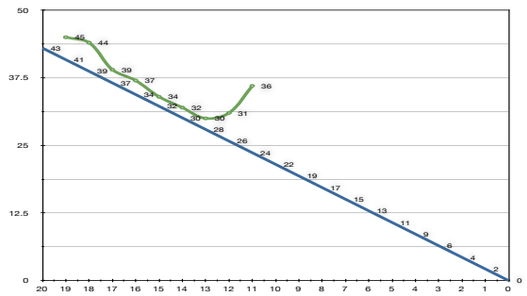


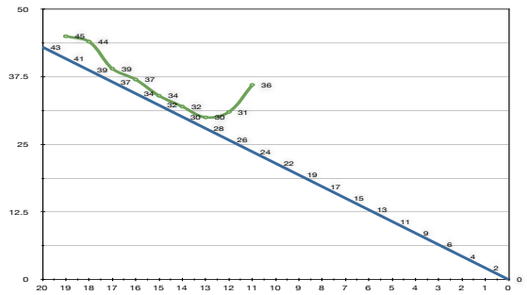
Next

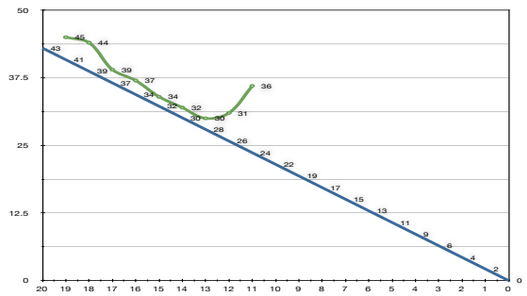
Completed

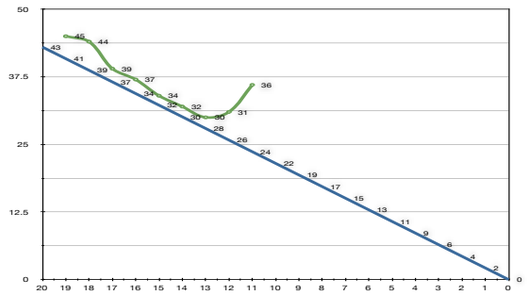
Tasks that a developer is working on move to "In Progress"

User Stories	In Progress	Complete	Burn Down
Title: Book package **Description:** An Orion's Orbits user will be able to book a spec[redacted]ck[redacted]th extras onlin[redacted]	[redacted]		
Title: Pay online **Description:** An Orion's O[redacted]ser [redacted]ab[redacted]pay fo[redacted]boo[redacted]on[redacted]			**Next**
Title: Show Current Deals **Description:** The website w[redacted]v cu[redacted]deals to O[redacted]Orb[redacted]rs.	[redacted]		
	If you stop working on a task, it goes back to its user story		**Completed**

User Stories	In Progress	Complete	Burn Down
Title: Book package **Description:** An Orion's Orbits user will be able to book a spec ckage with extras onlin			
Title: Pay online **Description:** An Orion's O ser will be ab pay fo bookings on			**Next**
Title: Show Current Deals **Description:** The website w v cu dea O Orb rs.			
	Tasks that get finished move to the “Complete” section of the swim lane and more tasks get started		**Completed**

User Stories	In Progress	Complete	Burn Down
Title: Book package **Description:** An Orion's Orbits user will be able to book a special package with extras online.			
Title: Pay online **Description:** An Orion's O ser will be ab pay fo bookings on			**Next**
Title: Show Current Deals **Description:** The website w v cu dea O Orb rs.			
	Be sure to update the Burn Down chart as you make (or don't make) progress		**Completed**

User Stories	In Progress	Complete	Burn Down
Title: Book package **Description:** An Orion's Orbits user will be able to book a special package with extras online.			
Title: Pay online **Description:** An Orion's Orbits user will be able to pay for their bookings online.			**Next**
Title: Show Current Deals **Description:** The website w[illegible] cu[illegible]dea[illegible] O[illegible] Orb[illegible]rs.			
	Its okay to be working on more than one task for a single user story		**Completed**

User Stories	In Progress	Complete	Burn Down
			
Title: Pay online **Description:** An Orion's Orbits user will be able to pay for their bookings online.			**Next**
Title: Show Current Deals **Description:** The website w[redacted] Orb[redacted]rs.			
	Eventually all tasks for a user story are complete; the whole story moves to the Completed section		**Completed** **Title:** Book package **Description:** An Orion's [redacted] user [redacted] able [redacted] spec[redacted]ckag[redacted] extras online.

User Stories

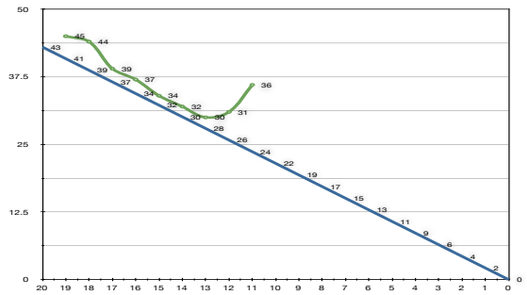
Title: Pay online

Description: An Orion's Orbits user will be able to pay for their bookings online.

In Progress

Complete

Burn Down



Next

Title: Show Current Deals

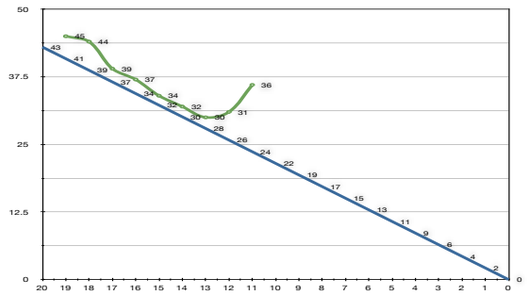
Description: The website w[illegible] cu[illegible]de[illegible] O[illegible]Orb[illegible]rs.

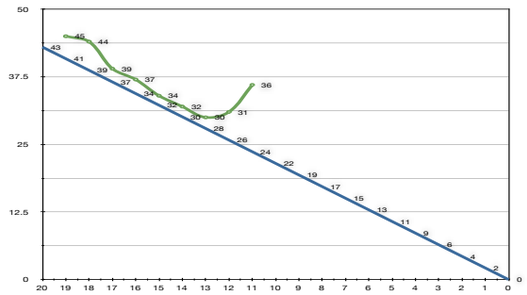
If a user story gets bumped (for whatever reason); move it to the Next section

Completed

Title: Book package

Description: An Orion's [illegible]user [illegible]able [illegible] spec[illegible]ckag[illegible] extras online.

User Stories	In Progress	Complete	Burn Down
			
		Title: Pay online **Description:** An Orion's O[redacted]	**Next** **Title:** Show Current Deals **Description:** The website w[redacted] O[redacted]
	Keep working until all stories are complete or have been pushed to the next iteration		**Completed** **Title:** Book package **Description:** An Orion's [redacted] extras online.

User Stories	In Progress	Complete	Burn Down
			
			Next **Title:** Show Current Deals **Description:** The website w[illegible] v cu[illegible]de[illegible] O[illegible]Orb[illegible]rs.
			Completed **Title:** Book package **Description:** An Orion's [illegible]user[illegible]able[illegible] spec[illegible]ckage[illegible] extras online. **Title:** Pay online **Description:** An Orion's O[illegible]ser[illegible]abl[illegible]y fo[illegible]boo[illegible]onli[illegible]

Don’t forget to update the Burn Down chart with your final status

Standup Meeting

- A daily meeting used to
  - keep the team motivated and aware of progress (or not)
  - keep your board up-to-date
  - highlight problems early
- It should
  - Track progress, update burn-down rate, update tasks, discuss what happened yesterday and plan today's activities, bring up issues, and last between 5 and 15 minutes
- "Its so short, no one has time to sit down"

Design Issues

- In the example, one of the issues raised at a standup meeting involved the design of the system
  - In particular, one developer was having problems with an unwieldy design that needed to be updated in lots of different places when a change request came in
- We'll look at this design problem in more detail in lecture 11
  - In the meantime, take a look at the Appendix 1 for a refresher on the notation used to present/discuss this problem

Expect the Unexpected

- The example in the book also showed an unexpected request come in from the client
  - The CEO of iSwoon wants the developers to demo the system to the CEO of Starbuzz who is interested in integrating his beverage-related services into iSwoon
- What to do? Add the unplanned task as a new task to this iteration and update the burn-down rate
  - Unplanned tasks become new user stories that have to be integrated into the current iteration, if at all possible

Velocity may help

- Velocity builds a little flexibility into the schedule
  - 3 developers working 20 days can theoretically get 60 days worth of work done
    - That's not realistic, so we add in velocity: 3 x 20 x 0.7 = 42
    - However, if we are more productive than our velocity accounted for, then we have "float" or "slack" in the schedule
      - In this case, we have up to 18 days of float time (60 - 42)
      - So, one or two small unplanned tasks may not upset the iteration
  - But, remember, you'll be burning through float naturally, so this is not a panacea

Project Success

- Successful software development is about knowing where you are
  - All of these practices, add certainty to the development process
    - You may be behind, but at least you KNOW you're behind
  - Armed with this information, you can make better decisions about what to do next
  - This, in turn, gives you increased confidence which increases your odds at success

Agile Supplement

- Our textbook is teaching an agile approach to software development
  - Lets look at the philosophy behind Agile and examine an Agile life cycle known as Extreme Programming
    - The material for this supplement is based on content from “Agile Software Development: Principles, Patterns, and Practices” by Robert C. Martin
      - As such, some of this material is copyright © Prentice Hall, 2003
- Note: some of this material is review
  - We’ll skim quickly over duplicated material

Goals

- (Very) Briefly introduce the concepts of Agile Design and Extreme Programming
- Agile Design is a design framework
- Extreme Programming is one way to “implement” agile design
  - Other agile life cycles include SCRUM, Crystal, feature-driven development, and adaptive software development
  - See http://www.agilealliance.org/ for pointers

Agile Development (I)

- Agile development is a response to the problems of traditional “heavyweight” software development processes
  - too many artifacts
  - too much documentation
  - inflexible plans
  - late, over budget, and buggy software

Agile Development (II)

- A manifesto (from the Agile Alliance)
  - “We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value
    - individuals and interactions over processes and tools
    - working software over comprehensive documentation
    - customer collaboration over contract negotiation
    - responding to change over following a plan
  - That is, while there is value in the items on the right, we value the items on the left more”

Agile Development (III)

- From this statement of values, agile development has identified twelve principles that distinguish agile practices from traditional software life cycles
- Lets look at five of them
  - Deliver Early and Often to Satisfy Customer
  - Welcome Changing Requirements
  - Face to Face Communication is Best
  - Measure Progress against Working Software
  - Simplicity is Essential

Deliver Early and Often to Satisfy Customer

- MIT Sloan Management Review published an analysis of software development practices in 2001
  - Strong correlation between quality of software system and the early delivery of a partially functioning system
    - the less functional the initial delivery the higher the quality of the final delivery!
  - Strong correlation between final quality of software system and frequent deliveries of increasing functionality
    - the more frequent the deliveries, the higher the final quality!
- Customers may choose to put these systems into production use or simply review and provide feedback

Welcome Changing Requirements

- Welcome change, even late in the project!
- Statement of Attitude
  - Developers in agile projects are not afraid of change; changes are good since it means our understanding of the target domain has increased
  - Plus, agile development practices (such as refactoring) produce systems that are flexible and thus easy to change

Face to Face Communication is Best

- In an agile project, people talk to each other!
  - The primary mode of communication is conversation
    - there is no attempt to capture all project information in writing
  - artifacts are still created but only if there is an immediate and significant need that they satisfy
    - they may be discarded, after the need has passed

Measure Progress against Working Software

- Agile projects measure progress by the amount of software that is currently meeting customer needs
  - They are 30% done when 30% of required functionality is working AND deployed
- Progress is not measured in terms of phases or creating documents

Simplicity is Essential

- This refers to the art of maximizing the amount of work NOT done
  - Agile projects always take the simplest path consistent with their current goals
  - They do not try to anticipate tomorrow's problems; they only solve today's problems
  - High-quality work today should provide a simple and flexible system that will be easy to change tomorrow if the need arises

The Other Seven

- The other seven principles are
  - Deliver working software frequently
  - Stakeholders and developers work together daily
  - Build projects around motivated individuals
  - Agile processes promote sustainable development
  - Continuous attention to technical excellence and good design enhances agility
  - Agile team members work on all aspects of the project
  - At regular intervals, the team reflects on how to become more effective

Extreme Programming

- Extreme Programming (XP) takes commonsense software engineering principles and practices to extreme levels
  - For instance
    - “Testing is good?”
    - then
    - “We will test every day” and “We will write test cases before we code”
- As Kent Beck says extreme programming takes certain practices and “sets them at 11 (on a scale of 1 to 10)”

XP Practices

- The best way to describe XP is by looking at some of its practices
  - There are fourteen standard practices

Customer Team Member
User Stories
Short Cycles
Acceptance Tests
Pair Programming
Test-Driven Development
Collective Ownership
Continuous Integration
Sustainable Pace
Open Workspace
The Planning Game
Simple Design
Refactoring
Metaphor

Customer Team Member

- The “customer” is made a member of the development team
  - The customer is the person or group who defines and prioritizes features
  - A customer representative should be “in the same room” or at most 100 feet away from the developers
  - “Release early; Release Often” delivers a working system to the client organization; in between, the customer representative provides continuous feedback to the developers

User Stories (I)

- We need to have requirements
- XP requirements come in the form of “user stories” or scenarios
  - We need just enough detail to estimate how long it might take to support this story
    - avoid too much detail, since the requirement will most likely change; start at a high level, deliver working functionality and iterate based on explicit feedback

User Stories (II)

- User stories are not documented in detail
  - we work out the scenario with the customer “face-to-face”; we give this scenario a name
  - the name is written on an index card
    - developers then write an estimate on the card based on the detail they got during their conversation with the customer
- The index card becomes a “token” which is then used to drive the implementation of a requirement based on its priority and estimated cost

Short Cycles (I)

- An XP project delivers working software every two weeks that addresses some of the needs of the customer
  - At the end of each iteration, the system is demonstrated to the customer in order to get feedback

Short Cycles (II)

- Iteration Plan
  - The collection of user stores that will be implemented during this iteration
  - determined by a “budget” of points
  - the budget is determined by the progress made on the previous iteration
- Release Plan
  - A plan that maps out the next six iterations or so (3 months)
  - A release is a version of the system that can be put into production use

Acceptance Tests

- Details of a user story are captured in the form of acceptance tests specified by the customer
  - The tests are written before a user story is implemented
  - They are written in a scripting language or testing framework that allows them to be run automatically and repeatedly
  - Once a test passes, it is never allowed to fail again (at least for very long)
  - These tests are run several times a day each time the system is built

Pair Programming (I)

- All production code is written by pairs of programmers working together at the same workstation
  - One member drives the keyboard and writes code and test cases; the second watches the code, looking for errors and possible improvements
- The roles will switch between the two frequently
- Pair membership changes once per day; so that each programmer works in two pairs each day
  - this facilitates distribution of knowledge about the state of the code throughout the entire team

Pair Programming (II)

- Studies indicate that pair programming does not impact efficiency of the team, yet it significantly reduces the defect rate!
  - [Laurie Williams, 2000] [Alistair Cockburn, 2001] [J. Nosek, 1998]

Test-Driven Development

- All production code is written in order to make failing test cases pass
  - First, we write a test case that fails since the required functionality has not yet been implemented
  - Then, we write the code that makes that test case pass
  - Iteration between writing tests and writing code is very short; on the order of minutes
- As a result, a very complete set of test cases is written for the system; not developed after the fact

Collective Ownership

- A pair has the right to check out/improve ANY module
  - Developers are never individually responsible for a particular module or technology
- Contrast this with Fred Brook's conceptual integrity and the need for a small set of "minds" controlling a system's design
  - Apparent contradiction is resolved when you note that XP is designed for use by small programming teams; I haven't seen work that tries to scale XP to situations that require 100s or 1000s of developers

Continuous Integration

- Developers check in code and integrate it into the larger system several times a day
- Simple Rule: first one to check-in “wins”; everyone else merges
- Entire system is built every day; if the final result of a system is a CD, a CD is burned every day; if the final result is a web site, they deploy the web site on a test server, etc.
  - This avoids the problem of cutting integration testing to “save time and money”

Sustainable Pace

- A software project is not a sprint; it's a marathon
  - A team that leaps off the starting line and races as fast as it can will burn out long before the finish line
  - The team must instead "run" at a sustainable pace
- An XP rule is that a team is not allowed to work overtime
  - This is also stated as "40 hour work week"

Open Workspace (I)

- The team works together in an open room
  - There are tables with workstations
  - There are whiteboards on the walls for the team members to use for status charts, task tracking, UML diagrams, etc.
- Each pair of programmers are within earshot of each other; information is communicated among the team quickly
  - “War room” environments can double productivity
    - http://www.sciencedaily.com/releases/2000/12/001206144705.htm

Open Workspace (II)

- Joel on Software disagrees
  - http://www.joelonsoftware.com/items/2006/07/30.html

The Planning Game (I)

- Customer decides how important a feature is
- Developers decide how much that feature costs
- At the beginning of each release and/or iteration, developers give customers a budget based on productivity of previous iteration

The Planning Game (II)

- Customers choose user stories whose costs total up to but do not exceed the budget
  - The claim is that it won't take long for customer and developers to get used to the system
  - and then the pace can be used to estimate cost and schedule

Simple Design

- An XP team makes their designs as simple and expressive as they can be
  - They narrow focus to current set of stories and build the simplest system that can handle those stories
- Mantras
  - Consider the Simplest Thing That Could Possibly Work
  - You Aren't Going to Need It
  - Once and Only Once (aka Don't Repeat Yourself)

Refactoring

- XP teams fight “code rot” by employing refactoring techniques constantly
  - They have the confidence to do this because they also use test-driven design
  - By “constantly” we mean every few hours versus “at the end of the project”, “at the end of the release”, or “at the end of the iteration”

Metaphor (I)

- The big picture that ties the whole system together
  - Vocabulary that crystallizes the design in a team member's head

Metaphor (II)

- Example
  - A system that transmits text to a screen at 60 chars per second; programs write to buffer, when buffer full, programs are suspended, when buffer empty, programs are activated
    - Metaphor: Dump Trucks Hauling Garbage
    - Screen = “Garbage Dump”, Buffer = “Dump Truck”, Programs = “Garbage Producer”

Metaphor (III)

- Example
  - network traffic analyzer, every 30 minutes, system polled dozends of network adapters and acquired monitoring data; Each adaptor provides block of data composed of several variables
    - Metaphor: A toaster toasting bread
    - Data Block = “Slices”
    - Variables = “Crumbs”
    - Network analyzer = “The Toaster”
    - Slices are raw data “cooked” by the toaster

Benefits of XP

- Customer Focus
- Emphasis on teamwork and communication
- Programmer estimates before implementation
- Emphasis on responsibility for quality
- Continuous measurement
- Incremental development
- Simple design
- Frequent redesign via refactoring
- Frequent testing
- Continuous reviews via pair programming

Criticisms of XP

- Code centered vs. Design centered
  - Hurts when developing large systems
- Lack of design documentation
  - Limits XP to small systems
- Producing readable code is hard
- Code is not good documentation
- Lack of structured inspection process (can miss defects)
- Limited to narrow segment of software application domains
- Methods are only briefly described
- Difficult to obtain management support
- Lack of transition support (how do you switch from waterfall or other process?)

Coming Up

- Lecture 10: Shared Objects & Mutual Exclusion
  - Chapter 4 of Magee and Kramer
- Lecture 11: Good Enough Design
  - Chapter 5 of Pilone & Miles