Agile Project Execution

CSCI 5828: Foundations of Software Engineering
Lecture 21 — 04/03/2012

Goals

- Review the material of Chapters 9-11 of the Agile text book

  - Iteration Management

  - Agile Communication Plans

  - Setting Up a Visual Workspace

Where are we?

- In our review of Agile life cycles, we have discussed

  - Agile Project Inception

    - How do we know if we have a viable project?

    - Do we have the right team?

    - Do we know what we're supposed to build?

  - Agile Project Planning

    - What are user stories and how do we generate them?

    - How do we assign estimates and priorities to those user stories?

    - How do we create a plan and what do we do when things change?

What's Next?

- Agile Project Execution

  - We have our goals, user stories, priorities, estimate and an overall plan

  - Now, we have to execute that plan to produce working software

- We do this via iterations; But, how do we convert index cards to running code

  - First, we'll need a way to do analysis that's fast but accurate

  - Second, we'll need solid development practices that produce good code

  - Third, we'll need to integrate testing into the process from day 1

Agile Iteration

- An iteration is a time-boxed phase (one or two weeks) where

  - we convert our customer's highest priority stories into working software

Analysis & Design

Development

Test

Everything else!

Stories

Working software

Feedback
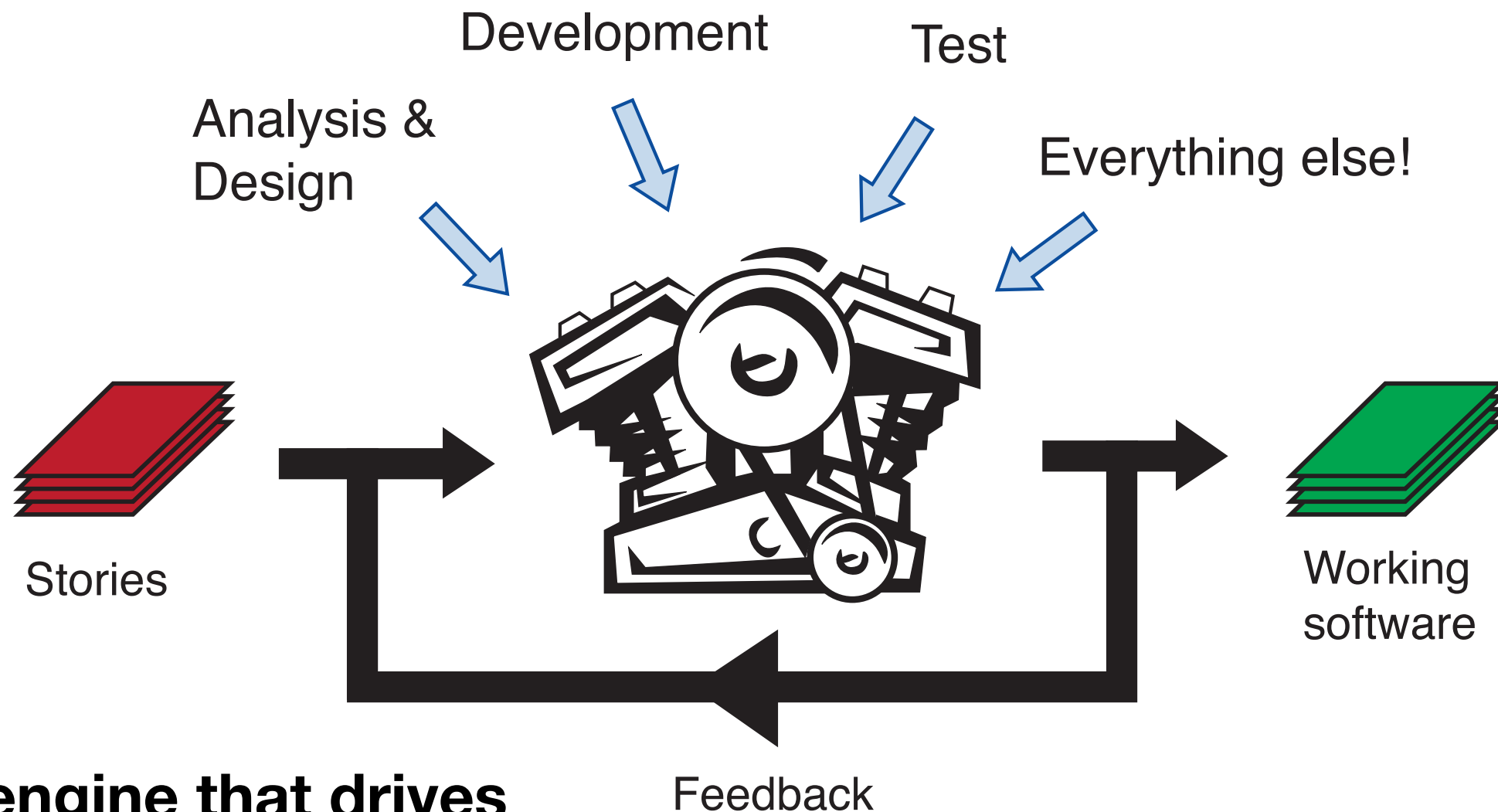
It is the engine that drives our project forward

Iteration Break-Down

- Each iteration has the following breakdown

  - For each story assigned to this iteration

    - Perform analysis and design (get the work ready)

    - Implement the story (do the work)

    - Perform Testing (check the work)

  - At the end of the iteration

    - provide a demo to the customer

    - reevaluate priorities and generate new stories (if needed)

    - Plan next iteration; Note: we avoid changing stories mid-iteration

Example

- The book presents an example of an iteration that has been assigned two user stories for a website that allows customers to create construction work permits:

  - Create work permit

  - Print work permit

- We'll draw on this example as we continue to discuss what to do on an iteration

Analysis and Design

- Different teams will need different artifacts but a general approach is the following

  - Take an index card and convert it into a single page of text that analyzes the feature in more depth, adds task info, and testing criteria

  - Perhaps create a flow-chart to understand the interactions that need to occur around the story

    - Who creates the permit? Who approves it? What can go wrong?

  - Create personas to describe the different type of users who interact with this story; use that information to update the flow chart

  - Experiment with different designs (UI layouts) by creating paper prototypes

  - Finally, define success for the story by writing acceptance tests (Use Cucumber!) (See book pages 165-170 for examples of the above steps)

Plug for User-Centered Design and OOA&D

- The book says (unfortunately)

    - "Remember, no one went to school to be taught how to do this stuff. Be creative. There is no one right way."

- That's not true!

    - Human-Centered Computing (HCI & CSCW & Ubiquitous Computing + ...)

        - has been developing techniques for designing interactive software systems for decades

- if you are interested in learning more about analysis and design techniques

    - Take CSCI 4839/5839: User-Centered Design

    - Take CSCI 4448/5448: Object-Oriented Analysis & Design

A&D: When do we do all this?

- The book recommends that analysis and design be done

  - by 1-2 team members plus the customer

  - on stories assigned to iteration **n+1**

  - during iteration **n**

- As a result, you are sure to have the analysis and design information you need just when you need it

  - And you do the work close enough to when it will be implemented to cut down on the chance that too many things change to disrupt development

- How do we get started?

  - Iteration 0 is a special case that we'll discuss in a moment

Implementation: Do the Work

- We'll cover techniques that are useful when developing software in an iteration in subsequent lectures

  - Unit Testing

  - Refactoring

  - Test-Driven Development (related to Cucumber)

  - Continuous Integration

  - Configuration/Build Management

Implementation: Iteration 0

- The first iteration on an Agile project is typically not focused on user stories but on getting the team ready to run

  - Determine your version control system (git, mercurial, svn, etc.)

  - Determine your development environment (Eclipse, IntelliJ, XCode, ...)

  - Determine your automated build tools (mvn, ant, rake, make, etc.)

  - Determine your automated testing tools (JUnit, Cucumber, etc.)

  - Determine your issue tracking system (Bugzilla, FogBugz, etc.)

- Plus, you need to start performing analysis and design on

  - the stories assigned to iteration 1!

Testing: Checking the Work

- Once a story has been implemented

  - with unit test and integration tests written and tested along the way

- the work is not yet over

- You must also allow the user to perform user acceptance tests

  - That is, you need to show the implemented story to the user

  - Show them that it passes the tests they helped you to create (Cucumber)

  - And get feedback on how well it meets their expectations

    - Change requests lead to new/updated stories with updated estimates and priorities and are handled in subsequent iterations

Execution Requires Coordination

- A&D, implementation, and testing are fundamental parts of an iteration

  - you have to do each of them for each story distributed across 2 iterations

- But, how do you keep track of the state of your user stories?

  - How do you know what progress is being made?

- You have to plan the types of communication that will exist in your iteration and where/when they will occur

  - Communication via e-mail, social media, issue tracking, etc. will be constant part of daily life

- But there are other practices you can place in your normal iteration that represent team synchronization points

  - These practices help your team stay coordinated and focused

Types of Coordination/Communication

SPM   **IPM**   Showcase
                    Plan next iteration
                    Mini-retrospective

Iteration (n)
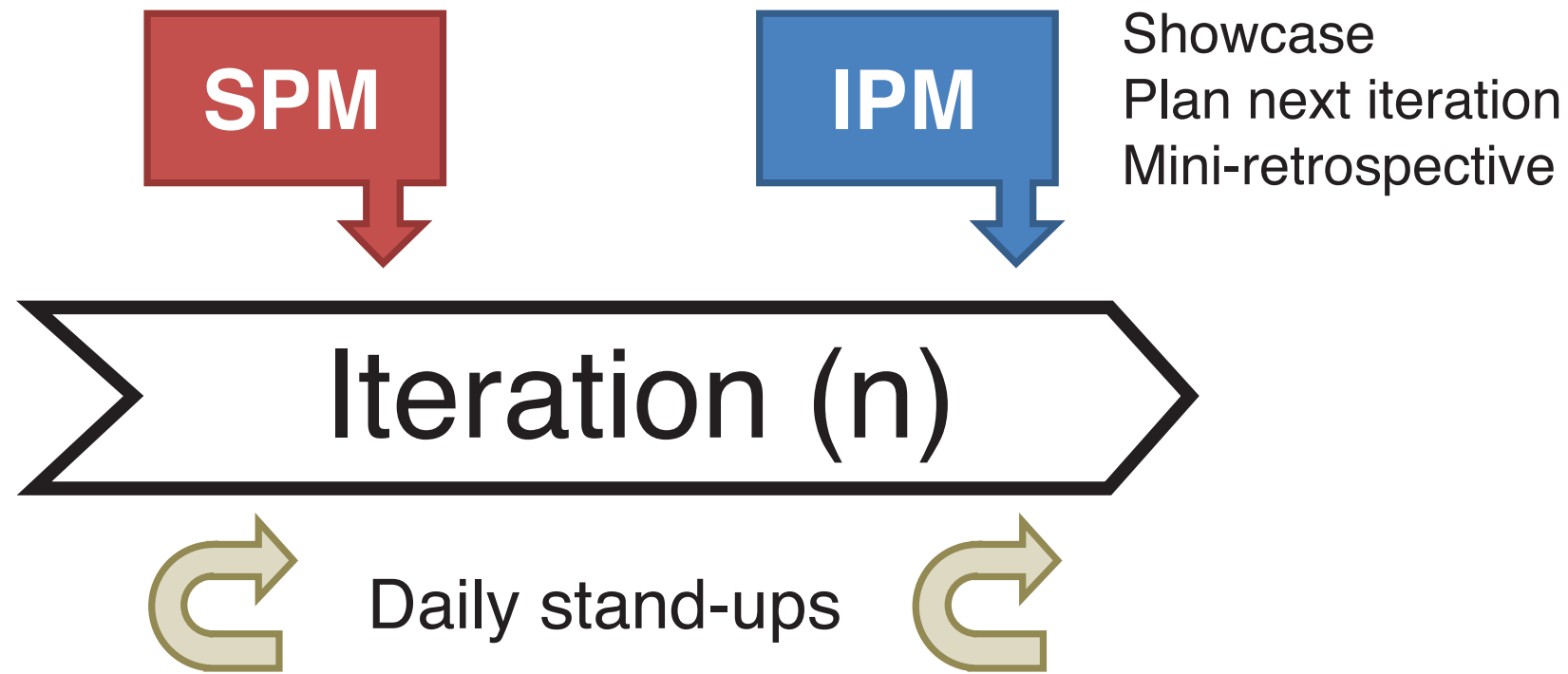
Daily stand-ups

* SPM: Story planning meeting
* IPM: Iteration planning meeting

- Daily stand-up meetings ("so short, there's no time to sit down")

- Story planning meetings; Iteration planning meetings;

  - Showcases (demo); Mini-retrospectives

The stand-up meeting

- Held every day, at the beginning of the work day

    - Quick status reports covering

        - the work finished yesterday

            - (make sure the burn down chart is updated if you are updating it daily)

        - the work planned for today

        - any issues that need to be addressed

            - such as problems with the development environment, a problem with a tricky algorithm, a difficult UI interaction, someone is out sick, etc.

- These meetings are meant to be quick; establish a heartbeat for the project

Story Planning Meeting

- The story planning meeting is a meeting

  - that is schedule towards the beginning or middle of an iteration

  - to verify that good progress is being made on

  - the analysis and design of the stories assigned to the next iteration

- It is also a place where our iteration plan can be updated if

  - a story turns out to be too big for a single iteration, or

  - vice-versa, a story turns out to be smaller than planned

- Both of these situations, require the iteration plan to be updated

  - that is, what stories are assigned to which iterations

  - In addition, estimates and priorities for upcoming stories can be adjusted

The Showcase

- You need to schedule time to demo the software that you created

  - The book recommends scheduling an event called the showcase where

    - during iteration n, you demo the work you finished during iteration n-1

- If you do it this way, you will be working right up to the end of an iteration to get stories completed

  - you then demo those stories during the next iteration

  - and respond to feedback in iteration n+1

- Or, you can show your completed stories at the end of an iteration

  - if so, you need enough time to do the demo and then an iteration planning meeting afterwards

Iteration Planning Meeting (I)

- The iteration planning meeting is held towards the end of an iteration

- It is the place where you

  - review your team's velocity

  - you review upcoming stories (as determined by priority)

  - and you plan out the next iteration

    - You already had a sense for this because you were already doing analysis and design on the upcoming stories BUT

      - you have to be flexible, if something doesn't go as planned during THIS iteration, that can affect your plans for the NEXT iteration

Iteration Planning Meeting (II)

- The IPM is also where you can discuss how things are going, in general,

  - and address any issues that may be causing problems

  - that is, issues that haven't come up or been addressed by the daily stand-up meetings

- Update the burndown chart (if you're updating each iteration rather than daily)

  - Discuss implications because

    - you'll either be ahead of schedule, on schedule, or LATE

- This is the part of Agile that is both loved and hated

  - there's no hiding the state of the project, progress is kept visible at all times

Example

Effort remaining

New stories

Actual velocity

Estimated velocity

Iterations

Time

What should we do with these?

Here the team is falling behind, because the customer added new stories sometime during iteration 3 or 4
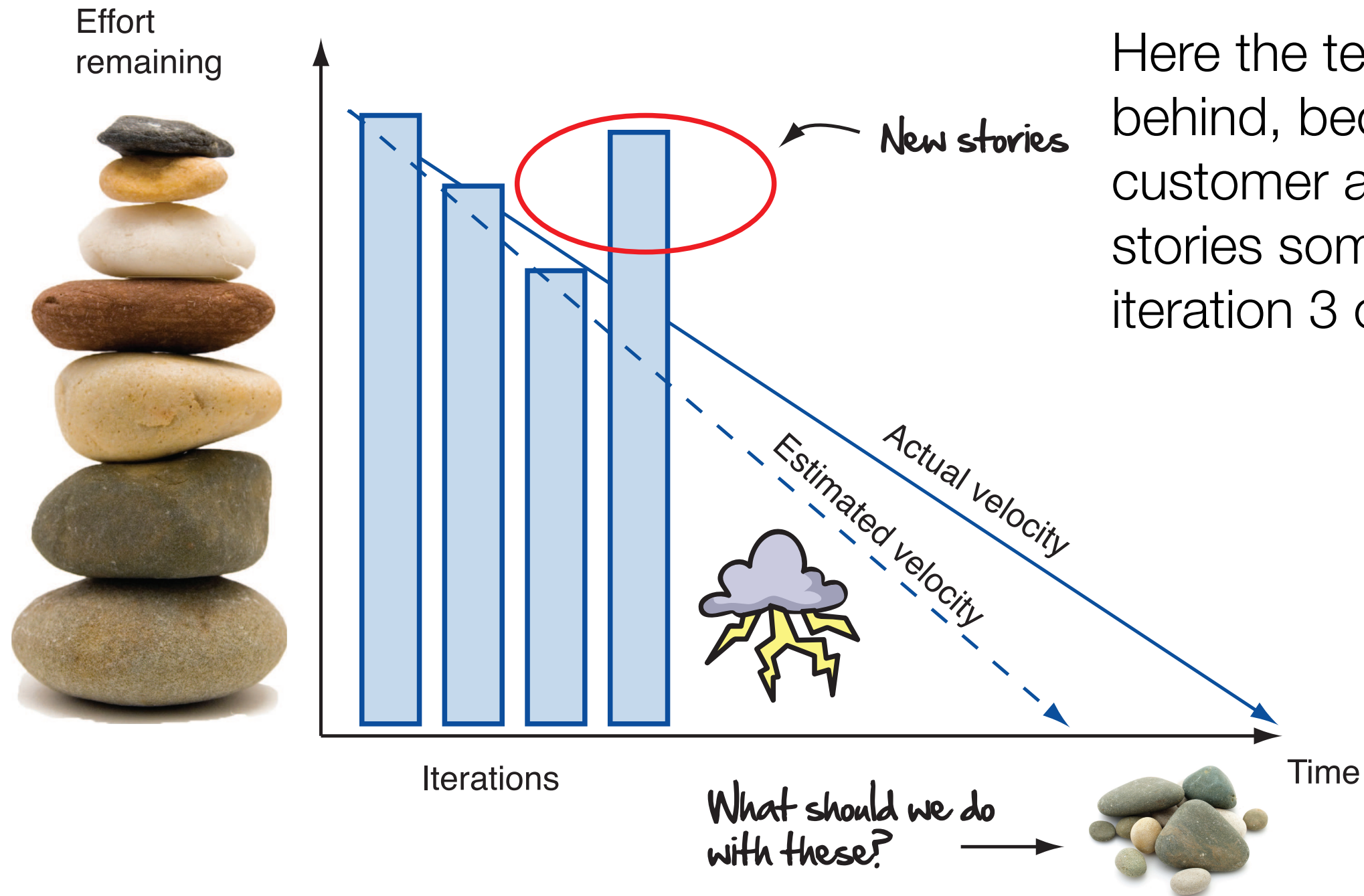
Mini-Retrospective

- The final coordination practice to put in place is

  - holding a short meeting at the end of an iteration

  - to examine our process

    - is there anything about our life cycle that is holding the team back

    - if so, identify potential solutions, pick one, and deploy the change in the next iteration

      - agile requires active software process improvement on an iteration by iteration basis!

  - you can identify other issues as well that are related to the tools being used by the team, or for overall team issues (the number of bugs went up)

Flexibility: No One-Size-Fits-All

- Agile is not a one-size-fits-all software life cycle

    - while these meetings are recommended

        - stand-ups, SPMs, showcases, IPMs, mini-retrospectives

    - they are not required; use what works for your team

        - try things out and iterate until you find the right balance

        - that's the essence of software process improvement

            - agility

                - the ability to do change how we do things on a weekly or biweekly basis

Your workspace

- If a team is co-located, there are things you can do to keep the progress of the project visible at all times

    - Our book calls this the visual workspace

        - It consists of

            - The inception deck (why are we doing this in the first place?)

            - The release wall (where are we?)

            - The storyboard (what are we doing right now?)

            - The velocity and burn-down wall (how fast are we going and when will we get there?)

The Release Wall

The release wall

Story cards remaining

I1   I2   I3   Iteration 4   ToDo

Stories we've done
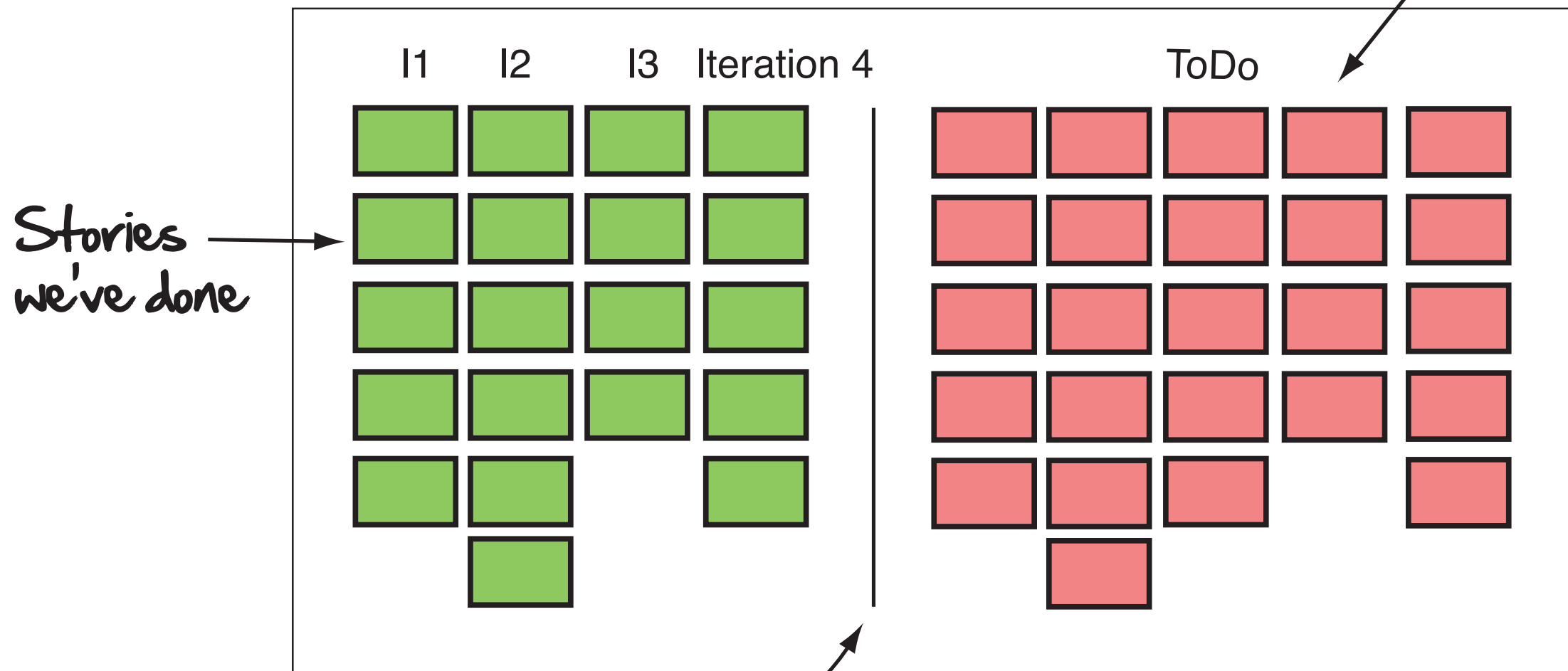
Looks like we are almost ½ way there

Updated once per iteration at the end of the iteration

The Storyboard

The storyboard

Current iteration — State of this iteration's user stories

Not started	In progress	Ready for test	Done

Analysis done — Under construction — Ready for review — Blessed and seen by our customer

The Velocity and Burn-Down Wall

Team velocity

V = 15 pts

Velocity (pts)

Iterations

How fast we are going

feeds Text

Project burn-down

Iterations

When we expect to be done
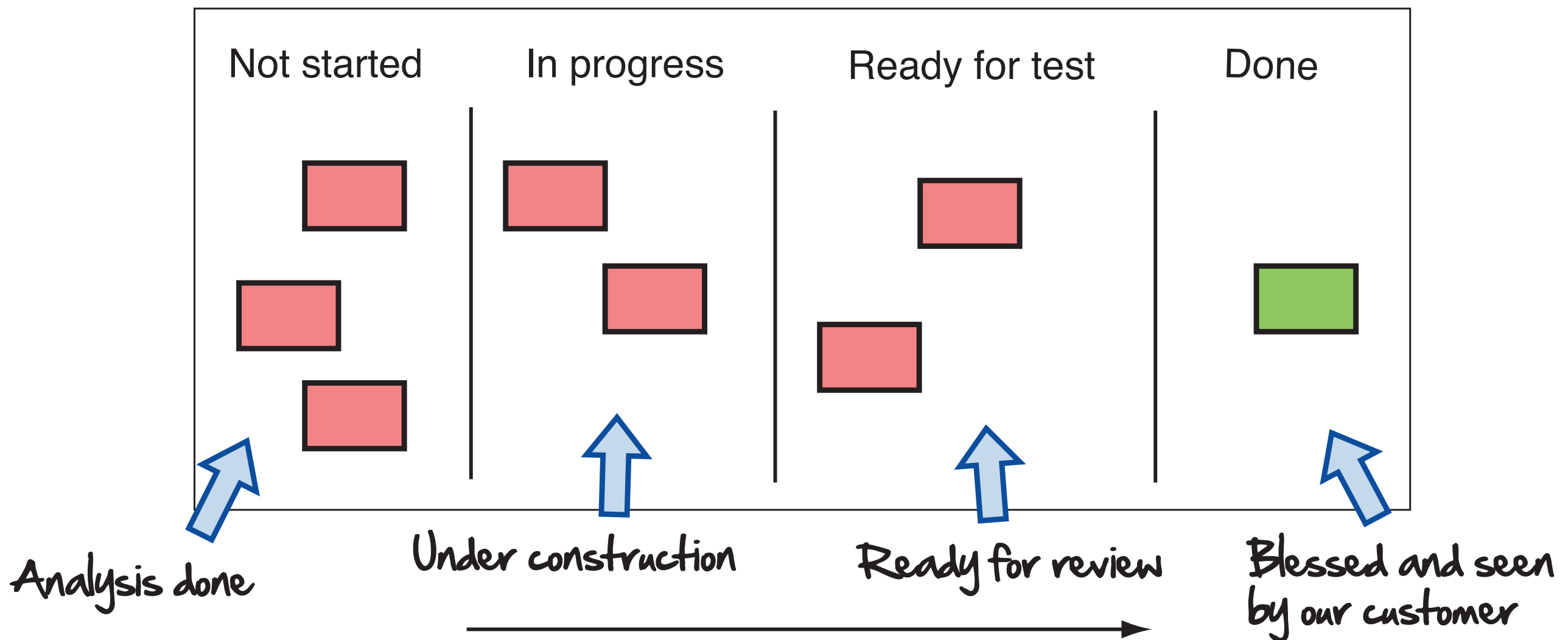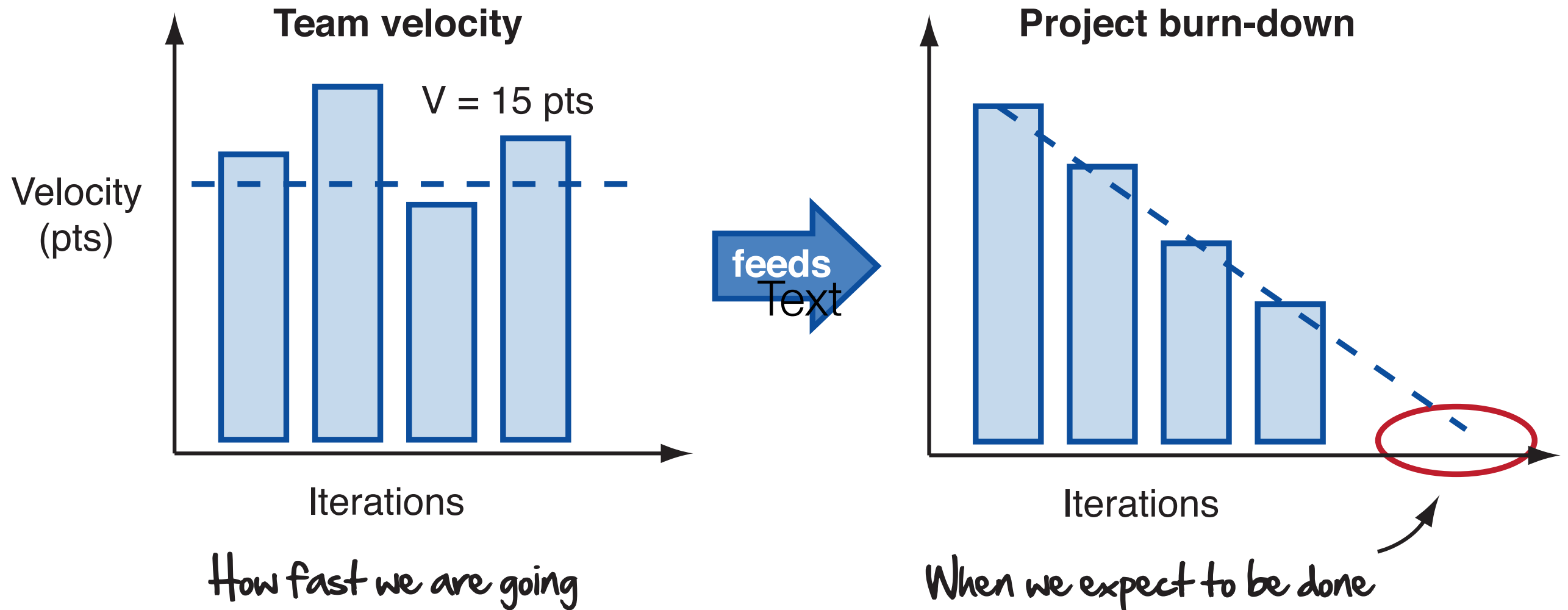
A Variant on the Story Board: The Big Board

- Head First Software Development presents a technique similar to the storyboard

  - It shows how to break the user story to a finer granularity to get a more detailed view of the progress made each day

  - In particular, user stories are decomposed into tasks

    - the tasks are shown on the storyboard as well and move around as they are worked on and completed

- Here's a demo of the big board technique

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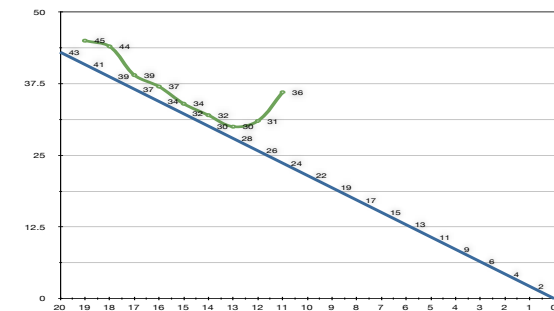
User Stories	In Progress	Complete	Burn Down
			Next
	Start with this…		
	Title: Show Current Deals **Description:** The website will show current deals to Orion's Orbits users.	**Title:** Book package **Description:** An Orion's Orbits user will be able to book a special package with extras online. **Title:**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

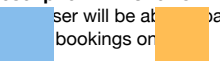| **User Stories**	**In Progress**	**Complete**	**Burn Down**

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.

Title: Show Current Deals

Description: The website will show current deals to Orion's Orbits users.
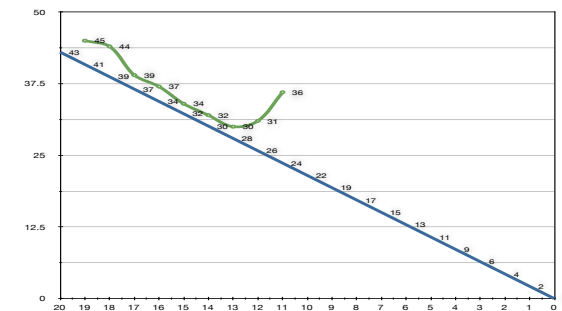
And add user stories

one per swim lane

Next

Completed
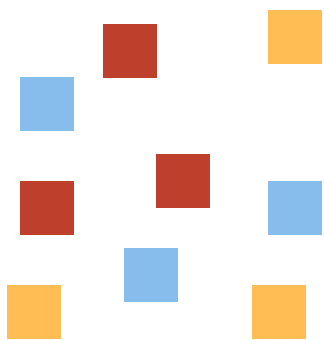
User Stories	In Progress	Complete	Burn Down

User Stories

Title: Book package

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

Title: Pay online

Description: An Orion's Orbits user will be able to pay for a booking online.
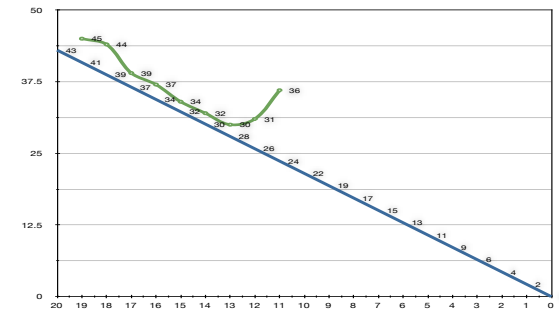
Title: Show Current Deals

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

In Progress   **Complete**

Burn Down
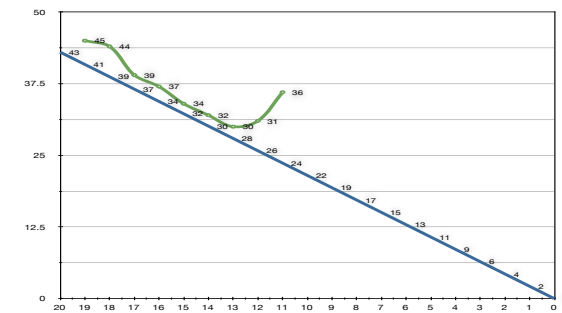
Next

Now add tasks each with a description and estimate

Completed

User Stories	In Progress	Complete	Burn Down

User Stories

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 bookings online

Title: Show Current Deals

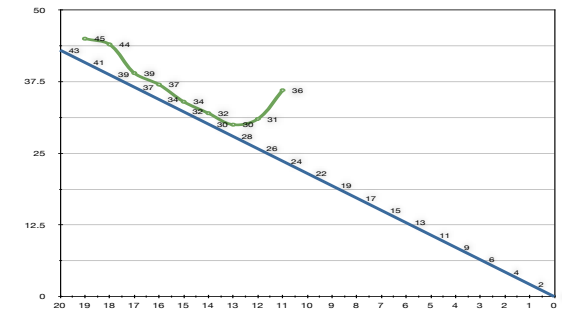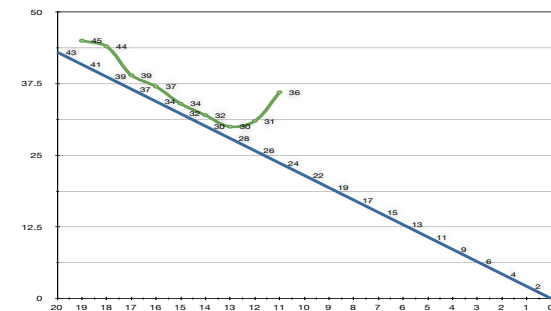**Description:** The website will show current deals to Orion Orbits users.

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 special package with extras online			
Title: Pay online **Description:** An Orion's O__ser __ab__ay fo__boo__on			**Next**
Title: Show Current Deals **Description:** The website w__w cu__deals to O__w Orb__rs.			
	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 special package with extras online

Title: Pay online

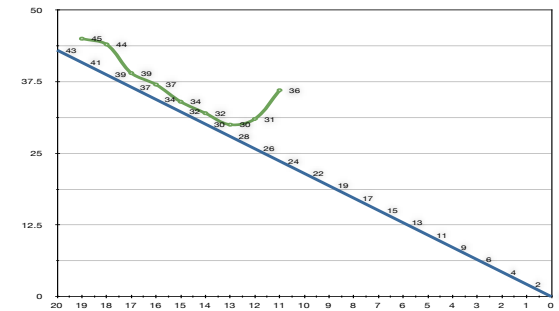**Description:** An Orion's Orbits user will be able to pay for bookings on

Title: Show Current Deals

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

Next

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

User Stories

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...

Title: Show Current Deals

Description: The website w... w cu... dea... O... Orb... rs.

In Progress

Complete

Burn Down

Next

Completed

Be sure to update the Burn Down chart as you make (or don't make) progress

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.
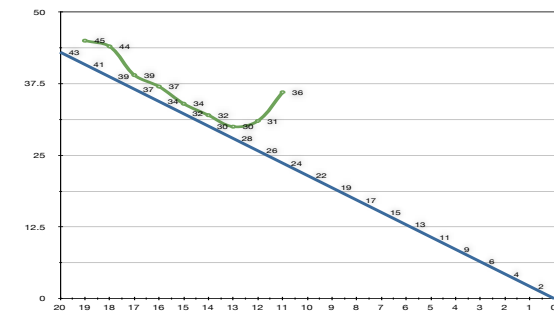
Title: Show Current Deals

Description: The website will show current deals Orion's Orbits offers.
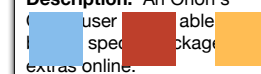
Next

Completed

Its okay to be working on more than one task for a single user story

User Stories	In Progress	Complete	Burn Down
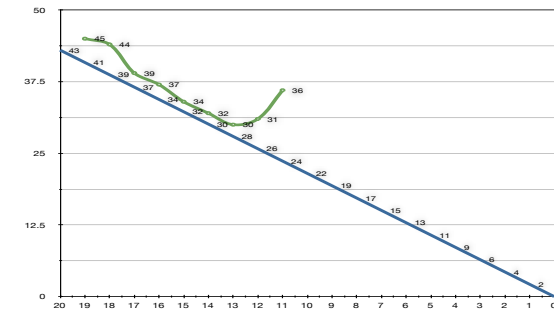
Title: Pay online

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

Title: Show Current Deals

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

Next

Eventually all tasks for a user story are complete; the whole story moves to the Completed section
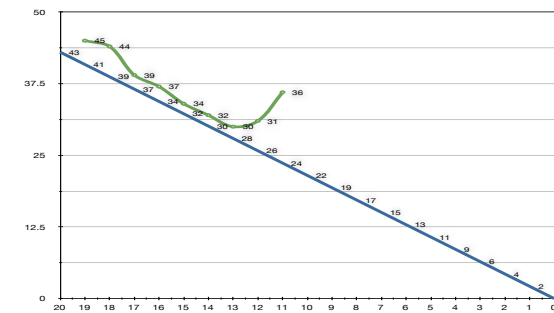
Completed

Title: Book package

Description: An Orion's user able special package extras online.

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.

Burn Down

Next

Title: Show Current Deals

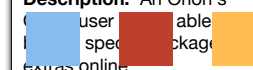**Description:** The website will show current deals for Orion's Orbits customers.

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

Completed

Title: Book package

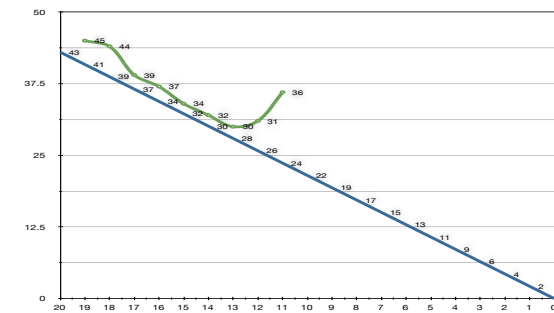**Description:** An Orion's Orbits user will be able to book special packages and extras online.

User Stories	In Progress	Complete	Burn Down

Burn Down

Title: Pay online

Description: An Orion's
O▢ user ▢ abl▢ ▢uy
fo▢ ▢boo▢ ▢onli

Next

Title: Show Current Deals

Description: The website
w▢▢ ▢w c▢▢ ▢dea▢
O▢ ▢Orb▢ ▢rs.

Keep working until all stories are complete or have been pushed to the next iteration

Completed

Title: Book package

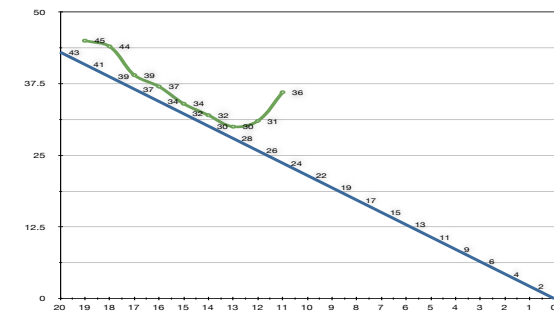**Description:** An Orion's
O▢ user ▢ able▢
▢ spec▢ ▢ckage▢
extras online.

User Stories	In Progress	Complete

Burn Down

Next

Title: Show Current Deals

Description: The website w___ ___ cu___ dea___ O___ Orb___ rs.

Completed

Title: Book package

Description: An Orion's O___ user ___ able ___ ___ spec___ ckage___ extras online.

Title: Pay online

Description: An Orion's O___ ser ___ abl___ ___ y fo___ boo___ onli___

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

Summary

- Iteration Management

  - for each story: Analysis & Design, Implement, Test; split across 2 iterations

- Agile Communication Plans

  - Stand-Ups, SPMs, IPMs, Showcases, Retrospectives

- Setting Up a Visual Workspace

  - Inception Deck, Release Wall, Storyboard (Big Board), Velocity/Burn-Down

Coming Up Next

- Lecture 22: Cucumber: Testing User Interfaces and More

- Lecture 23: TBD