Planning and Tracking Agile Projects

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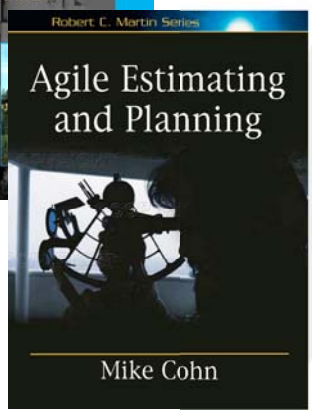
Mike Cohn - background



Consultant, author, and speaker

- Founding member and director of Agile Alliance, Scrum Alliance, and Agile Project Leadership Network
- Founder of Mountain Goat Software

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Imagine...

- That you're fed up with software development as a career
- And you decide to go into the landscaping business
- Your first job is moving this pile of rock from the front of my house to the back

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How might you estimate this?

- One way:
  - Look at the pile of rock and estimate how many wheelbarrow loads it represents
- After an hour, see how many wheelbarrow loads you've moved then extrapolate the total duration

- I think that's 80 wheelbarrow loads
- After an hour I've moved 20 loads
- So, I'll be done in a total of 4 hours

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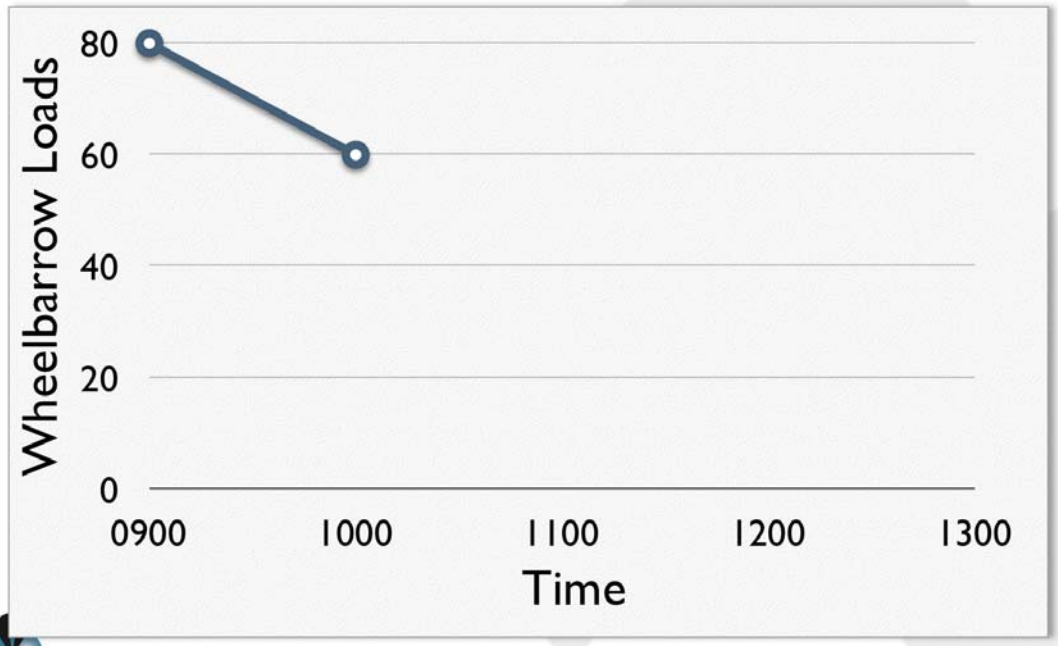
My landscaping



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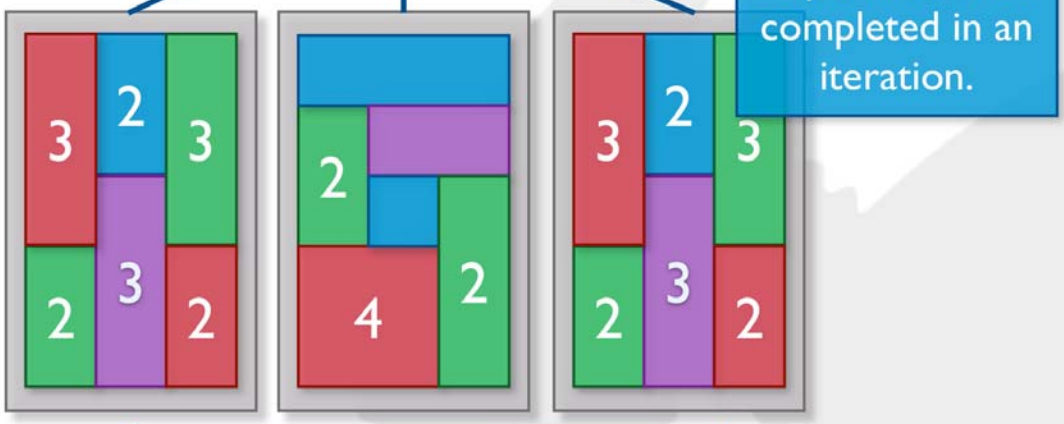
- An iteration is a short, constrained period of time
- Typically 1-4 weeks

Velocity is the amount of work planned or completed in an iteration.



A release typically comprises more than one iteration

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The planning onion

- Agile teams plan at the innermost three levels.
- Others (on the team in the company) plan at the outer levels.

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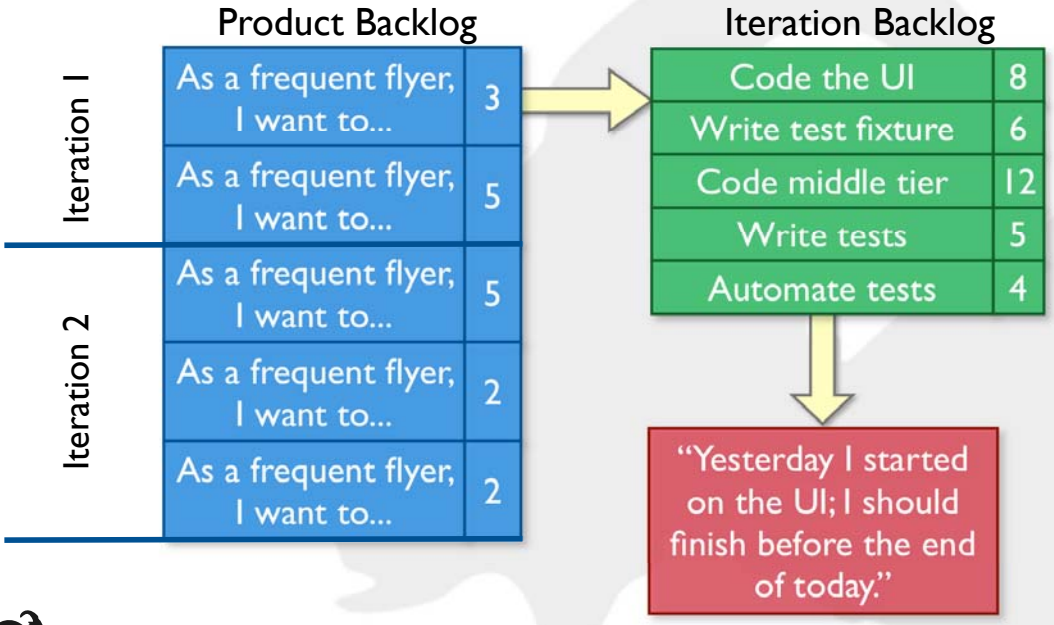
Relating the different planning levels



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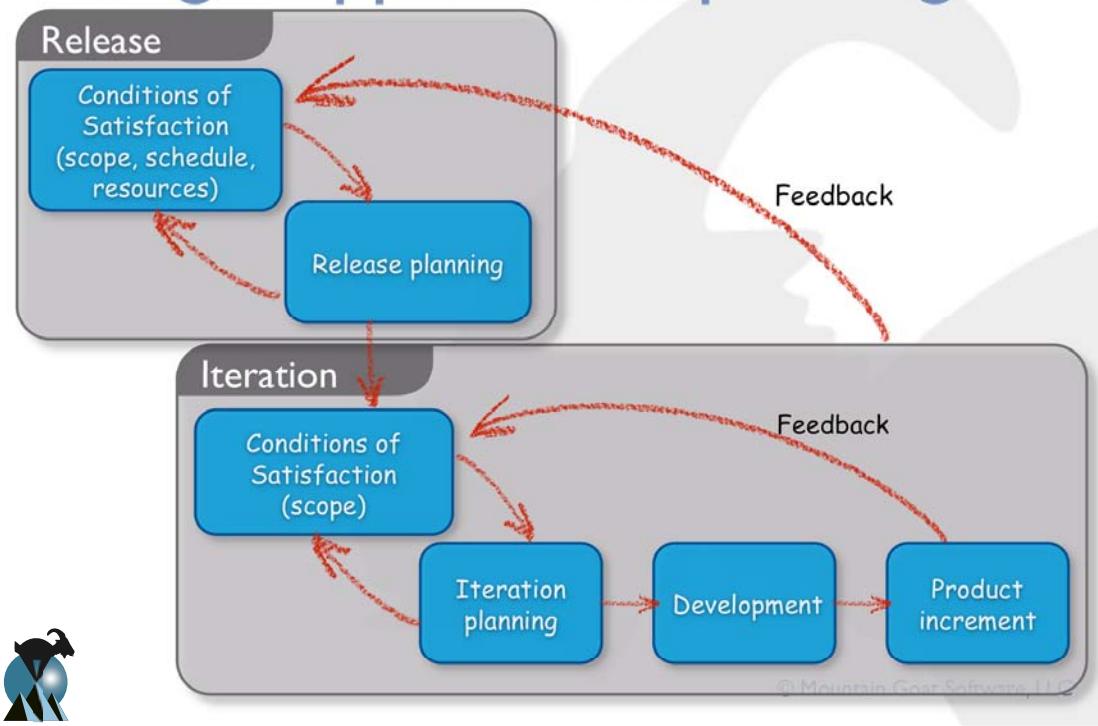
An agile approach to planning



Agenda

- Estimating
- Release planning
- Burndown charts

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Story points

- Probably the most commonly used estimating unit among agile teams today
  - Name is derived from agile teams commonly expressing requirements as "user stories"
- Based on a combination of the size and complexity of the work
- Unitless but numerically relevant estimates
  - A 10-point user story is expected to take twice as long as a 5-point user story

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Consider these two piles of work

What story point values might we put on these?

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Zoo points

Assign "zoo points" to the following breeds

Lion
Kangaroo
Rhinocerus
Bear
Giraffe
Gorilla
Hippopotamus
Tiger

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Three key advantages

- Estimating in story points:
  1. Forces the use of relative estimating
     - Studies have shown we're better at this†
  2. Focuses us on estimating the size, not the duration
     - We derive duration empirically by seeing how much we complete per iteration
  3. Puts estimates in units that we can add together
     - Time based estimates are not additive

†Lederer and Prasad, 1998. *A Causal Model for Software Cost Estimating Error* and Vicinanza et al., 1991. *Software Effort Estimation: An Exploratory Study of Expert Performance.*

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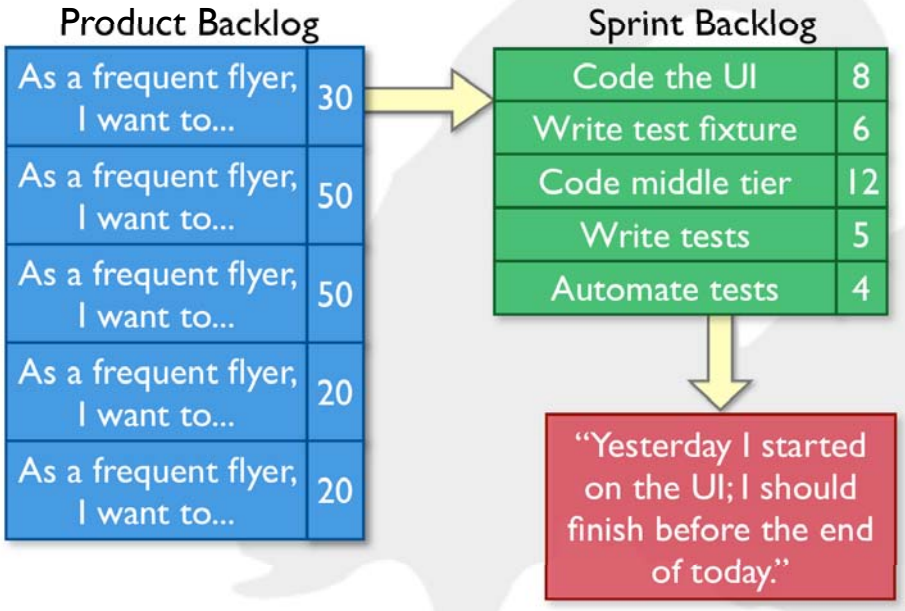
Comparing apples to apples



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Planning poker for estimating

- An iterative approach to estimating, loosely based on wideband Delphi
- Steps
  1. Each estimator is given a deck of cards, each card has a valid estimate written on it
  2. Customer/Product owner reads a story and it's discussed briefly
  3. Each estimator selects a card that's his or her estimate
  4. Cards are turned over so all can see them
  5. Discuss differences (especially outliers)
  6. Re-estimate until estimates converge

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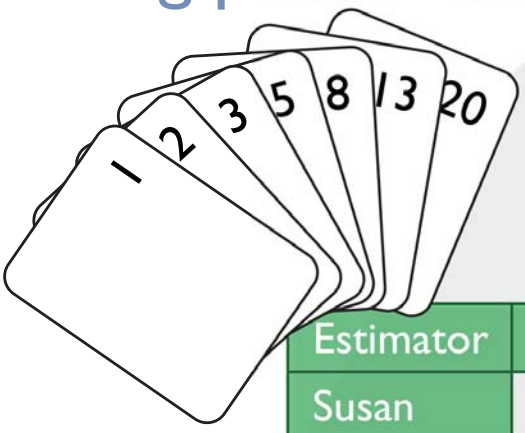
Planning poker - an example



Estimator	Round 1	Round 2
Susan	3	5
Vadim	8	5
Ann	2	5
Chris	5	8

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Estimate these

Product backlog item	Estimate
Read a high-level, 10-page overview of agile software development in *People* magazine.	
Read a densely written 5-page research paper about agile software development in an academic journal.	
Write the product backlog for a simple eCommerce site that sells only clocks.	
Recruit, interview, and hire a new member for your team.	
Create a 60-minute presentation about agile estimating and planning for your coworkers.	
Wash and wax your boss' Porsche.	
Read a 150-page book on agile software development.	
Write an 8-page summary of that book for your boss.	

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Why planning poker works

- Those who will do the work, estimate the work[1]
- Estimators are required to justify estimates[2, 3]
- Focuses most estimates within an approximate one order of magnitude[4, 5]

[1]Jørgensen, Magne. 2004. *A Review of Studies on Expert Estimation of Software Development Effort.*
[2]Hagafors, R., and B. Brehmer. 1983. *Does Having to Justify One's Decisions Change the Nature of the Decision Process?*
[3]Brenner, et al. 1996. *On the Evaluation of One-sided Evidence.*
[4]Miranda, Eduardo. 2001. Improving Subjective Estimates Using Paired Comparisons.
[5]Saaty, Thomas. 1996. *Multicriteria Decision Making: The Analytic Hierarchy Process.*

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Why planning poker works

- Combining of individual estimates[6] through group discussion[7] leads to better estimates
- Emphasizes relative rather than absolute estimating
- Estimates are constrained to a set of values so we don't waste time in meaningless arguments
- Everyone's opinion is heard
- It's quick and fun

[6]Hoest, Martin, and Claes Wohlin. 1998. *An Experimental Study of Individual Subjective Effort Estimations and Combinations of the Estimates.*
[7]Jørgensen, Magne, and Kjetil Moløkken. 2002. *Combination of Software Development Effort Prediction Intervals: Why, When and How?*

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Reduces impact of irrelevant information

Group A
- Given project spec.

→ 20 hours

Group B
- Given same spec but with estimation-irrelevant details added:
  - end users' desktop applications
  - user passwords,
  - etc.

→ 39 hours

Source: *How to avoid impact from irrelevant and misleading information on your cost estimates,* Magne Jørgensen and Stein Grimstad, Simula Research Laboratory, Simula Research Labs Estimation Seminar, Oslo, Norway 2006.

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Specification length

Group A
- Given a one-project spec.

→ 117 hours

Group B
- Given a spec with exactly the same text but was 7 pages long
- Increased length achieved through
  - double line space
  - wide margins
  - larger font size
  - more space between paragraphs

→ 173 hours

Source: *How to avoid impact from irrelevant and misleading information on your cost estimates,* Magne Jørgensen and Stein Grimstad, Simula Research Laboratory, Simula Research Labs Estimation Seminar, Oslo, Norway 2006.

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Extra requirements

Group A
- Given requirements R1–R4

→ 4 hours

Group B
- Given requirements R1–R5

→ 4 hours

Group C
- Given requirements R1–R5
  - but told to estimate R1–R4 only

→ 8 hours!

Source: *How to avoid impact from irrelevant and misleading information on your cost estimates*, Magne Jørgensen and Stein Grimstad, Simula Research Laboratory, Simula Research Labs Estimation Seminar, Oslo, Norway 2006.

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Reduces likelihood of anchoring

Control group
- Given a product spec

→ 456 hours

High anchor group
- Given the same product spec
- Told the customer thinks 500 hours is a reasonable estimate but that
  - The customer knows very little about the implications of his spec on the estimate
  - You shouldn't let his number influence you

→ 555 hours

Low anchor group
- Same as high but customer thinks 50 hours

→ 99 hours

Source: *How to avoid impact from irrelevant and misleading information on your cost estimates*, Magne Jørgensen and Stein Grimstad, Simula Research Laboratory, Simula Research Labs Estimation Seminar, Oslo, Norway 2006.

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Agenda

- [x] Estimating
- [ ] Release planning
- [ ] Burndown charts

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Release planning

Purpose

To answer questions such as:

- How much will be done by 30 June?
- When can we ship with this set of features?
- How many people or teams should be on this project?

Inputs

- Velocity
- The length of the project
- Prioritized product backlog

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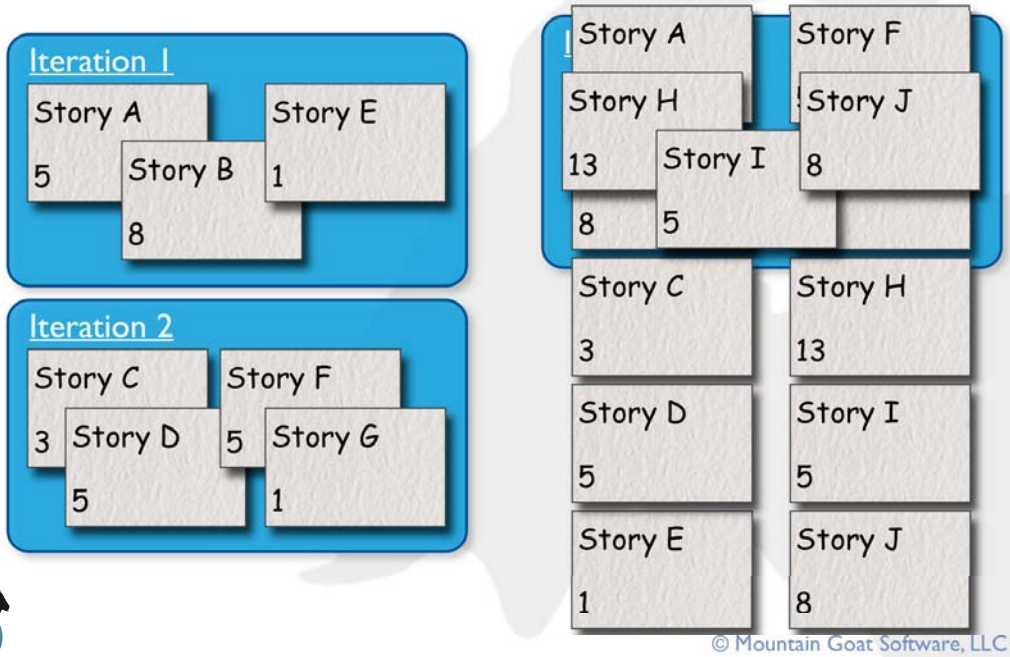
An example with velocity=14



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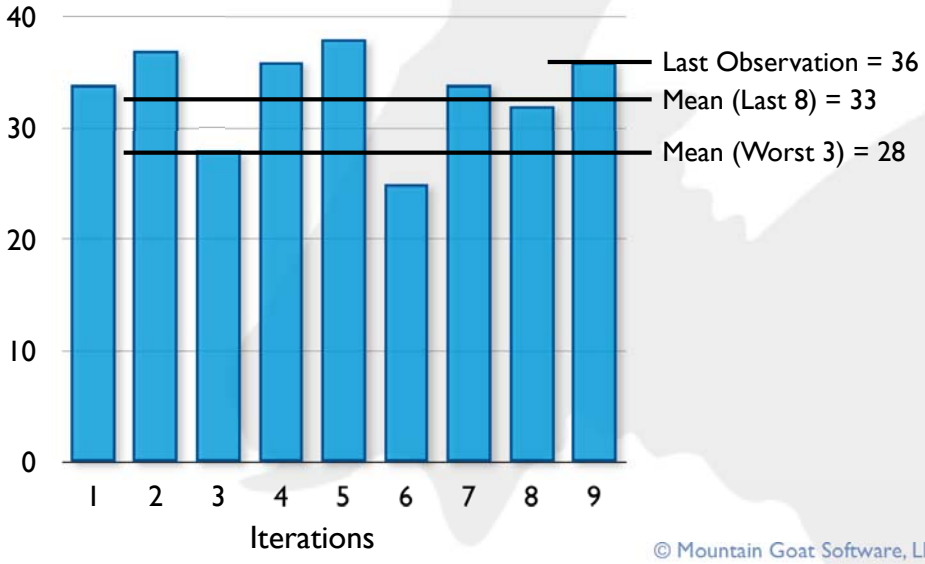
Updating the release plan

- Use multiple views of observed velocity



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Extrapolate from velocity

At our slowest velocity we'll finish here

At our long-term average we'll finish here

At current velocity we'll finish here

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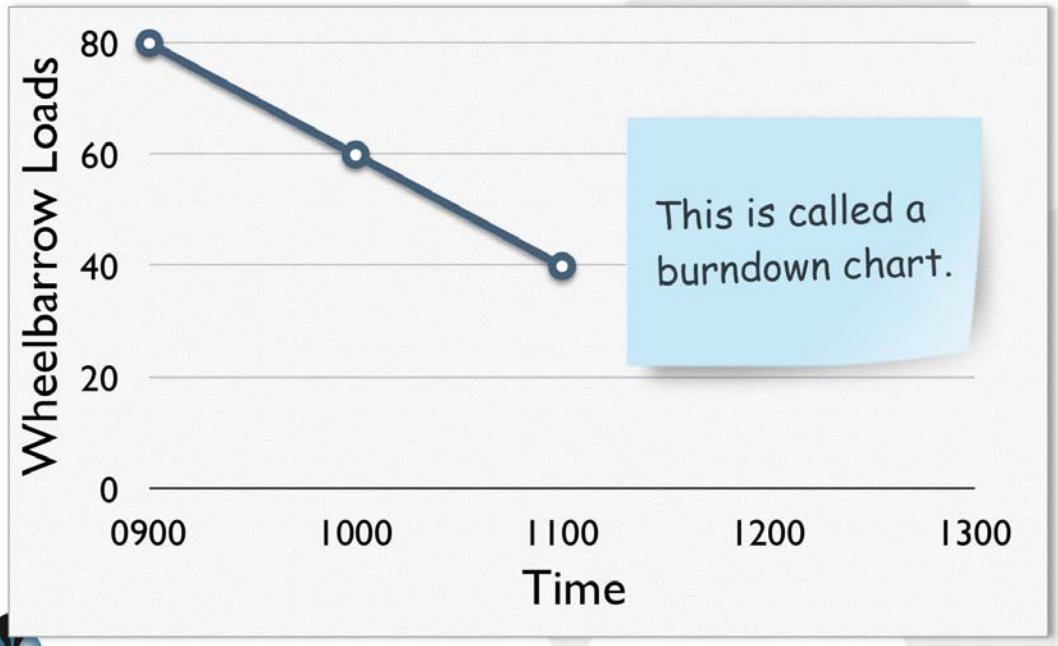
How's my landscaping coming?



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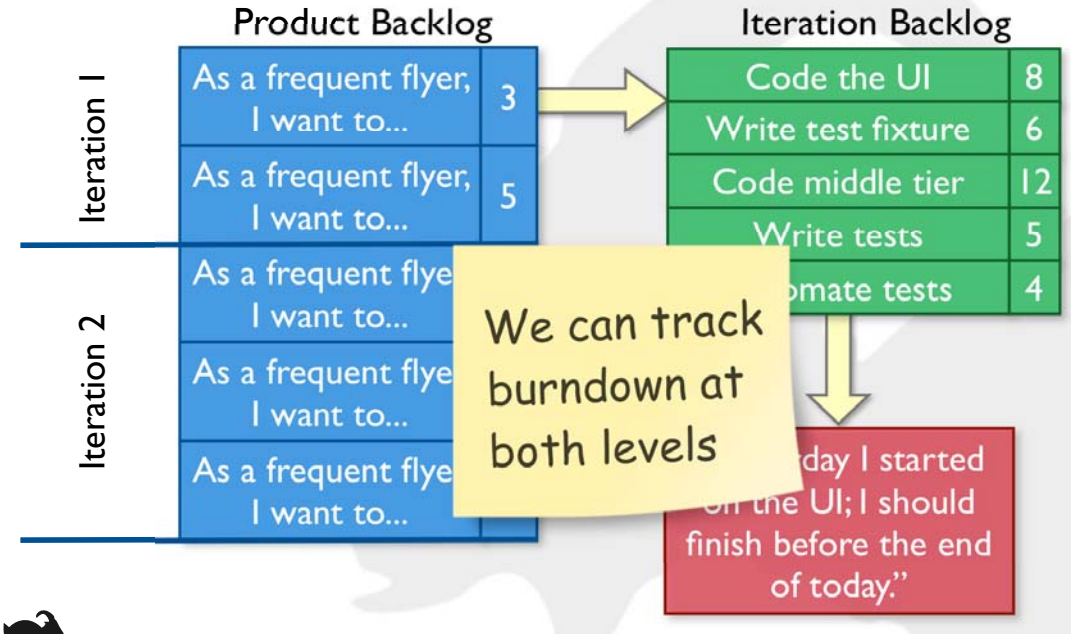
Remember the different levels?



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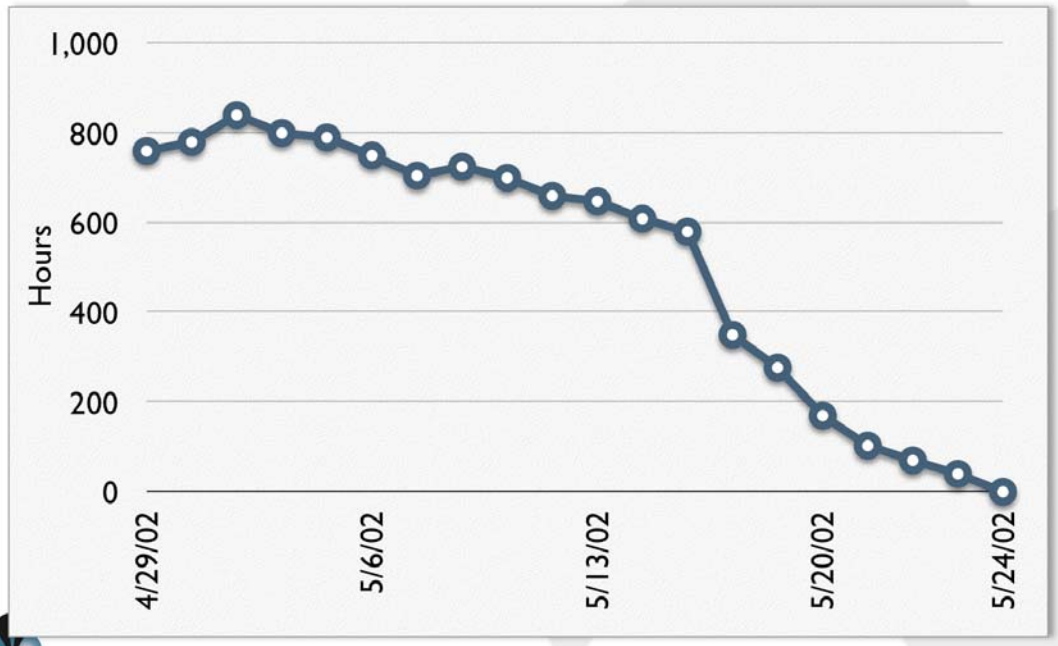
An iteration burndown chart



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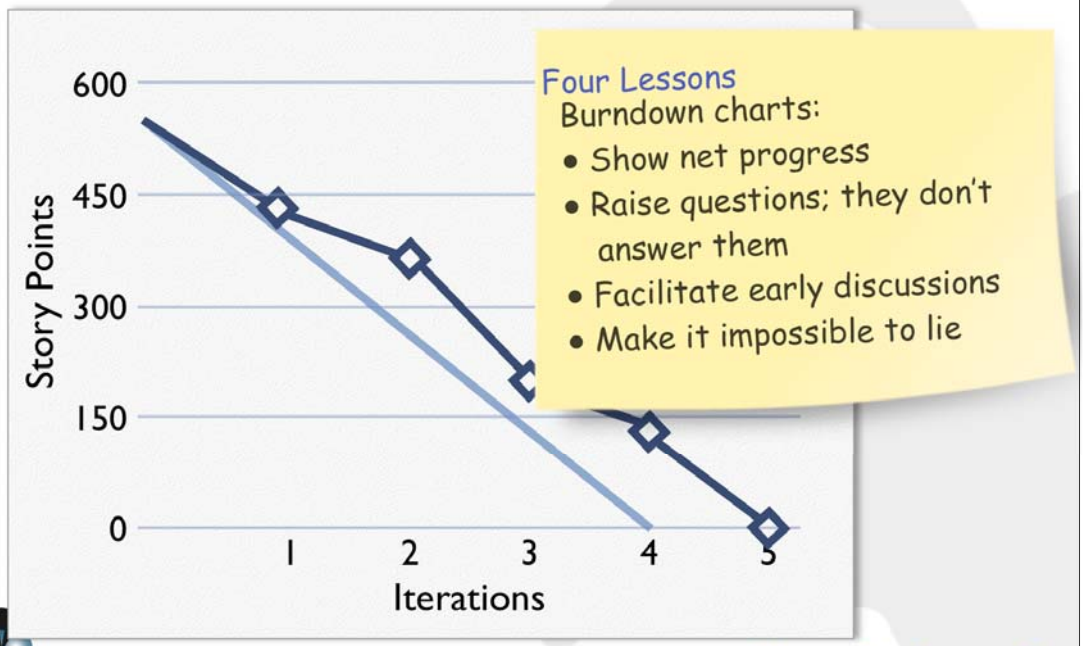
A release burndown chart



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Mike Cohn contact info

mike@mountaingoatsoftware.com

www.mountaingoatsoftware.com

(720) 890-6110 (office)

(303) 810-2190 (mobile)

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