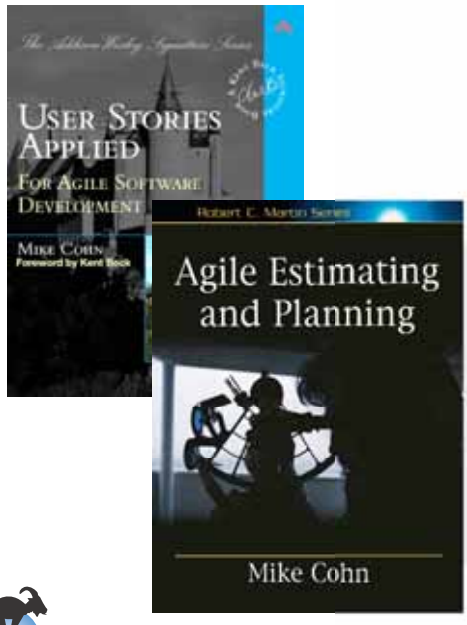
Agile Estimating and Planning

Mike Cohn - background



- Agile coach and trainer
- Founding member and director of Agile Alliance and Scrum Alliance
- Founder of Mountain Goat Software
- Ran my first Scrum project back in 1995
- Typical programmer to manager etc. progression

What's a good plan?

- A good plan is one that supports reliable decision-making
- Will go from
  - We'll be done in the third quarter
  - We'll be done in August
  - We'll be done August 18th

"It's better to be roughly right than precisely wrong."

~John Maynard Keynes

What makes planning agile?

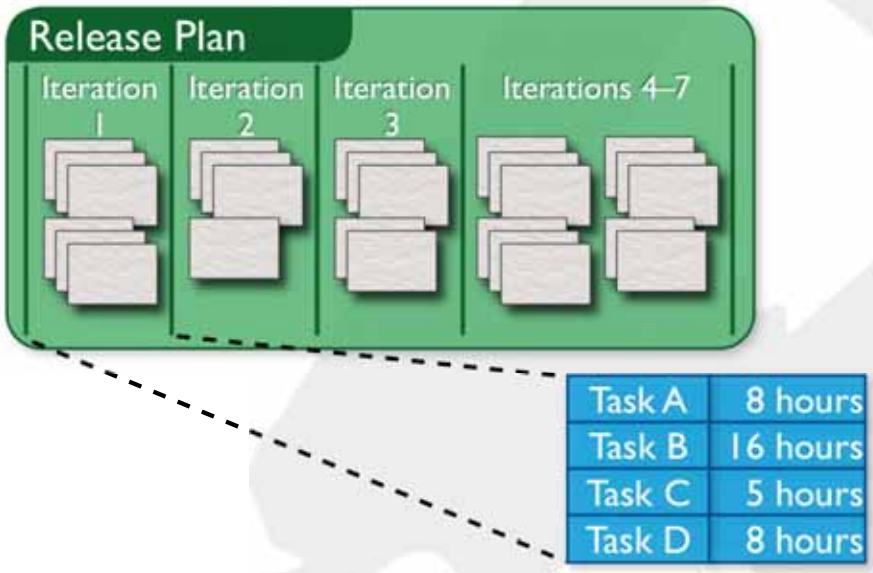
Is more focused on planning than the plan

Encourages change

Results in plans that are easily changed

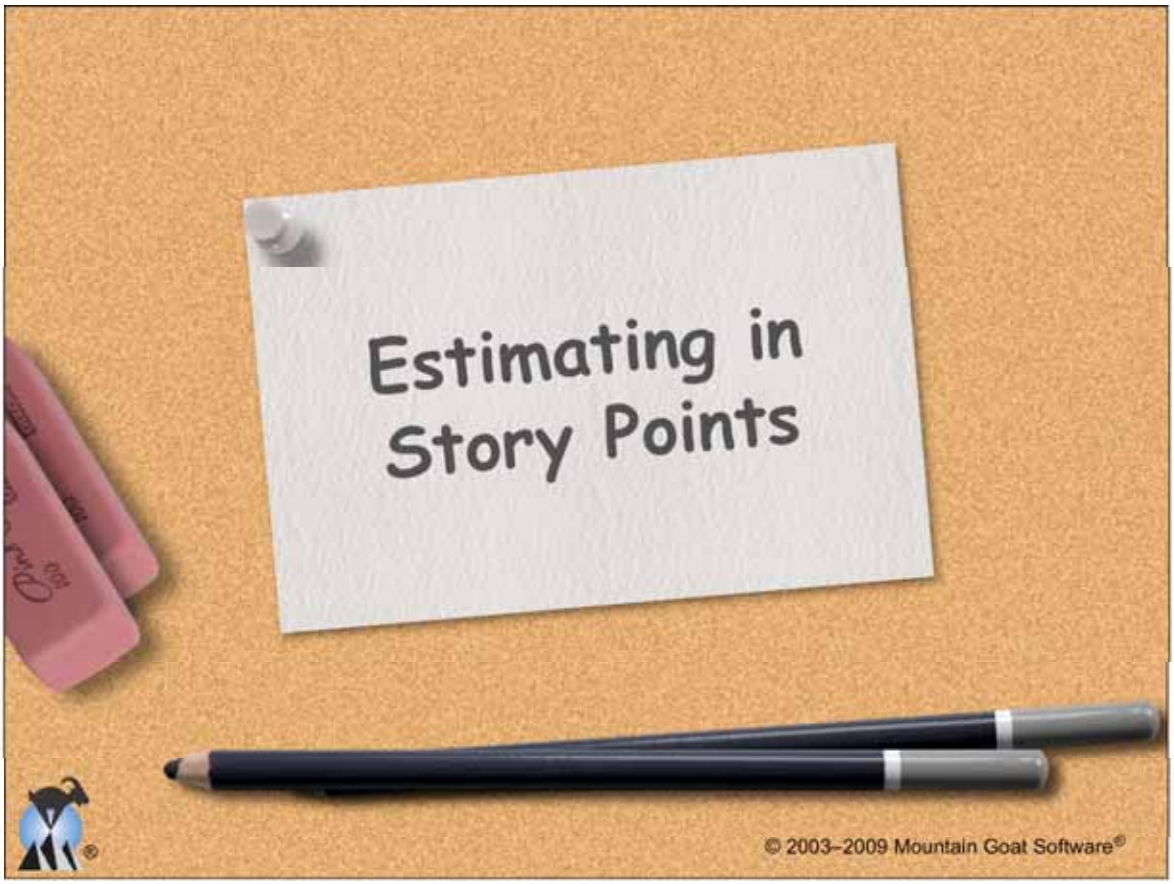
Is spread throughout the project

Release and iteration planning



Agenda

- Product backlog estimation units
  - Story points
  - Ideal time
- Techniques for estimating
- Iteration planning
- Release planning


Estimating in Story Points
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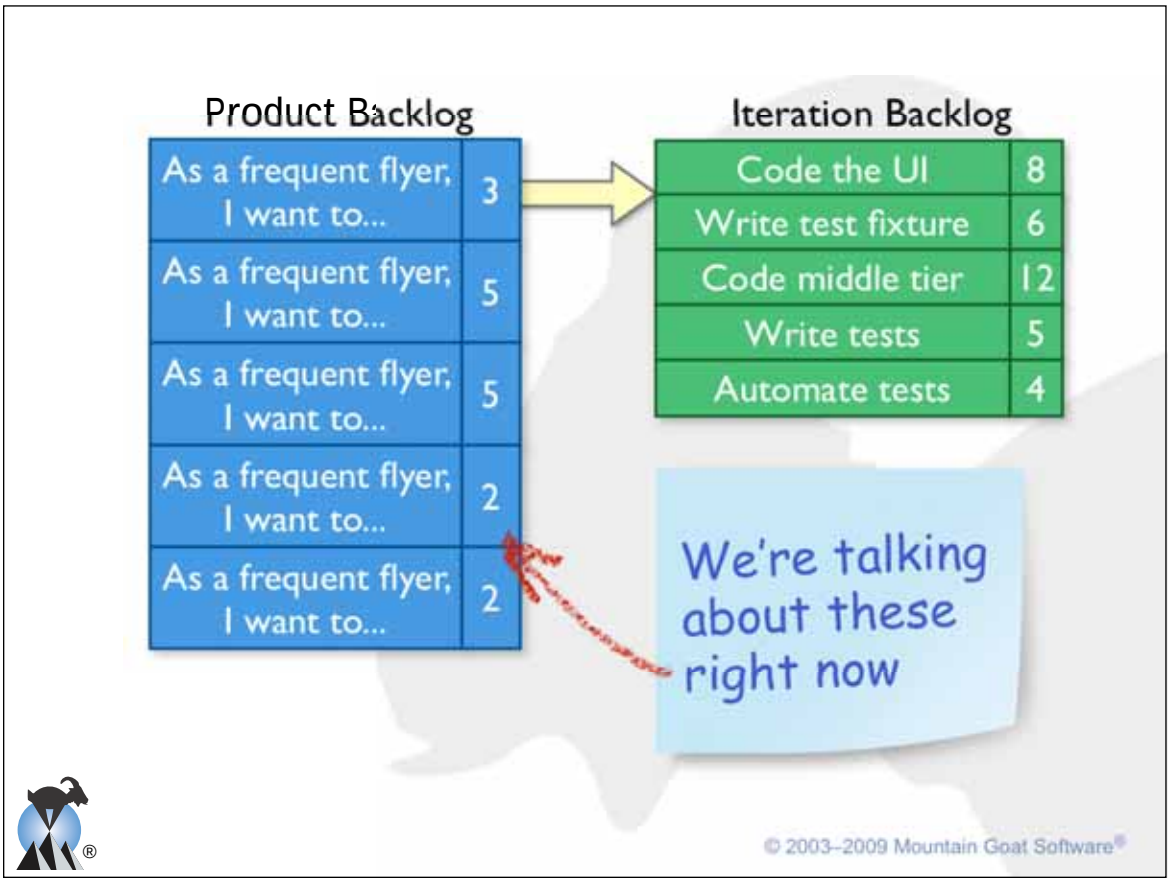
Product Backlog
As a frequent flyer, I want to... 3
As a frequent flyer, I want to... 5
As a frequent flyer, I want to... 5
As a frequent flyer, I want to... 2
As a frequent flyer, I want to... 2
Iteration Backlog
Code the UI 8
Write test fixture 6
Code middle tier 12
Write tests 5
Automate tests 4
We're talking about these right now
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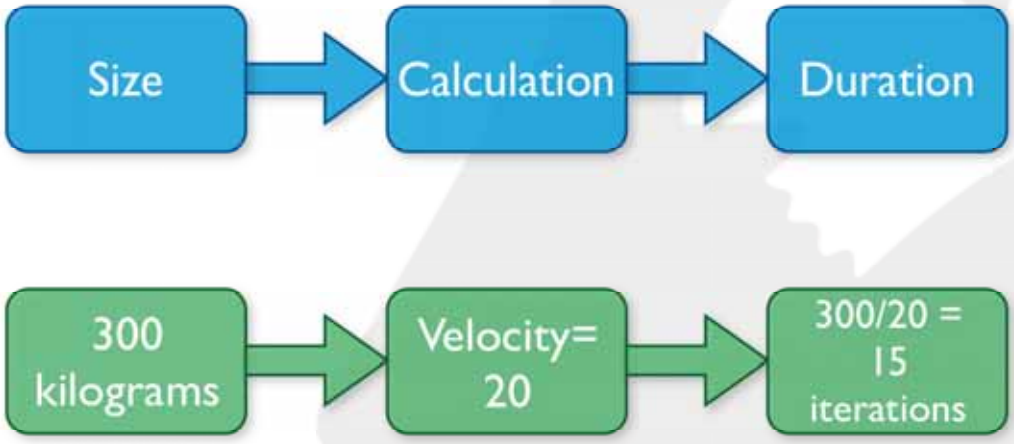
How long will it take...

- ...to read the latest Harry Potter book?
- ...to drive to Phoenix?

Estimate size; derive duration

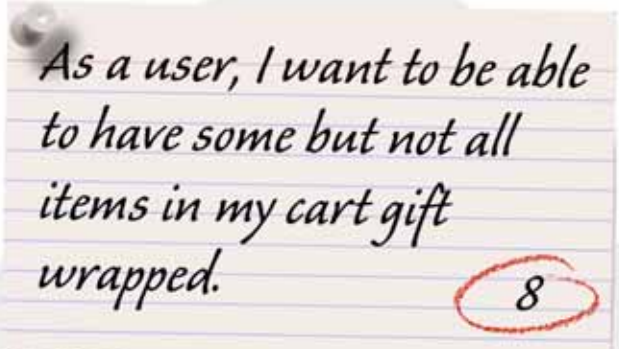


Measures of size

- Traditional and agile measure size differently

Story points

- The "bigness" of a task
- Influenced by
  - How hard it is
  - How much there is



- Relative values are what is important.
  - A login screen is a 2.
  - A search feature is an 8.
- Points are unit-less
- Basic math properties should hold, e.g., 5+5 = 10

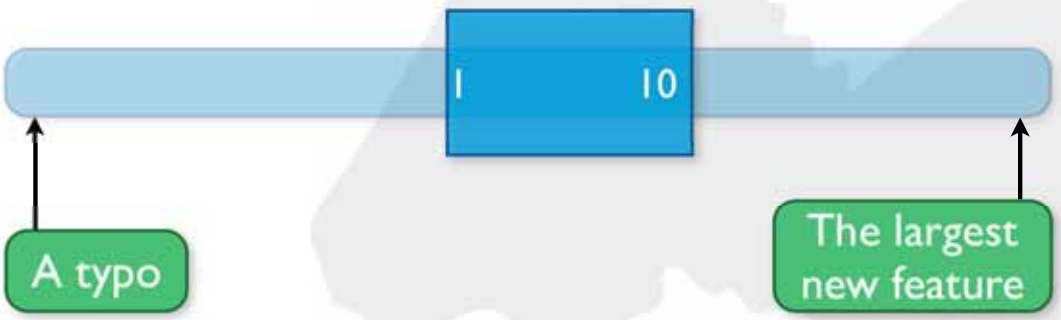
Zoo points

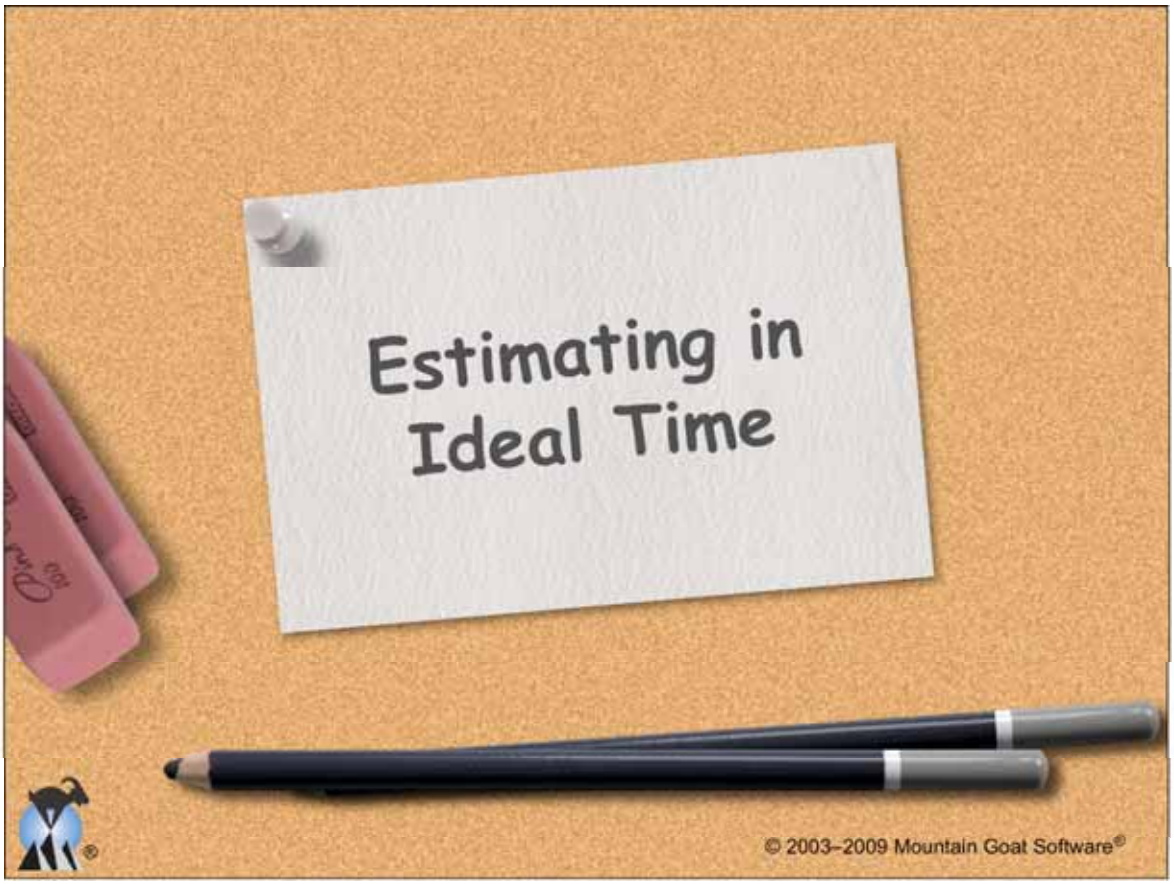
Assign "zoo points" to the following animals

Lion
Kangaroo
Rhinocerus
Bear
Giraffe
Gorilla
Hippopotamus
Tiger

One order of magnitude

- We're good over one order of magnitude
- So think about where to place it on your product backlog





Ideal time

- How long something would take if
  - it's all you worked on
  - you had no interruptions
  - and everything you need is available
- The ideal time of a football game is 60 minutes
  - Four 15-minute quarters
- The elapsed time is much longer (3+ hours)

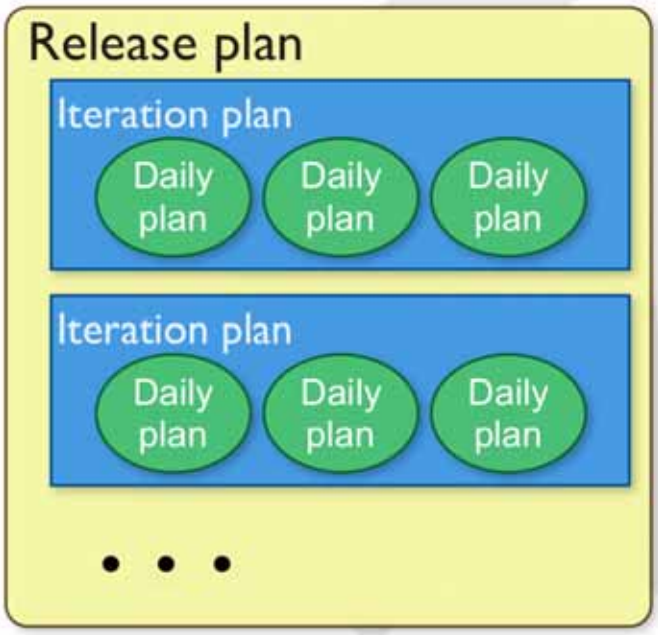
Ideal time vs. elapsed time

- It's easier to estimate in ideal time
- It's too hard to estimate directly in elapsed time
  - Need to consider all the factors that affect elapsed time at the same time you're estimating

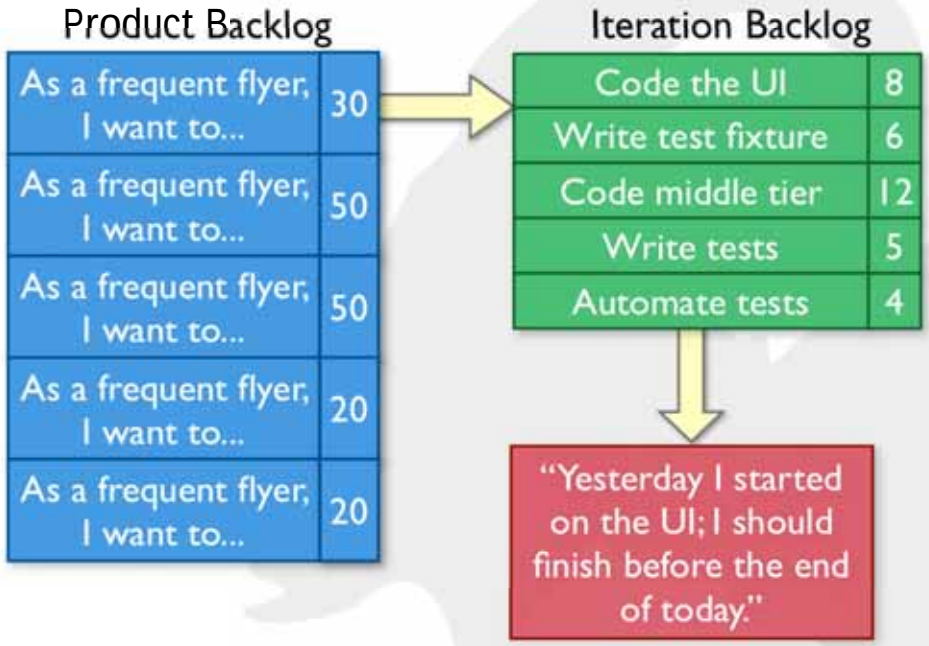
Comparing the approaches

- Story points help drive cross-functional behavior
- Story point estimates do not decay
- Story points are a pure measure of size
- Estimating in story points is typically faster
- My ideal days cannot be added to your ideal days
- Ideal days are easier to explain outside the team
- Ideal days are easier to estimate at first

Three levels of planning...

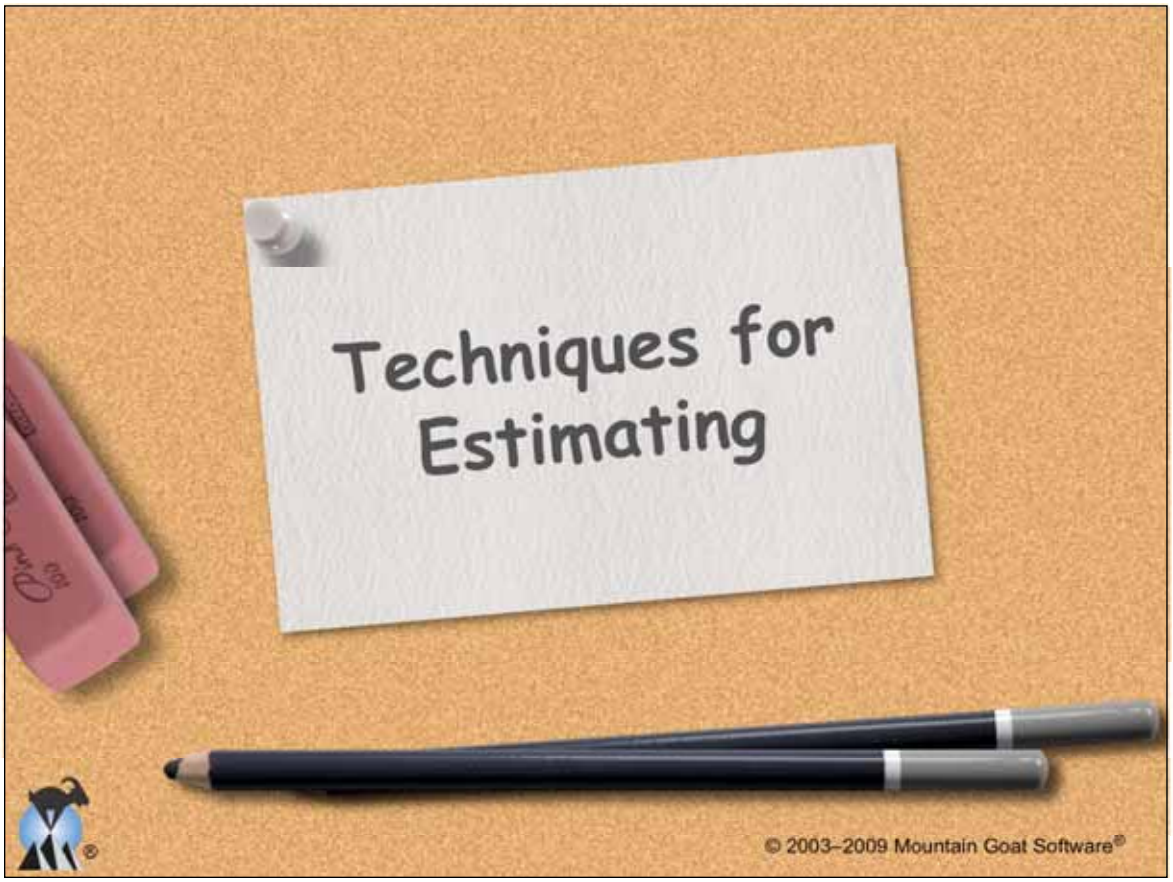


...three levels of precision



What I usually do

- I prefer story points
- ...but they make some teams uncomfortable, so I'll
  - Start with ideal time
    - Gives the team a nice foundation for the initial stories
    - Helps team get started
  - Define "1 story point = 1 ideal day"
  - Then
    - Gradually convert team to thinking in unit-less story points
    - "This story is like that story."
    - Stop talking about how long it will take



Irrelevant information

- Irrelevant information has an impact on estimates:
  - Specification length
  - Unnecessary detail
  - Unneeded "requirements"
- It's important
  - to avoid clearly irrelevant information
  - to acknowledge that we're all affected by this
  - to not dilute highly relevant information with information of marginal value

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.

Specification length

Group A
- Given a one-page 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.

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.

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!

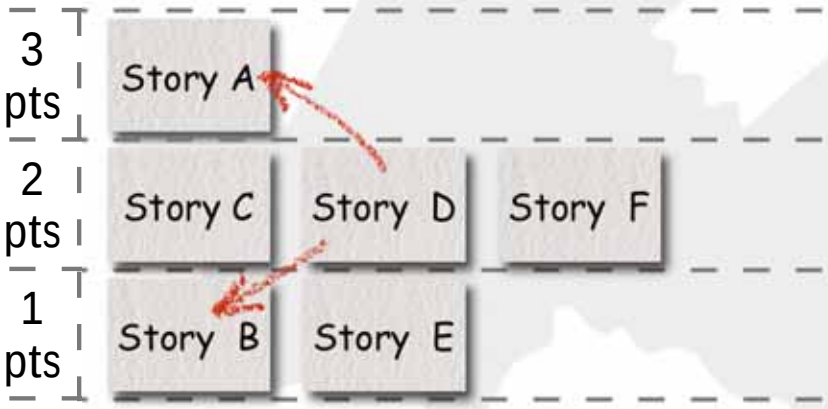
Source: *How to avoid impact from irrelevant and misleading information on your cost estimates*, Magne Jørgensen and Stein Grimstad, Simula Research Laboratory, Simula Research Labs Estimation Seminar, Oslo, Norway 2006.

Estimate by analogy

- Comparing a user story to others
  - "This story is like that story, so its estimate is what that story's estimate was."
- Don't use a single gold standard
- Triangulate instead
  - Compare the story being estimated to multiple other stories

Triangulation

- Confirm estimates by comparing the story to multiple other stories.
- Group like-sized stories on table or whiteboard

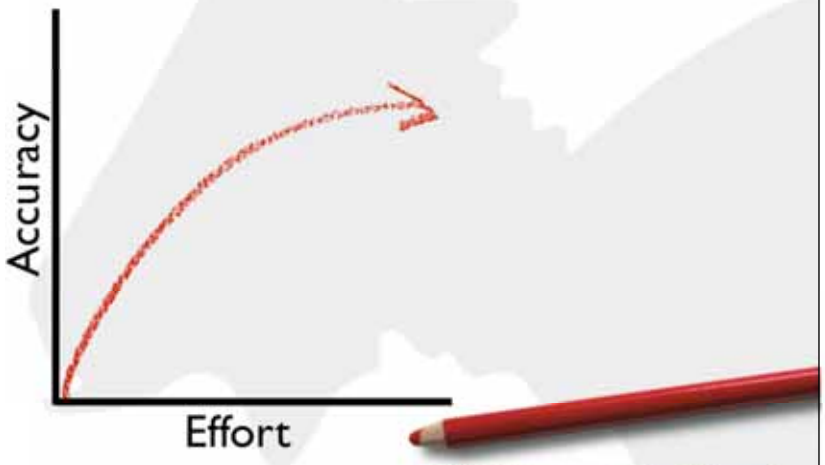


Disaggregation

- Breaking a big story into smaller stories or tasks
  - You know how long the smaller tasks take
  - So, disaggregating to something you know lets you estimate something bigger you don't know
- Sometimes very useful
- But disaggregating too far causes problems
  - Forgotten tasks

How much effort?

- A little efforts helps a lot
- A lot of effort only helps a little more



Use the right units

- Can you distinguish a 1-point story from a 2?
  - How about a 17 from an 18?
- Use a set of numbers that make sense; I like:
  - 1, 2, 3, 5, 8, 13, 20, 40, 100
- Stay mostly in a 1-10 range
- Nature agrees:
  - Musical tones and volume are distinguishable on a logarithmic scale

Include 0 and ½ if you want

Planning poker

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

Planning poker - an example

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

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 software development for your coworkers.	
Wash and wax your boss' Porsche.	
Read a 150-page book on agile software development.	
Write an 8-page summary of this conference for your boss.	

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.*

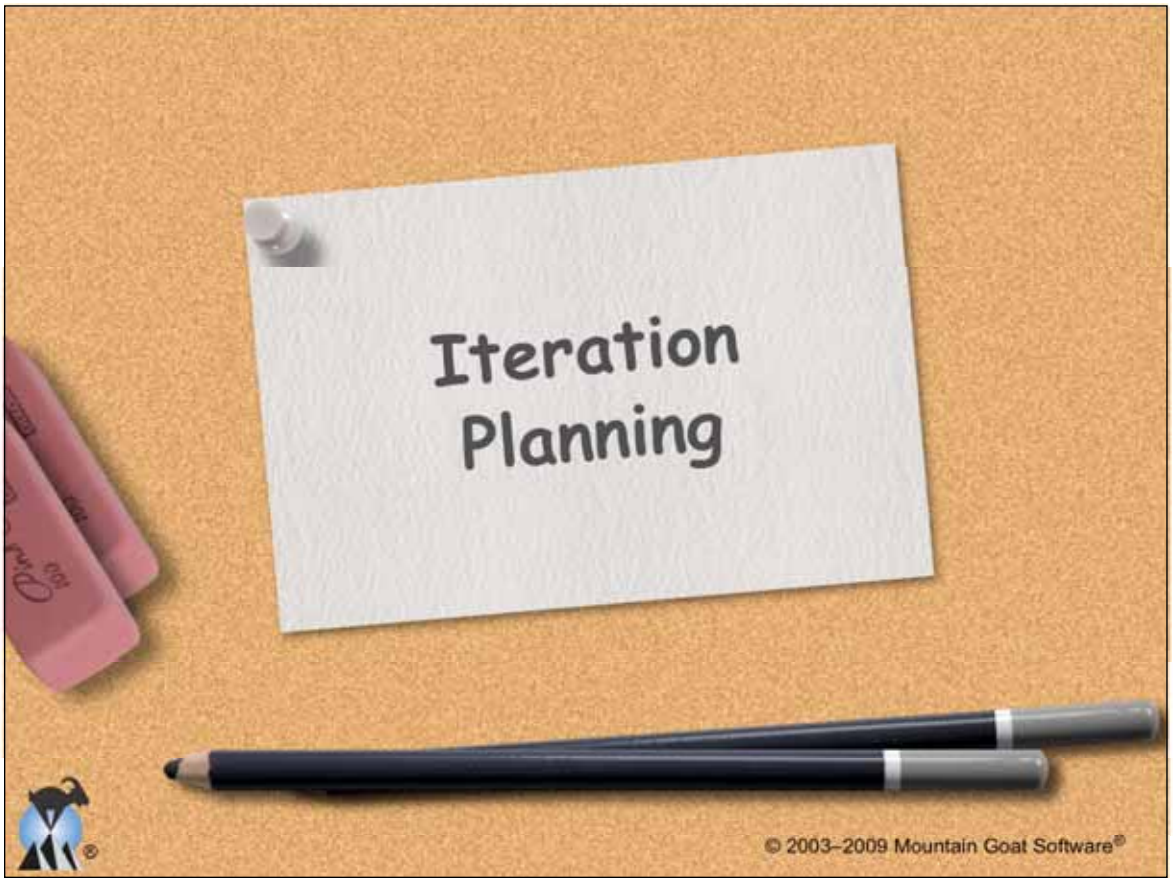
Why planning poker works

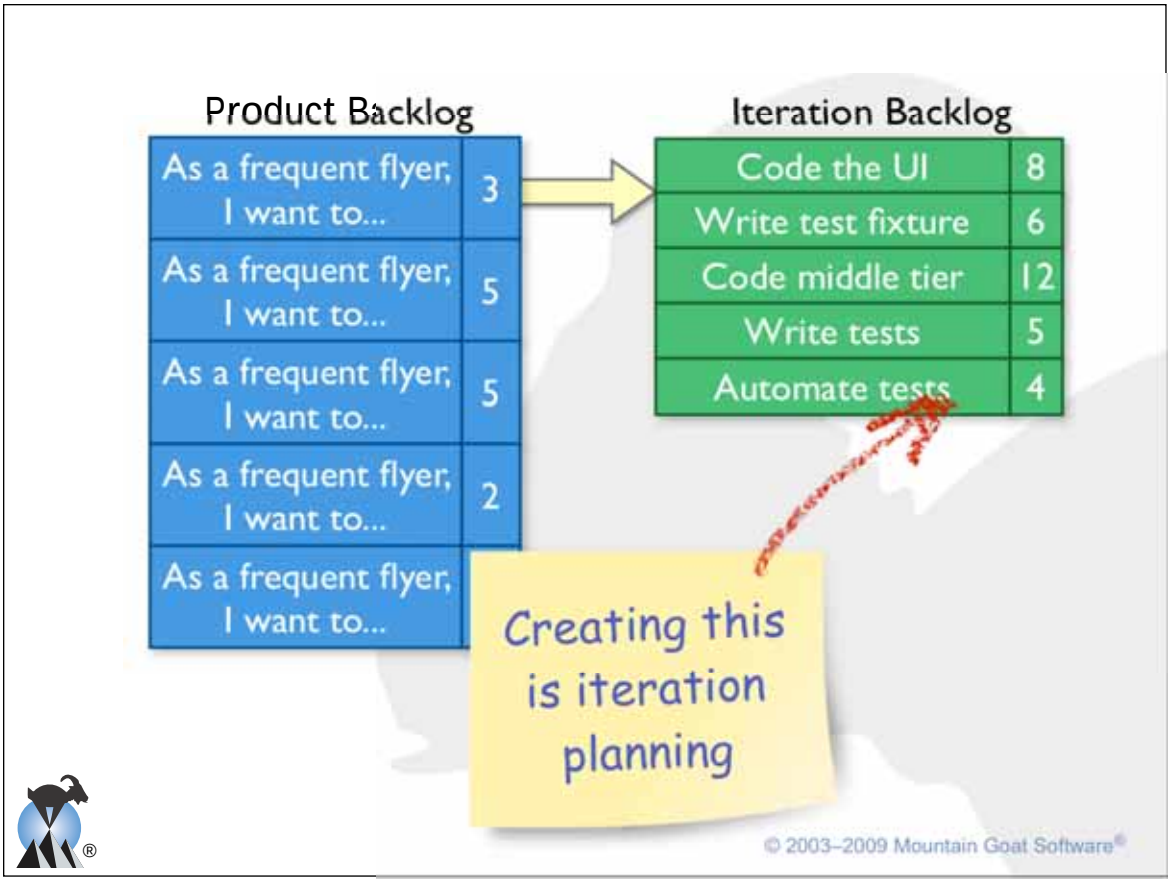
- Combining of individual estimates[6] through group discussion[7] leads to better estimates
- Emphasizes relative rather than absolute estimating
- Estimates are constrained to a set of values so we don't waste time in meaningless arguments
- Everyone's opinion is heard
- It's quick and fun

[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?*

www.planningpoker.com

Free, or I wouldn't mention it





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Two approaches

1 Velocity-driven iteration planning

- "We finished 15 story points last time, let's plan on 15 story points this time."
- Very unreliable in what will be accomplished during an iteration
  - Velocity is mostly useful over the long term

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2 Commitment-driven iteration planning

- Discuss the highest priority item on the product backlog
- Decompose it into tasks
- Estimate each task
  - Whole team estimates each task
- Ask ourselves, "Can we commit to this?"
  - If yes, see if we can add another backlog item
  - If not, remove this item but see if we can add another smaller one

Estimate availability

Person	Hours per Day	Hours per Iteration
Sergey	4-6	40-60
Yuri	5-7	50-70
Carina	2-3	20-30
Total		110-160

It looks something like this

As a user, I want ...

2

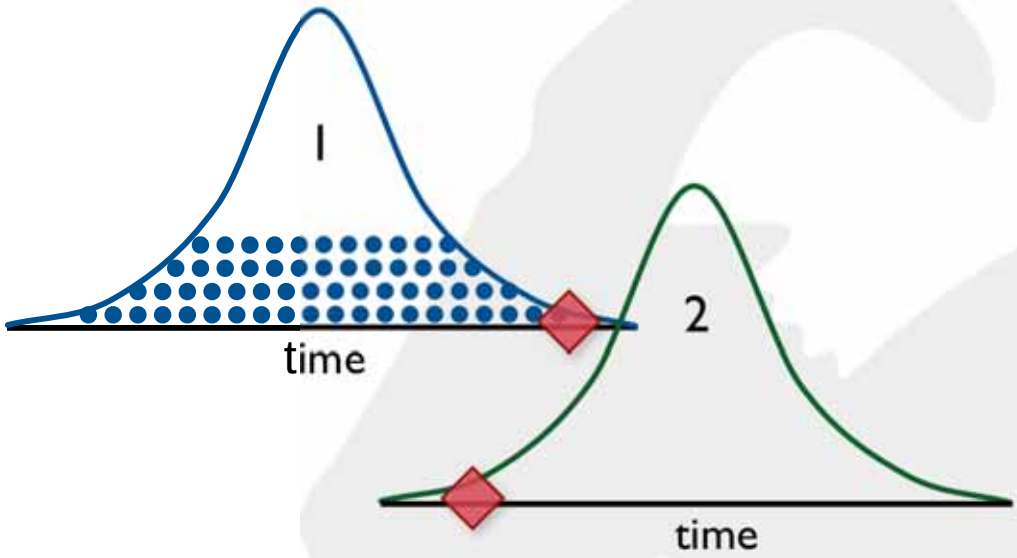
- Code the abc class (8 hours)
- Code the user interface (4)
- Write test fixtures (4)
- Code the xyz class (6)
- Update performance tests (4)

Team can commit, so they continue...

As a user, I want ...

3

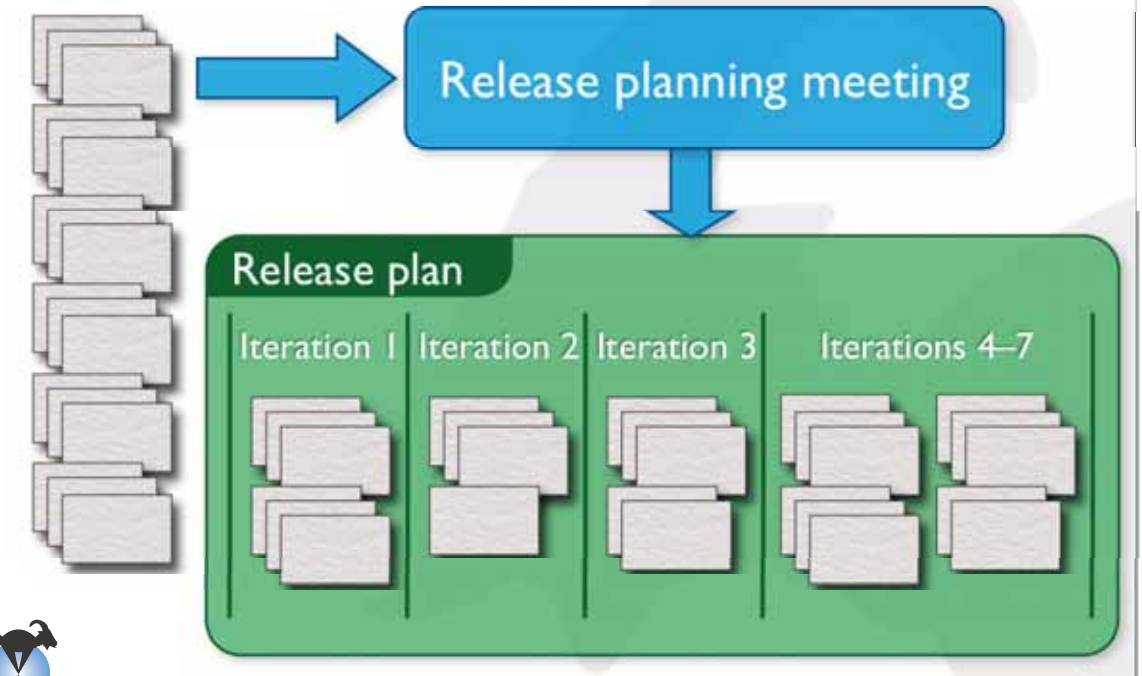
- Prototype the UI (8 hours)
- Demo UI to 3 outside users (3)
- Code new UI (12)
- Update documentation (3)



A caution

- The purpose of the iteration planning meeting is to arrive at a commitment to an iteration goal or set of product backlog items.
- The purpose of the meeting is not to come up with a list of tasks and hours.
- The tasks and estimates are a tool for determining what we can commit to.

Release planning



Velocity

- To do a release plan, you need to know or have an estimate of velocity
- Three ways to get velocity:
  1. Use historical averages
  2. Run 1-2 iterations and see what you get
  3. Forecast it
- Should be expressed as a range
  - Size of range depends on familiarity of team, domain, and technologies

Forecasting velocity

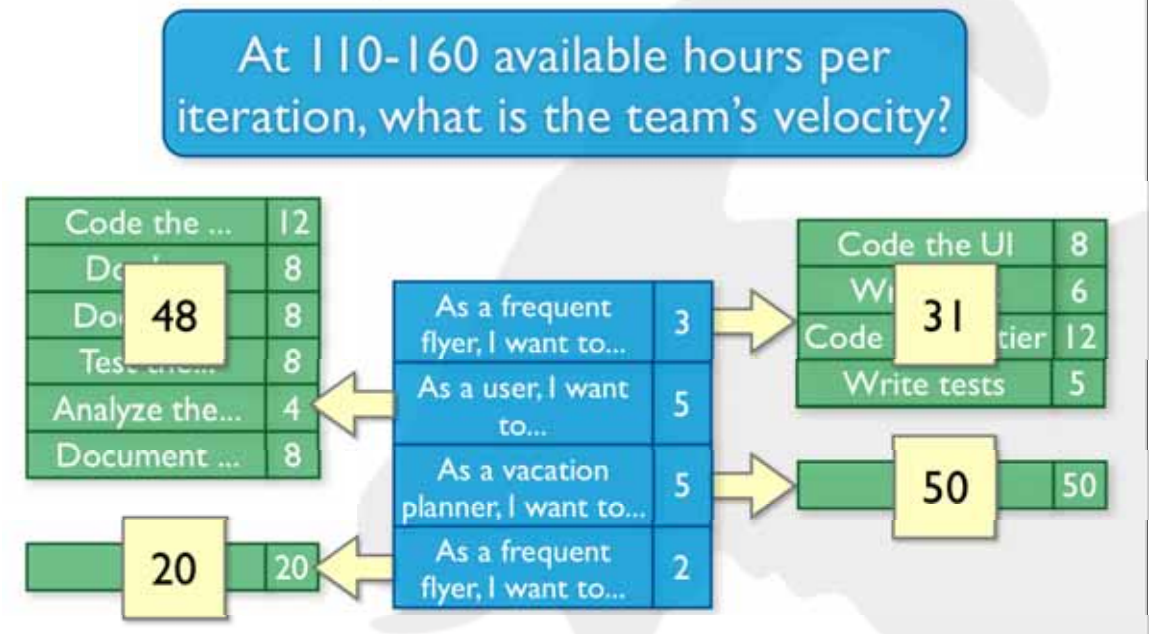
- Just like commitment-driven iteration planning
  - Estimate available hours for the iteration
  - Repeat until full:
    - Pick a story, break into tasks, estimate each task

An example

- Estimating available hours

Person	Hours per Day	Hours per Iteration
Sergey	4-6	40-60
Yuri	5-7	50-70
Carina	2-3	20-30
Total		110-160

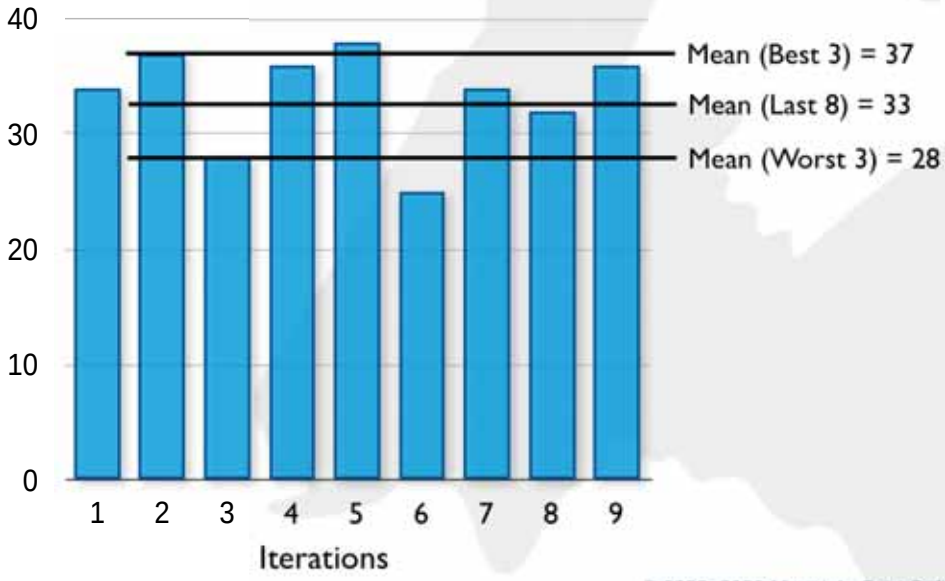
An example



Updating the release plan

- Revisit the release plan at the end of every iteration
- Update it based on:
  - Current understanding of velocity
  - Current prioritization of the product backlog
- This should be a very short and sweet process

Use actual velocities once they're available



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Extrapolate from velocity

Assume:
There are five iterations left.

At our slowest velocity we'll finish here (5×28)

At our long-term average we'll finish here (5×33)

At our best velocity we'll finish here (5×37)

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Upcoming public classes

Date	What	Where
Sep 14–15 Sep 16–17	Certified ScrumMaster Certified Scrum Product Owner (Both with Ken Schwaber)	La Jolla, CA
Nov 2 Nov 3–4 Nov 5	Effective User Stories Certified ScrumMaster Agile Estimating and Planning	San Jose, CA

Information and registration at mountaingoatsoftware.com

Classes are also scheduled in London, Oslo, and Stockholm.

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