Agile Estimating and Planning

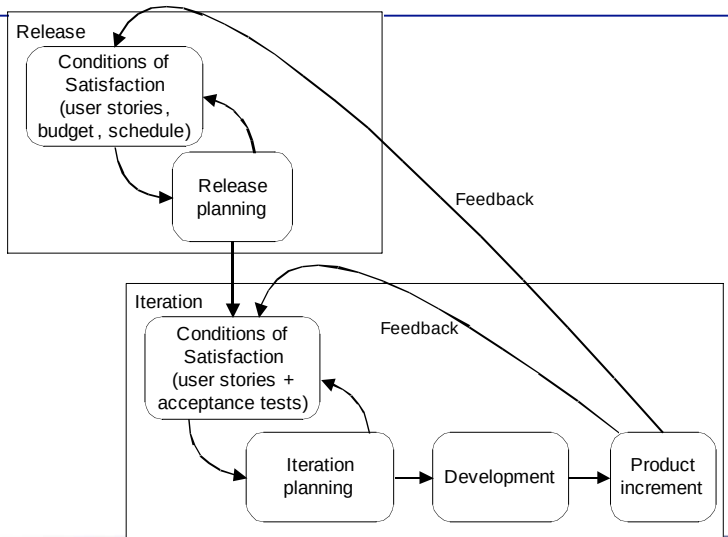
Mike Cohn—background

- Programming for 20 years
- Author of
  - *User Stories Applied*
  - *Agile Estimating and Planning*
  - Java, C++, database programming books
- Founding member and director of the Agile Alliance and the Scrum Alliance
- Founder of Mountain Goat Software
  - Process and project management consulting and training

Today's agenda

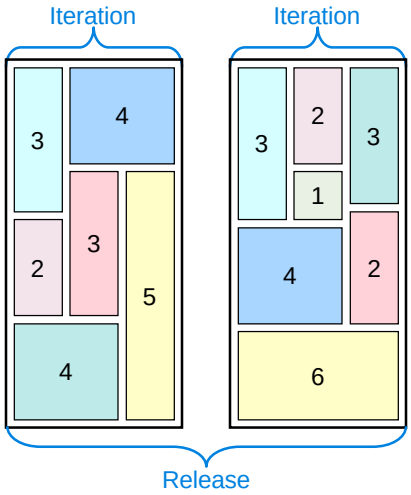
- Overview
- Estimating size
  - Story points
  - Ideal time
- Techniques for estimating
- Iteration planning
- Release planning
- Estimating velocity
- Havannah

An overview of planning

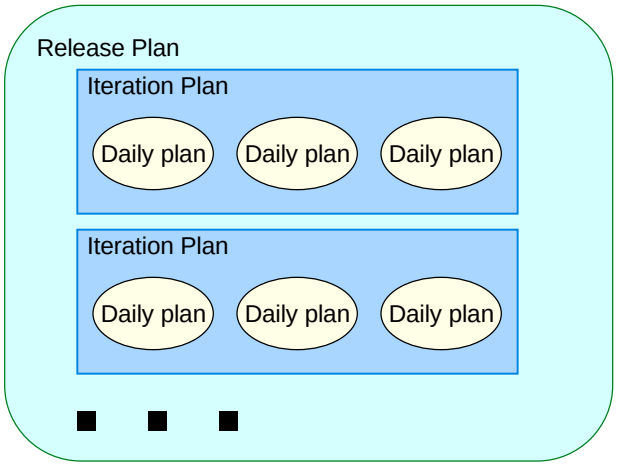


Release, iteration and velocity

- A release comprises multiple iterations
- Each iteration is considered to be a same-sized box
- Stories are put in each box until it's full
- The size of the box is the planned velocity for the iteration



Three levels of planning…



…three levels of precision

Iteration 1	As a frequent flyer, I want to…	3
	As a user, I want to…	5
	As a vacation planner, I want to…	5
	As a vacation planner, I want to…	2
Iteration 2	As a user, I want to…	1

Code the UI	8
Write test fixture	4
Code middle tier	5
Write tests	2

"Yesterday I started on the UI; I should finish before the end of today."

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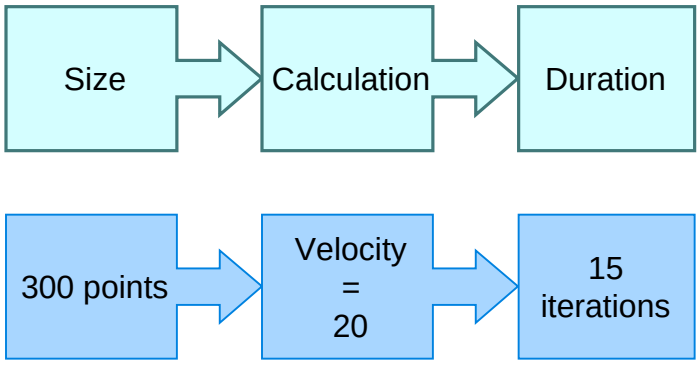
Estimate size first

- We want to separate estimates of size from estimates of effort
- Traditional estimates of size
  - Lines of Code (KLOC)
  - Function Points
- Agile estimates of size
  - Story points
  - Ideal days

From size to duration



Story points measure size

- The “bigness” of a task
- Influenced by
  - Complexity
  - Our current knowledge
  - How much of it there is
- Relative values are what is important:

> - “A login screen is a 2.”
> - “A search feature is an 8.”

Story points are unit-less

- All that matters is the relative sizes
  - A 5-point story is half the size of a 10
  - A 20 is twice the size of a 10
- These are unit-less story points
  - A 3,000 is twice the size of a 1,500

Exercise

- Assign “dog points” to each of the following types of dog.

  - Labrador Retriever
  - Dachshund
  - Great Dane
  - Terrier
  - German Shepherd
  - Poodle
  - St. Bernard
  - Bulldog

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
  - The elapsed time is much longer (3½ hours?)

Elapsed time vs. ideal time

Ideally

- Monday has 8 hours
- Each week has 40 hours

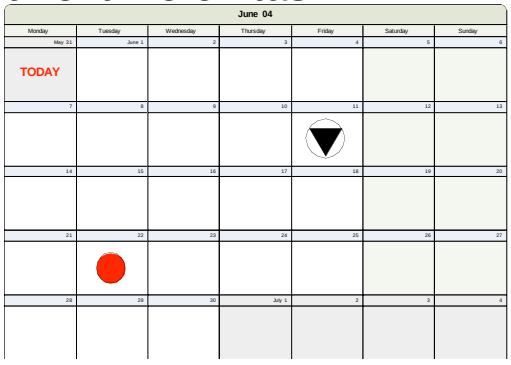
But instead

- Monday has
  - 3 hours of meetings
  - 1 hour of email
  - 4 hours of programming (time-on-task)

So this Monday has 4 ideal hours

"How long will this take?"

- "Two weeks."
- Two *calendar* weeks or two weeks worth of *time on task*?



Factors affecting ideal time

- Vacations
- Sick time
- All-company meetings
- Department meetings
- Demos
- Debugging

- Personnel issues
- Phone calls
- Special projects
- Training
- Email

- Reviews & walk-throughs
- Interviewing candidates
- Spikes
- Talking to vendors

Ideal time vs. elapsed time

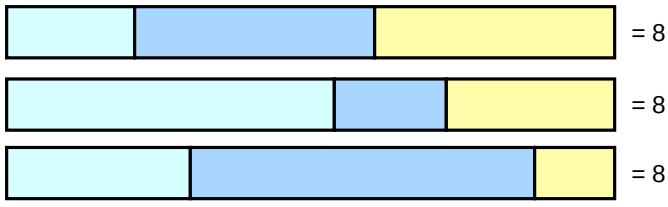
- It's easier to estimate in ideal time
- It's too hard to estimate directly in elapsed time
  - Need to consider all the factors that affect elapsed time at the same time you're estimating

Pair programming & ideal time

- It doesn't matter as long as you're consistent
  - If two of you will work on it for a full ideal day, call it 2 ideal days total

Specialization and ideal time

- First, don't worry about it too much
  - We're usually better off with fairly rapid, imprecise estimates than spending more time
- Second
  - Just add up the components and report one total estimate of ideal days



Which do you prefer?

1) Do you prefer story points or ideal time?
2) Why?

Advantages of story points

- 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 are not your ideal days

Advantages of ideal days

- Ideal days are easier to explain outside the team
- Ideal days are easier to estimate at first
- Ideal days make velocity predictions easier

What I usually do

Initially…

- Start with ideal time
- Gives the team a nice foundation for the initial stories
- Helps team get started
- I define “1 Story Point = 1 Ideal Day”

Then…

- Gradually convert team to thinking more about unit-less story points
- This story is like that story
- Stop talking about how long it will take

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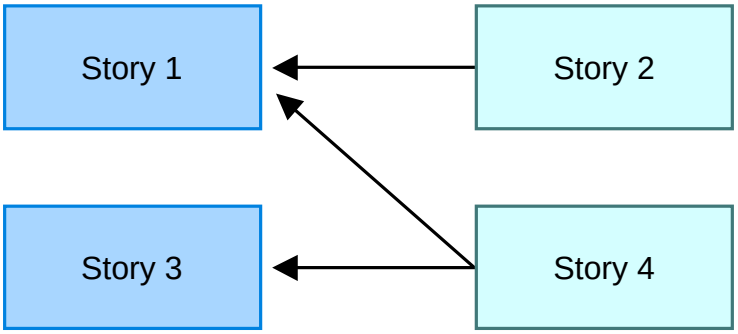
Analogy

- Analogy
  - "This story is like that story, so its estimate is what that story's estimate was."
  - Works especially well if baseline story has been coded
  - Triangulate
    - Estimate by analogy to two different stories

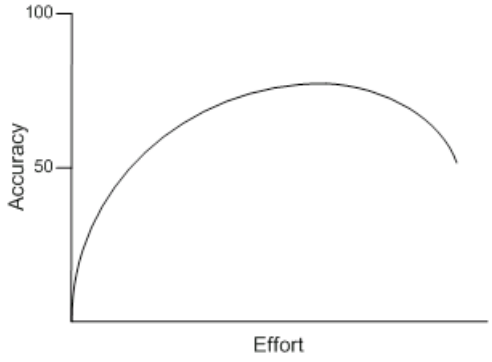
Triangulation



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

How much effort?

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



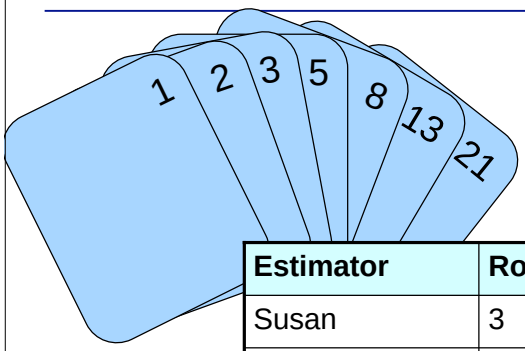
Use the right units

- Can you distinguish a 17 from an 18?
  - Probably not
- Can you distinguish a ½ from a 1?
  - Probably
- Use units that make sense, such as:
  - 1, 2, 3, 5, 8
  - 1, 2, 4, 8
- Include 0 and ½ if you want

Planning poker

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

Planning poker—an example



Estimator	Round 1	Round 2
Susan	3	3
Rafe	8	5
Ann	2	5
Sherri	5	5

Planning poker

1) Using the cards I'll pass out, estimate the items on the next page

Remodeling my kitchen

1. Install new hardwood floor
2. Refinish (remove, sand, repaint) the cabinets
3. Repaint entire kitchen
4. Lay shelf paper
5. Install recessed lighting
6. Replace electric stove with gas stove
7. Plumb the island and add sink

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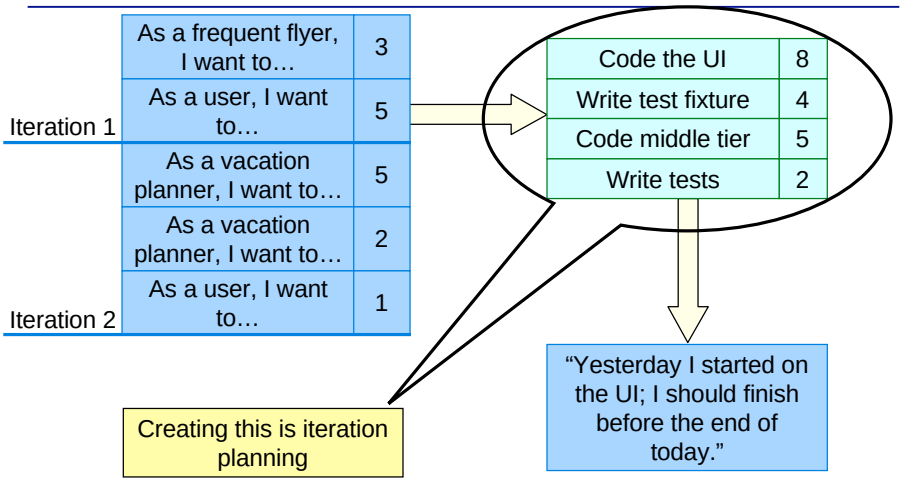
Iteration planning



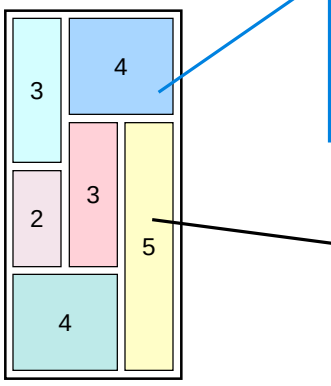
Two approaches

- Velocity-driven iteration planning
  - "We finished 15 story points last time, let's plan on 15 story points this time."
- Commitment-driven iteration planning

Commitment-driven iteration planning

1. Decide what is the most important thing to do nexte
2. Decompose it into tasks
3. Estimate each task
   - Whole team estimates each task
4. 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
- No one signs up for specific tasks yet

It looks something like this



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

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

Take items in priority order (mostly)

- Take items based on the order defined by the product owner
- But:
  - Pay attention to possible synergies with (slightly) lower priority items
- Typical iteration may work on items 1, 2, 3, and 8

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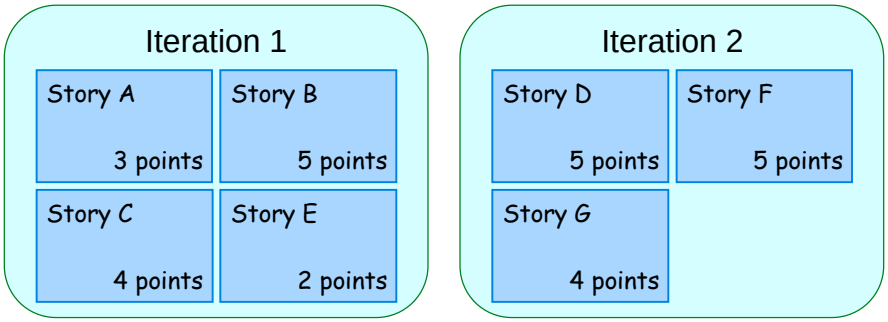
Work is allocated to iterations

- If we knew how many points a software team would finish per iteration we could assign work to iterations



An example with velocity = 14

Iteration 1

Iteration 2

Iteration 3

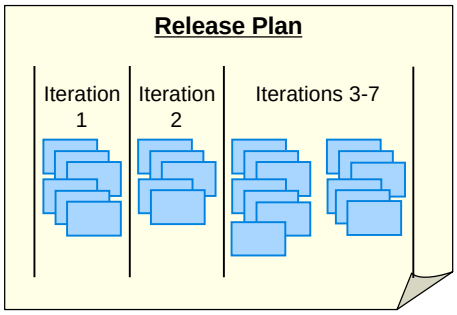
Iteratio

Story A	5
Story B	3
Story C	5
Story D	2
Story E	5
Story F	2
Story G	1
Story H	8
Story I	5

Story J	5
Story K	3
Story L	8
Story M	2

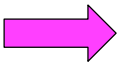
The release plan

- We can create a release plan from:
  - the point estimate on each card
  - The velocity ("points per iteration")
- Shows what will be worked on in each iteration
  - Each iteration is given the same number of points



Changing the release plan

	Story A	5
	Story B	3
	Story C	5
	Story F	3
	Story D	5
	Story E	5
	Story G	3
	Story I	3
	Story H	5
	Story J	2
	Story K	5
	Story L	4



√	Story A	5
√	Story B	3
√	Story C	5
	Story F	3
	Story D	5
	Story E	5
	Story G	3
	Story I	3
	Story H	5
	Story J	2
	~~Story K~~	~~5~~
	~~Story L~~	~~4~~

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How to estimate velocity

- Use historicals
- Don't until you've run a 1-3 iterations
- Forecast it

Forecasting velocity

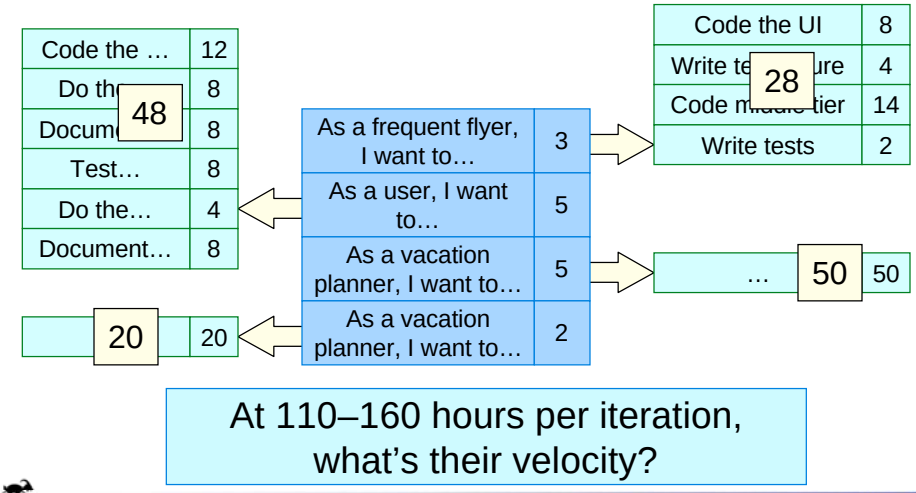
- Just like commitment-driven iteration planning
  - Estimate available hours for the iteration
  - Repeat until full:
    - Pick a story, break into tasks, estimate each task
- Doing this for more than one iteration is better than only doing one

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



At 110–160 hours per iteration, what's their velocity?

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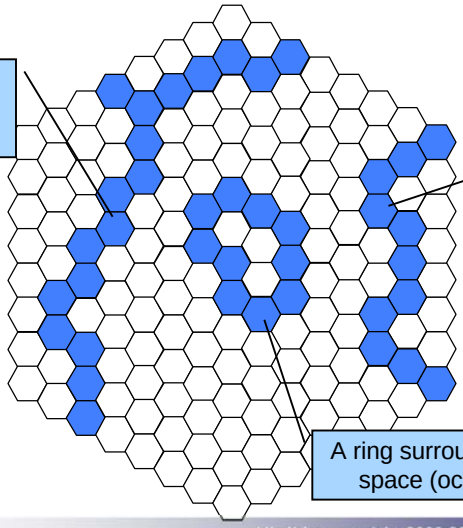
Havannah



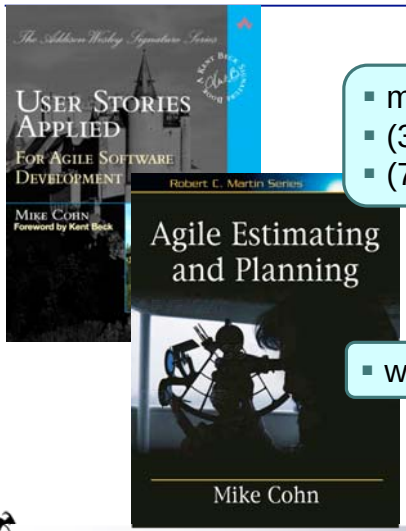
User stories

1. As a new player, I can play against a medium-strength computer opponent.
2. As an experienced player, I can play against a strong computer opponent.
3. As a player, I can save and restore a game.
4. As a player, I can use the program to play against another human on my computer.
5. As a player, I'd like to be able to choose between a wooden board and pieces and a metal board and pieces.
6. As a player, I'd like to ask for a hint.
7. As a player, I want to place a piece on the board using either my keyboard or my mouse.
8. As a player, I'd like to undo and redo moves.
9. As a new player, I want access to an online help system.
10. As a player, I want all pieces of the winning shape to blink or glow so that I can see the winning shape.
11. As a new player, I'd like to be warned after making a horrible move and be given the chance to take it back.

Planning Havannah

1) Estimate all of the Havannah stories
2) Invent a small team of 3-4 people
3) Plan their first iteration
4) Forecast their velocity
5) Develop the release plan

Mike Cohn contact information



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