Agile Estimating and Planning

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Mike Cohn - background

USER STORIES APPLIED
FOR AGILE SOFTWARE DEVELOPMENT

Agile Estimating and Planning

Mike Cohn

Consultant, author, and speaker
Founding member and director of Agile Alliance, Scrum

All:

Founder of Mountain Goat Software
- Process and project management training and consulting

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Today's agenda

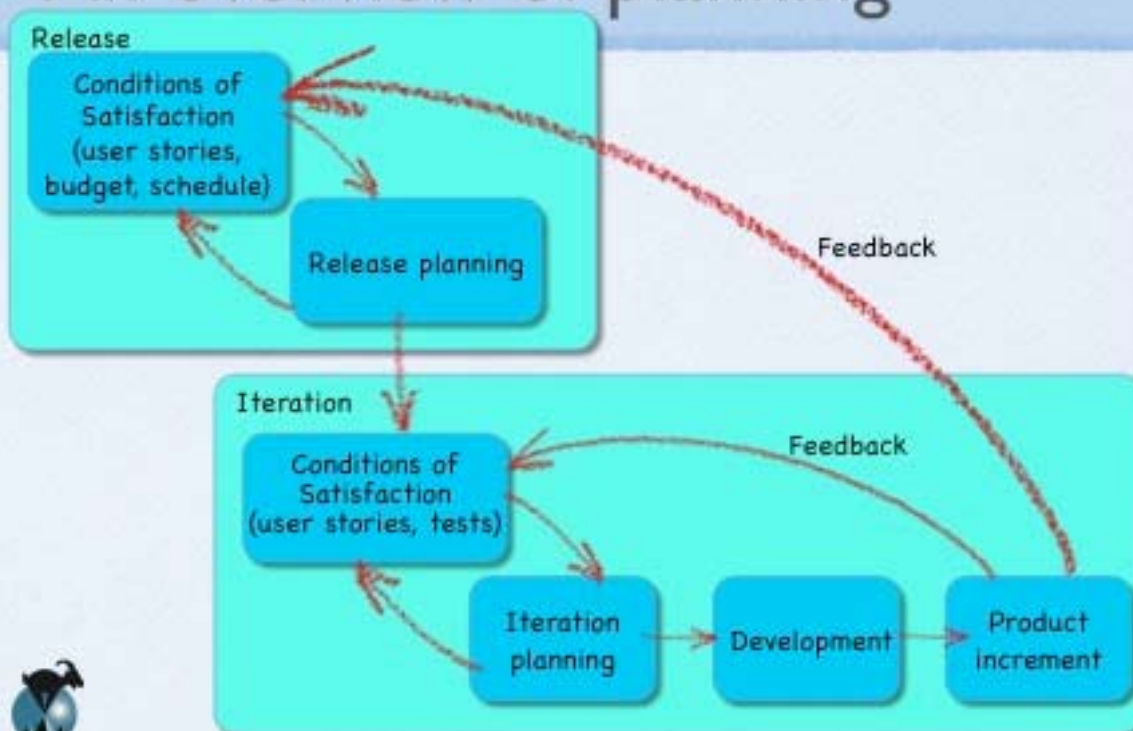- Overview
- Estimating size
  - Story points
  - Ideal time
- Techniques for estimating
- Iteration planning
- Release planning
- Estimating velocity
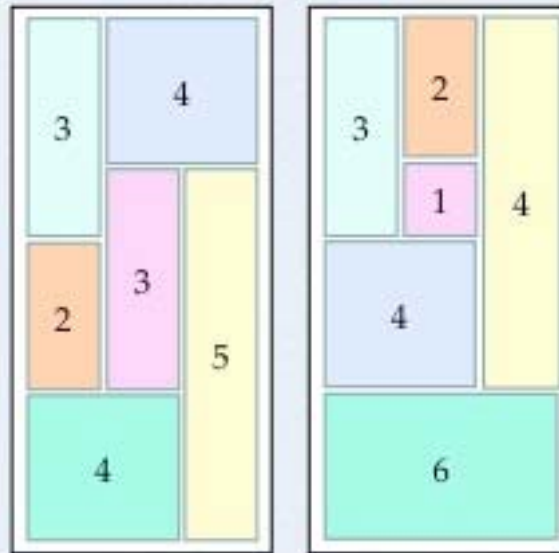- Havannah

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An overview of planning

Release
Conditions of Satisfaction (user stories, budget, schedule)

Release planning

Feedback

Iteration
Conditions of Satisfaction (user stories, tests)

Feedback

Iteration planning → Development → Product increment
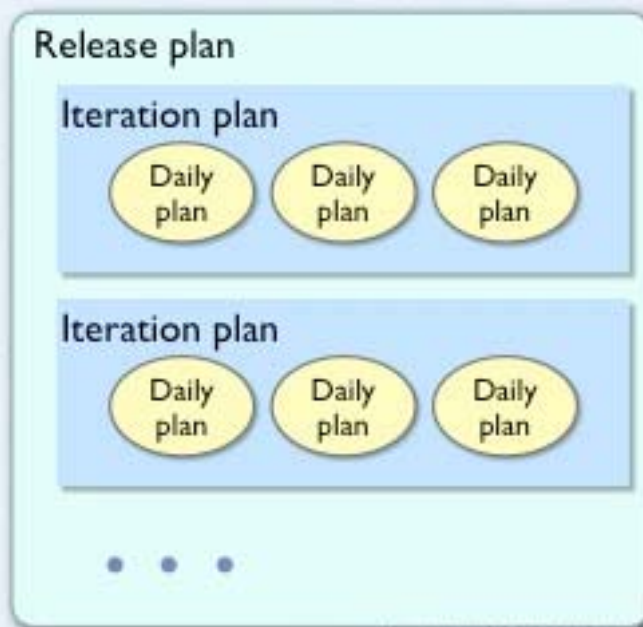
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Release, iteration, & velocity

- A release comprises multiple iterations

- Each iteration can be thought of as a same-sized box

- Stories are put into each box until it's full

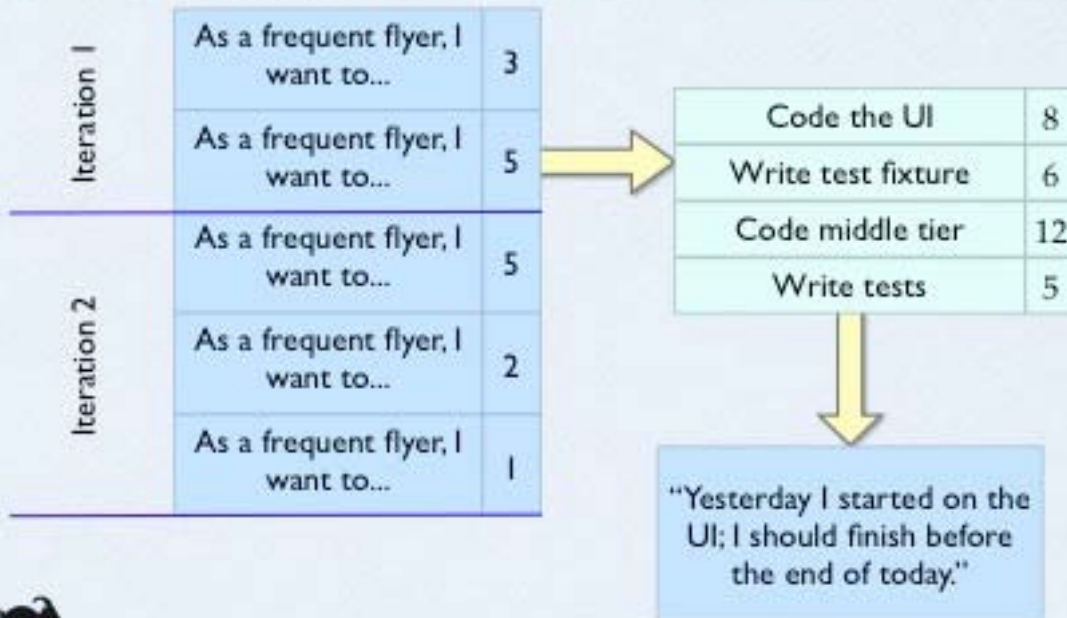- The size of the box is the planned velocity

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Three levels of planning...

Release plan

Iteration plan

Daily plan   Daily plan   Daily plan

Iteration plan

Daily plan   Daily plan   Daily plan

• • •

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...three levels of precision

Iteration 1	As a frequent flyer, I want to...	3	
	As a frequent flyer, I want to...	5	→
Iteration 2	As a frequent flyer, I want to...	5	
	As a frequent flyer, I want to...	2	
	As a frequent flyer, I want to...	1	

Code the UI	8
Write test fixture	6
Code middle tier	12
Write tests	5

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

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- ☐ Estimating velocity
- ☐ Havannah

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How long will it take...

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

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Estimate size; derive duration

Size → Calculation → Duration

300 story points → Velocity=20 → 300/20 = 15 iterations
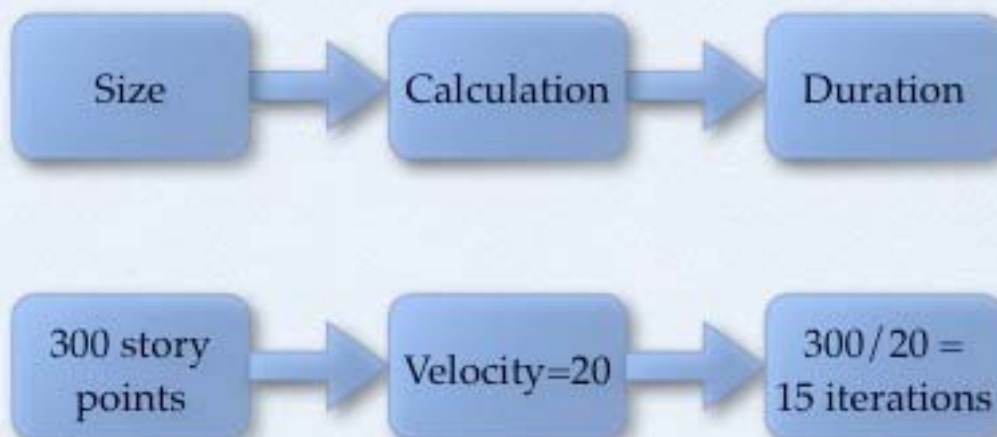
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Measures of size

- Traditional and agile measure size differently

Traditional measures of size

Lines of Code
Function Points

Agile measures of size

Story points
Ideal days

Story points

- The "bigness" of a task
- Influenced by
  - How hard it is
  - How much of it
- Relative values are
  - A login screen i
  - A search featur
- Points are unit-less

As a user, I want to be able to have some but not all items in my cart gift wrapped.

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Dog points

Assign "dog points" to the following breeds

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

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Ideal days

- 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?)

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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 left for the project

So, this developer will only make four hours of progress on Monday.

It will take two calendar days to complete one ideal day of work.

"How long will this take?" --Are you answering what is being asked?

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Factors affecting ideal time

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

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

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

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

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Pair programming

- It doesn't matter as long as you're consistent

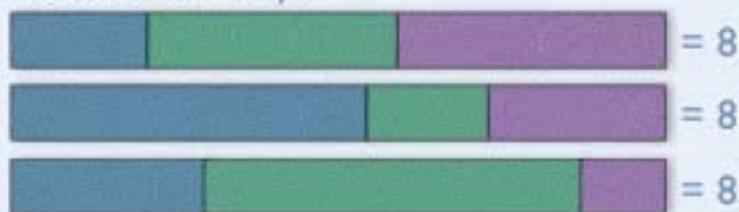 - If two of you will work on it for a full ideal day, call it 2 ideal days total

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Specialization

- 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

	= 8
	= 8
	= 8

Which do you prefer?

1) Do you prefer story points or ideal time?

2) Why?

Advantages to 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

- There are studies that show we are better at relative estimating

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Advantages to ideal days

- Ideal days are easier to explain outside the team

- Ideal days are easier to estimate at first

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What I usually do

- Initially
  - 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

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- ☐ Havannah

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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

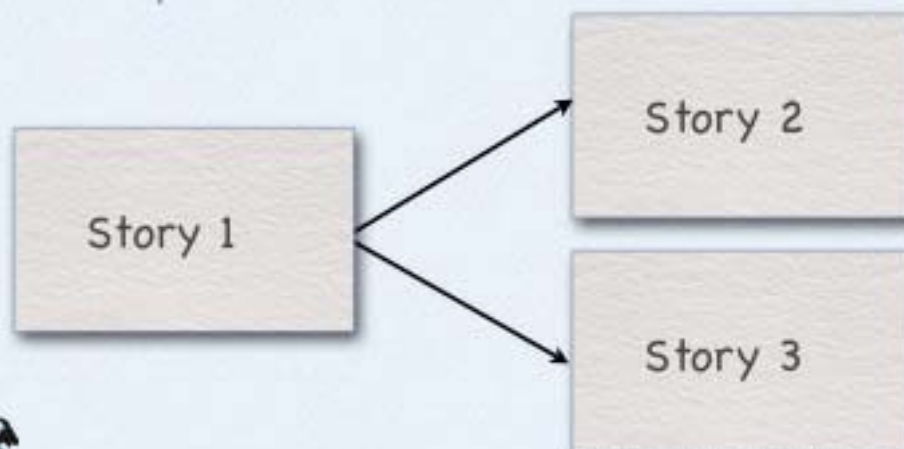 - Compare the story being estimated to multiple other stories

Triangulation

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

Story 1

Story 2

Story 3

How much effort?

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

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Use the right units

- Can you distinguish a 1-point story from a 2?
- Can you distinguish a 17 from an 18?
- Use units that make sense, such as
  - 1, 2, 3, 5, 8
  - 1, 2, 4, 8
- Stay mostly in ⌐

Include 0 and ½ if you want

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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

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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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Remodeling my kitchen

1. Install new hardwood floor
2. Refinish (remove, sand, repaint) the cabinets
3. Install granite countertop instead of tile
4. Repaint entire kitchen
5. Lay shelf paper
6. Install recessed lighting
7. Replace electric stove with gas stove
8. Install built-in refrigerator
9. Install a new oven
10. Plumb the island and add sink
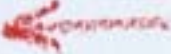11. Replace simple window with a bay window

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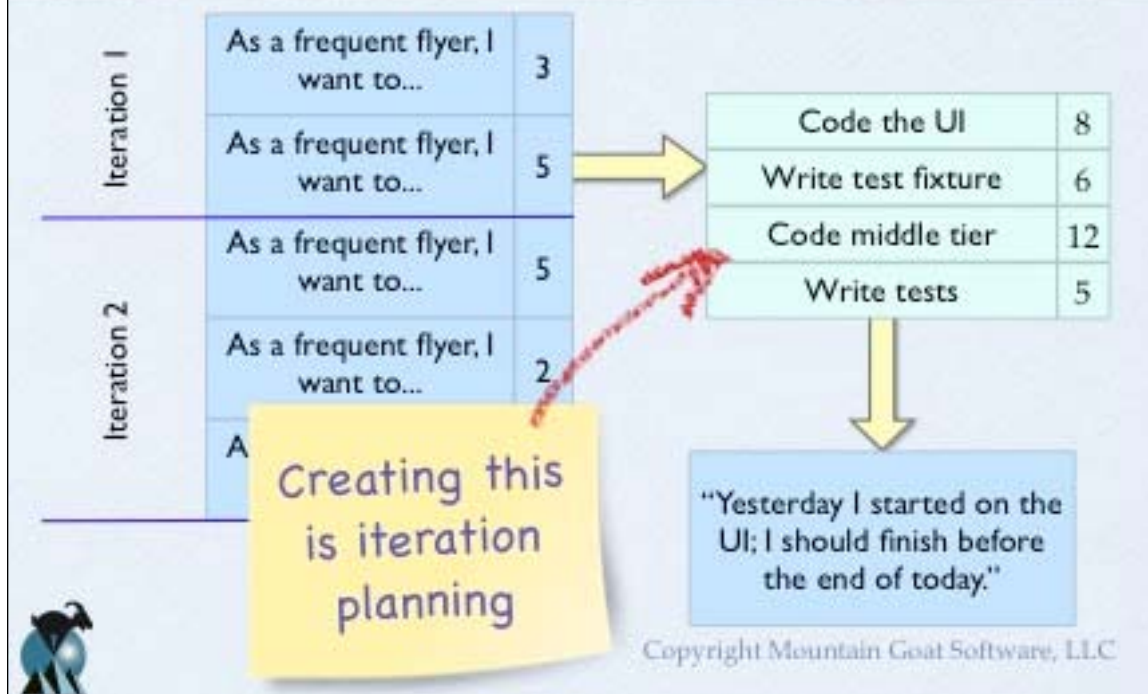☐ Release planning
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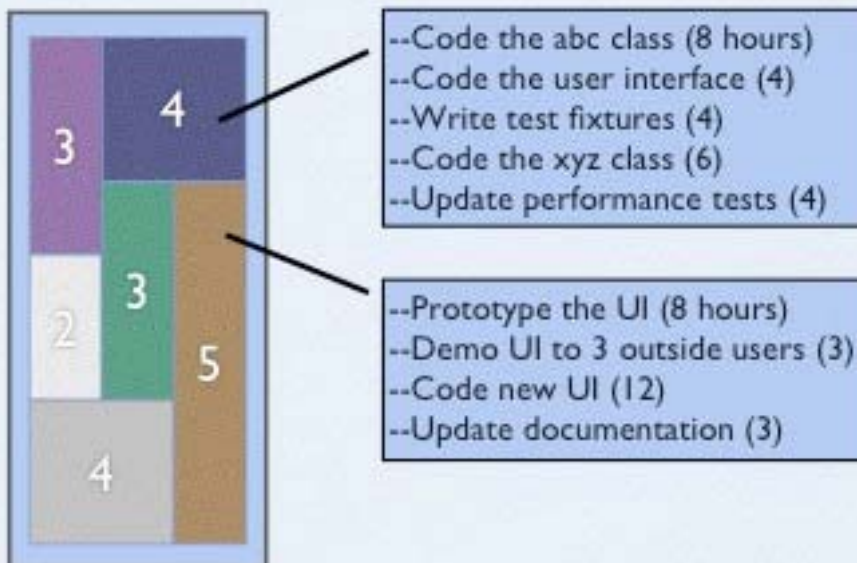33

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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
- 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 users (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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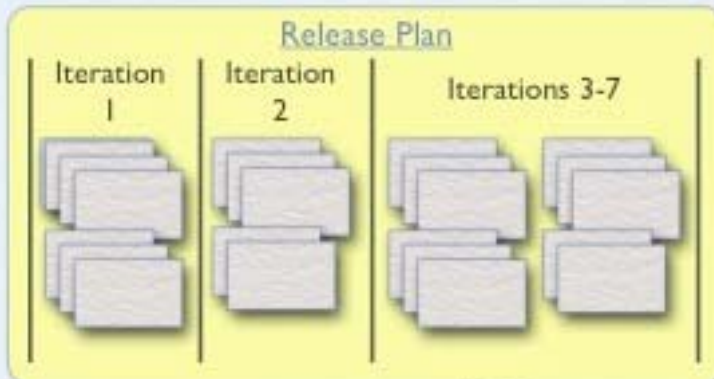- ☐ Release planning
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The release plan

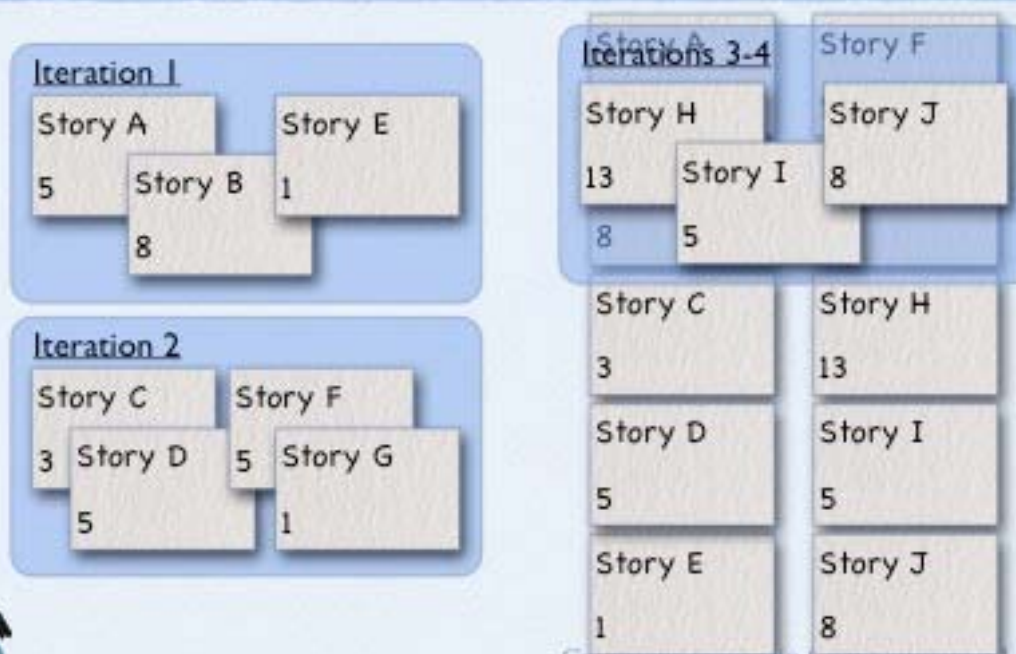- We can create a release plan from
  - the size estimate given to each story
  - the team's velocity
- Shows what will be worked on in each iteration

Release Plan

| Iteration 1 | Iteration 2 | Iterations 3-7 |

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An example with velocity=14

Iteration 1

Story A — 5
Story B — 1
8

Story E

Iteration 2

Story C — 3
Story D — 5
Story F — 5
Story G — 1

Iterations 3-4

Story A
Story F
Story H — 13
Story I — 5
Story J — 8
8

Story C — 3
Story H — 13
Story D — 5
Story I — 5
Story E — 1
Story J — 8

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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	3

	Story A	5
✓	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	3

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How to estimate velocity

Use historical values

Don't, until you've run 1-3 iterations

Forecast it

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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

Ideally, "plan" more than one iteration

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An example
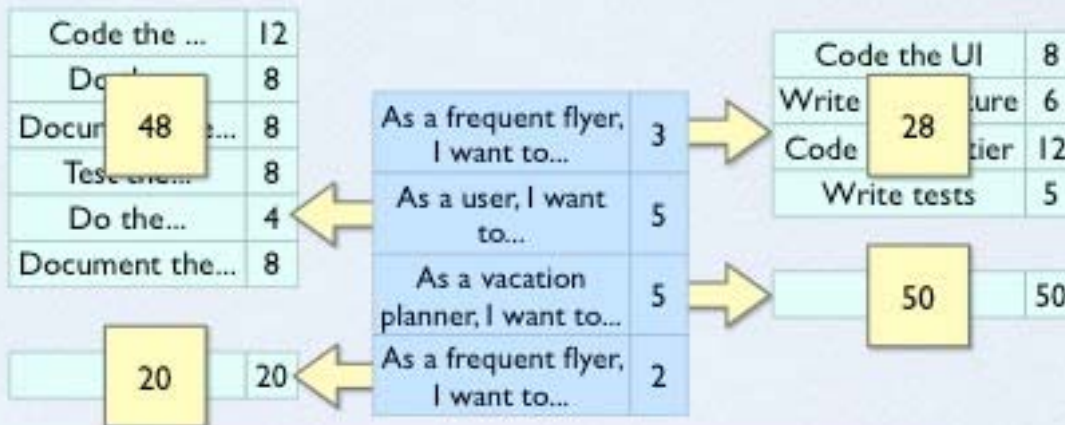
- Estimating available hours

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

45

An example

Code the ...	12
Do	8
Docu 48	8
Tes	8
Do the...	4
Document the...	8

20 | 20

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 frequent flyer, I want to...	2

Code the UI	8
Write ...ure	6
Code 28 tier	12
Write tests	5

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At 110-160 available hours per iteration, what is the team's velocity?
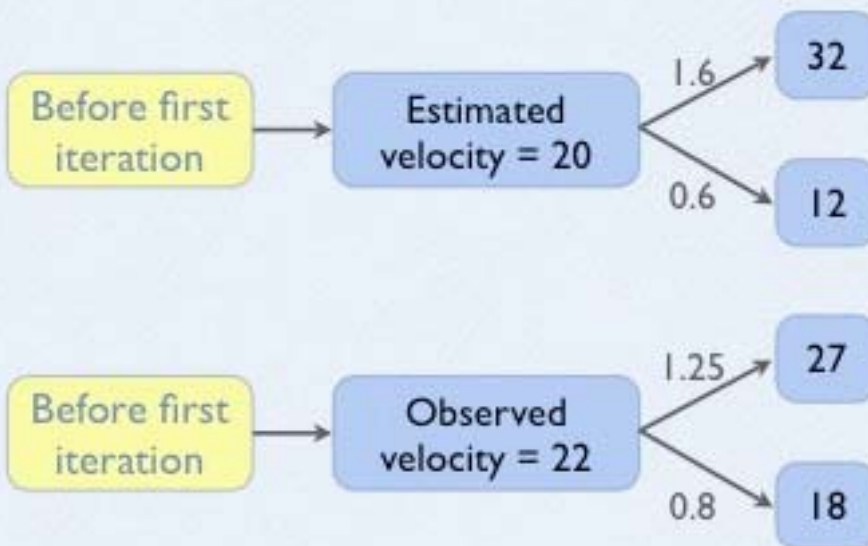
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Put a range around it

- You're unlikely to have precisely forecasted the exact velocity the team will average

- So, put a range around your estimate

  - I suggest plus and minus from 10% to 60%

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Expressing velocity as a range

Before first iteration → Estimated velocity = 20

1.6 → 32

0.6 → 12

Before first iteration → Observed velocity = 22

1.25 → 27

0.8 → 18

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Havannah

A fork connects three edges (not corners)
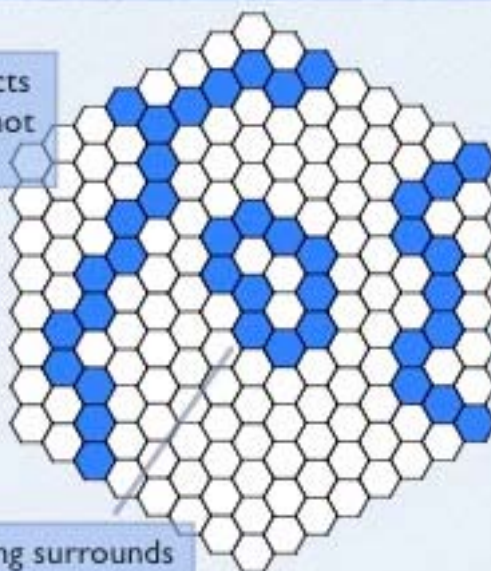
A bridge connects any two corners

A ring surrounds at least one space (occupied or not)

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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

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