CSIT214/CSCI814/HCSC814
IT Project Management

Agile project management using Scrum

Scrum origins

- **Jeff Sutherland**
  - Initial scrums at Easel Corp in 1993
  - IDX and 500+ people doing Scrum
- **Ken Schwaber**
  - ADM
  - Scrum presented at OOPSLA 95 with Sutherland
  - Author of three books on Scrum
- **Mike Beedle**
  - Scrum patterns in PLOPD4
- **Ken Schwaber and Mike Cohn**
  - Co-founded Scrum Alliance in 2002, initially within the Agile Alliance

Scrum has been used by:

- Microsoft
- Yahoo
- Google
- Electronic Arts
- High Moon Studios
- Lockheed Martin
- Philips
- Siemens
- Nokia
- Capital One
- BBC
- Intuit
- Intuit
- Nielsen Media
- First American Real Estate
- BMC Software
- Ipswitch
- John Deere
- Lexis Nexis
- Sabre
- Salesforce.com
- Time Warner
- Turner Broadcasting
- Oce

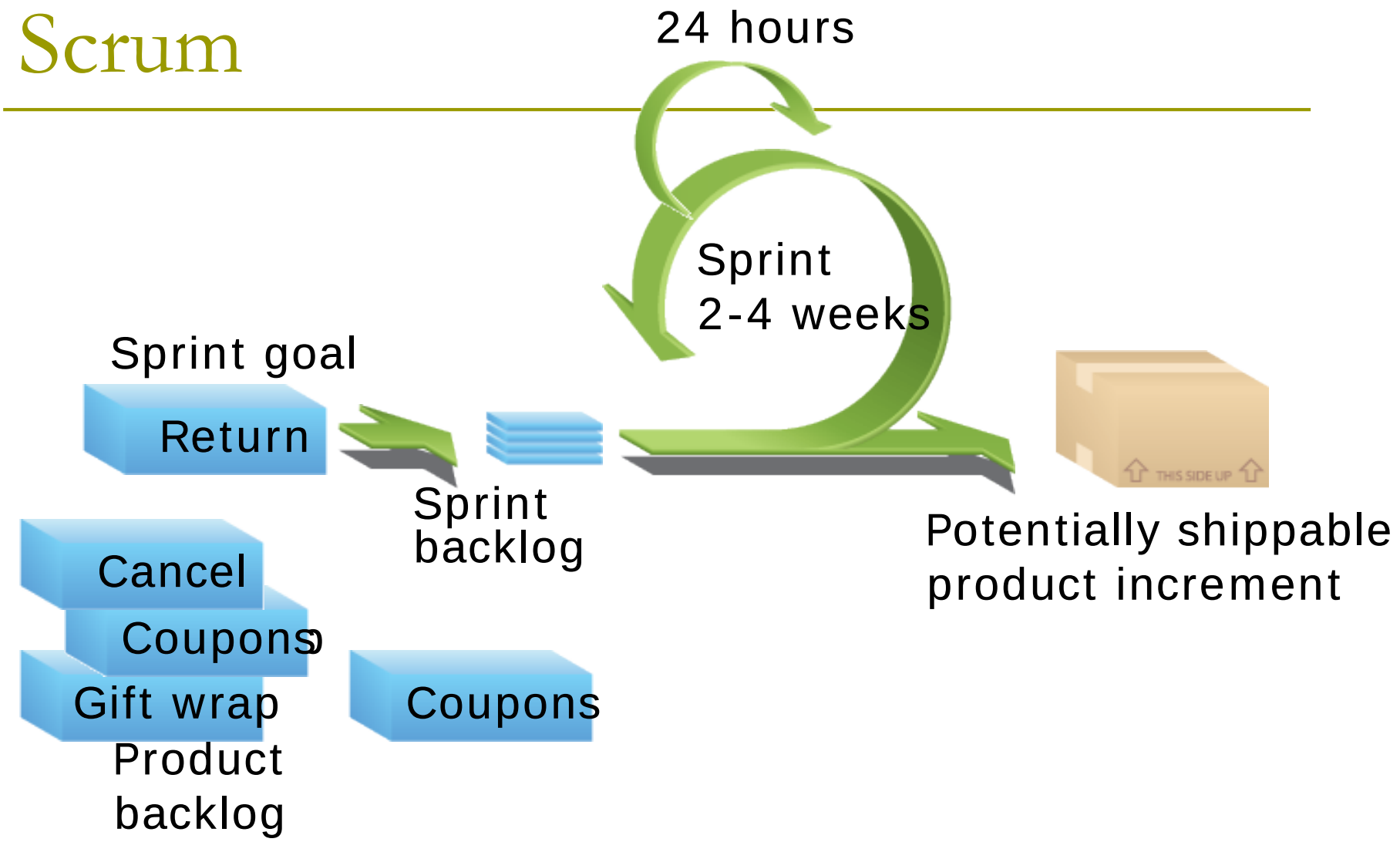
Scrum has been used for:

- Commercial software
- In-house development
- Contract development
- Fixed-price projects
- Financial applications
- ISO 9001-certified applications
- Embedded systems
- 24x7 systems with 99.999% uptime requirements
- the Joint Strike Fighter
- Video game development
- FDA-approved, life-critical systems
- Satellite-control software
- Websites
- Handheld software
- Mobile phones
- Network switching applications
- ISV applications
- Some of the largest applications in use

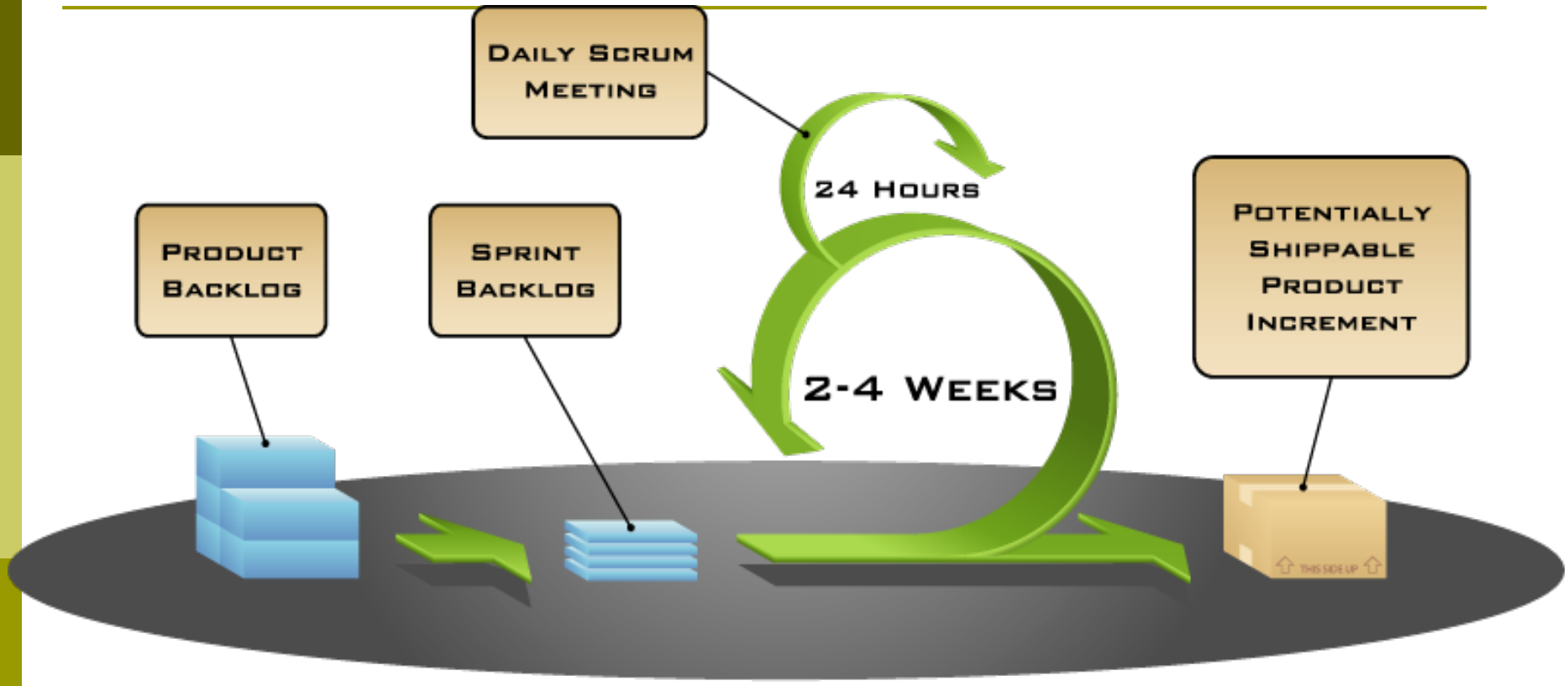
Characteristics

- Self-organizing teams
- Product progresses in a series of month-long “sprints”
- Requirements are captured as items (user stories) in a list of “product backlog”
- No specific engineering practices prescribed
- One of the “agile processes”

Scrum


24 hours
Sprint
2-4 weeks
Sprint goal
Return
Sprint
backlog
Potentially shippable
product increment
Cancel
Coupons
Gift wrap
Coupons
Product
backlog

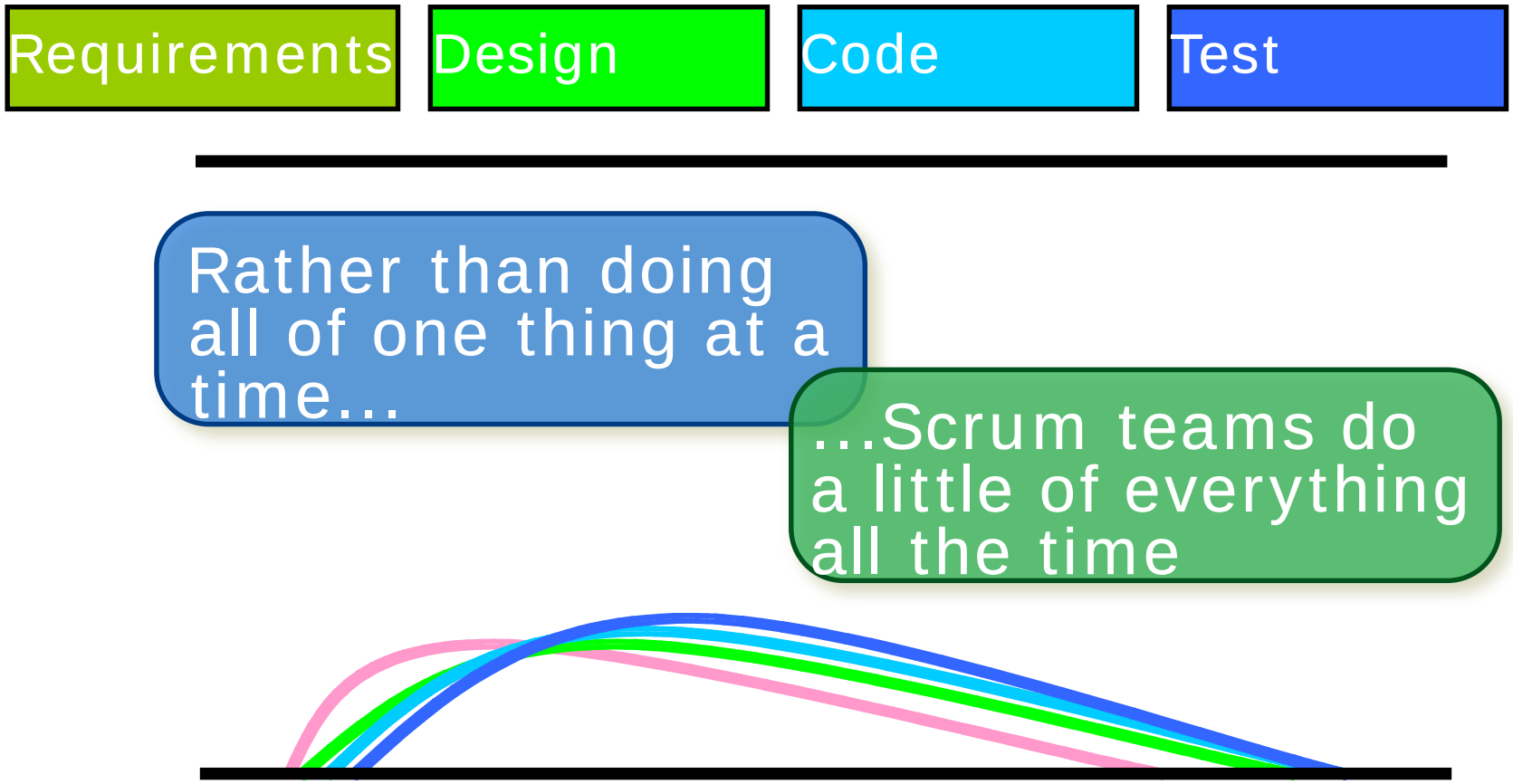
Putting it all together



Sprints

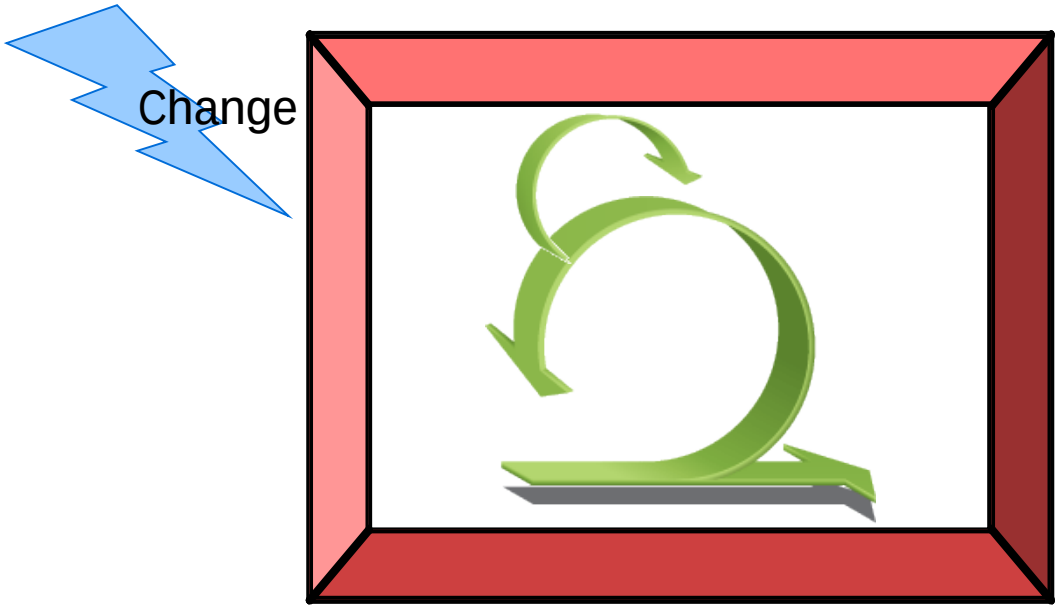
- Scrum projects make progress in a series of “sprints” (i.e. iterations)
- Typical duration is 2–4 weeks or a calendar month at most
- Product is designed, coded, and tested during the sprint

Sequential vs. overlapping development



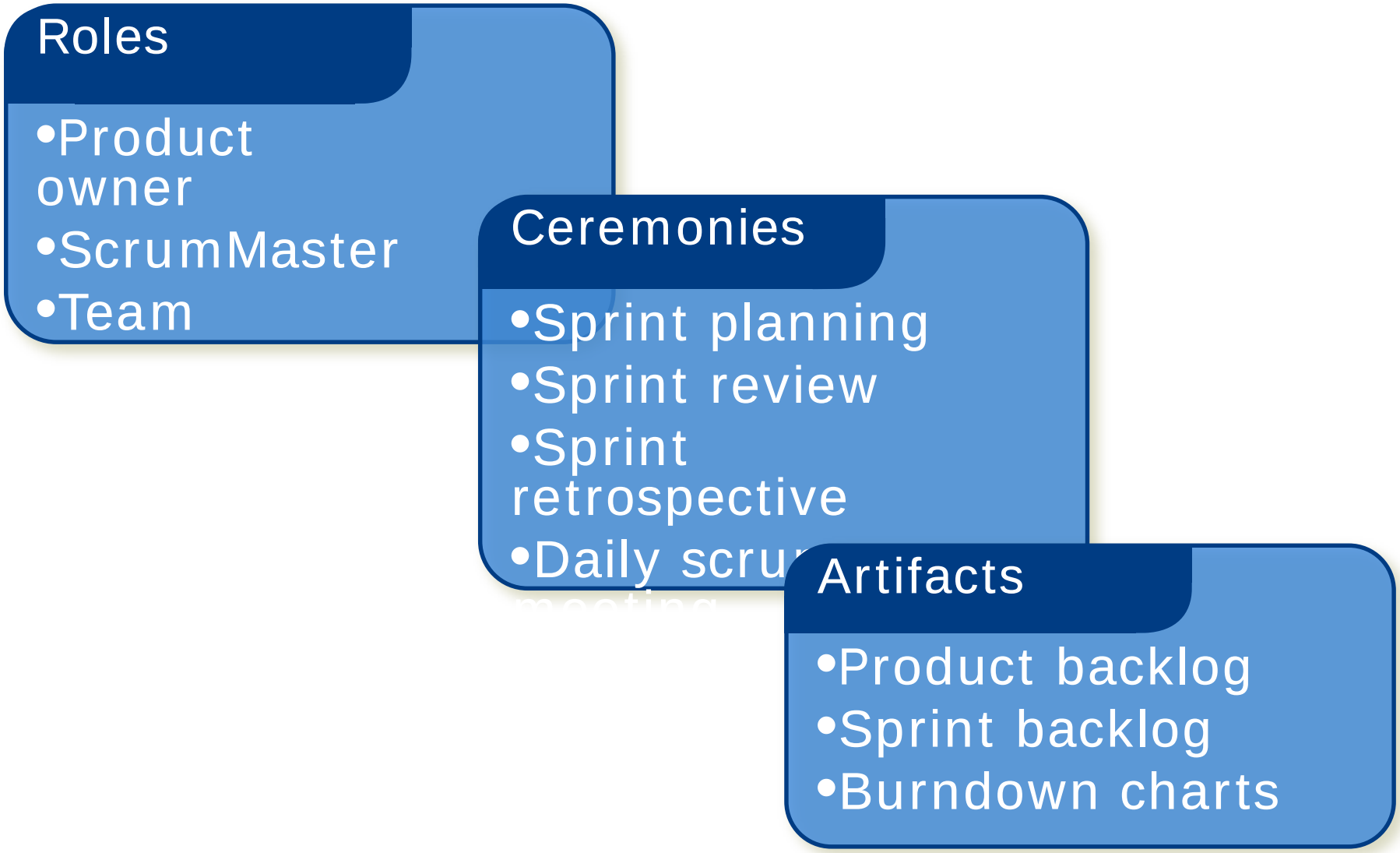
Source: “The New New Product Development Game” by Takeuchi and Nonaka. *Harvard Business Review,* January 1986.

No changes during a sprint



- Plan sprint durations around how long you can commit to keeping change out of the sprint

Scrum framework



Scrum framework

Roles

- Product owner
- ScrumMaster
- Team

Ceremonies

- Sprint planning
- Sprint review
- Sprint retrospective
- Daily scrum meeting

Artifacts

- Product backlog
- Sprint backlog
- Burndown charts

Product backlog

This is the product backlog

- A typical Scrum backlog comprises the following different types of items:
  - Features
  - Bugs
  - Technical work (e.g. “Upgrade all developers' workstations to Windows 7”)
  - Knowledge acquisition (e.g. “researching various JavaScript libraries and making a selection.”
- **Prioritized** by the product owner
- Reprioritized at the start of each sprint

User stories

- **User stories** are short, simple descriptions of a feature told from the perspective of a user or customer of the system who desires the new capability.

- User stories typically follow a simple template:
  - *As a < type of user >, I want < some goal > so that < some reason >.*

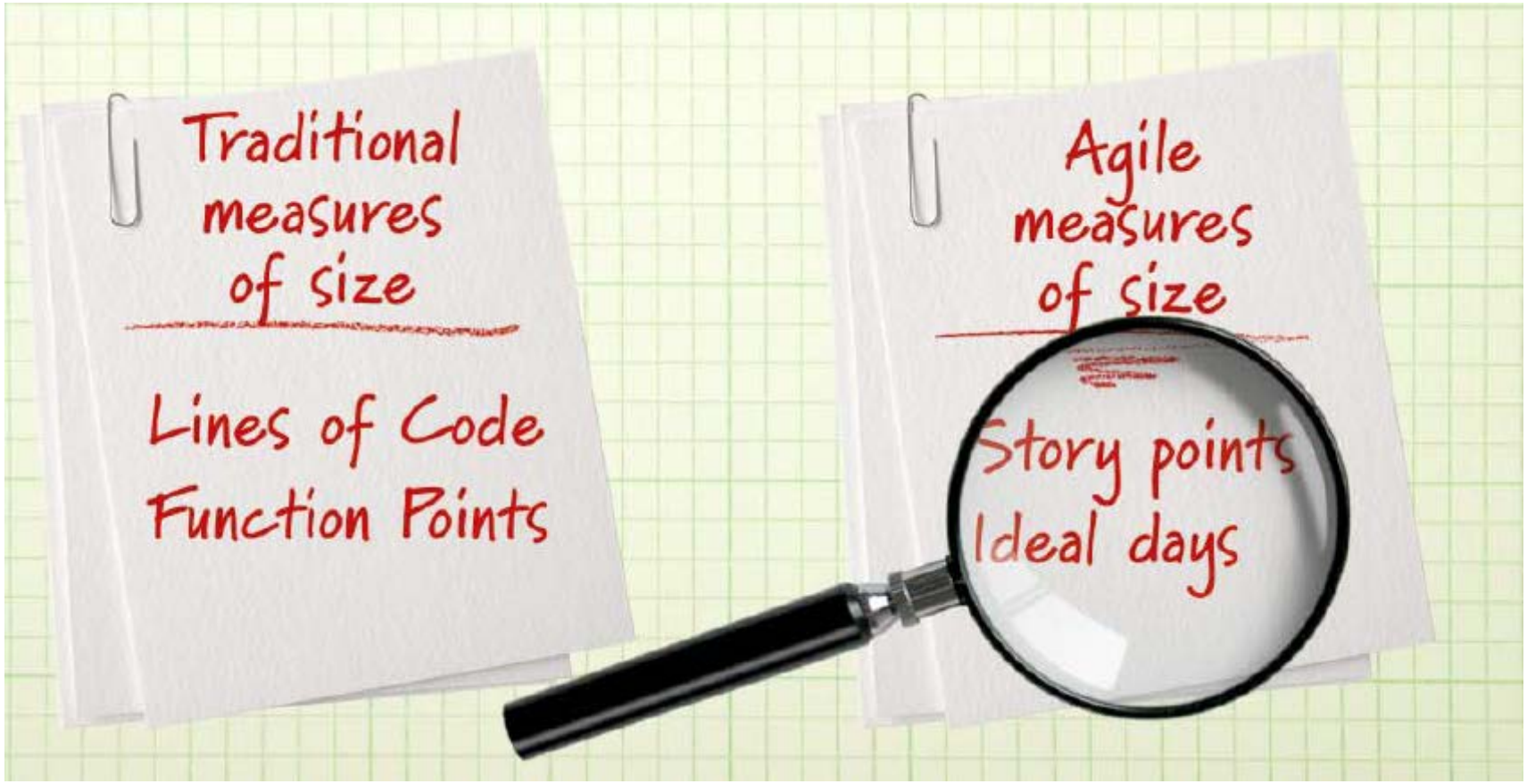
- Examples:
  - As a site visitor, I can read current news on the home page.
  - As a trainer, I can create a new course or event. This includes the following information: name, description (HTML), trainer names (multiple selection from a list), start date, end date, venue name (HTML) and address, contact name, contact phone, contact email, a link for more information, and a link to register. For a certification course the name of the class is a dropdown list; for others, it is free text.

A sample product backlog

Backlog item	Estimate
Allow a guest to make a reservation	3
As a guest, I want to cancel a reservation.	5
As a guest, I want to change the dates of a reservation.	3
As a hotel employee, I can run RevPAR reports (revenue-per-available-room)	8
Improve exception handling	8

What are these?

Traditional vs. agile size/effort estimation



Estimate user stories using ideal days

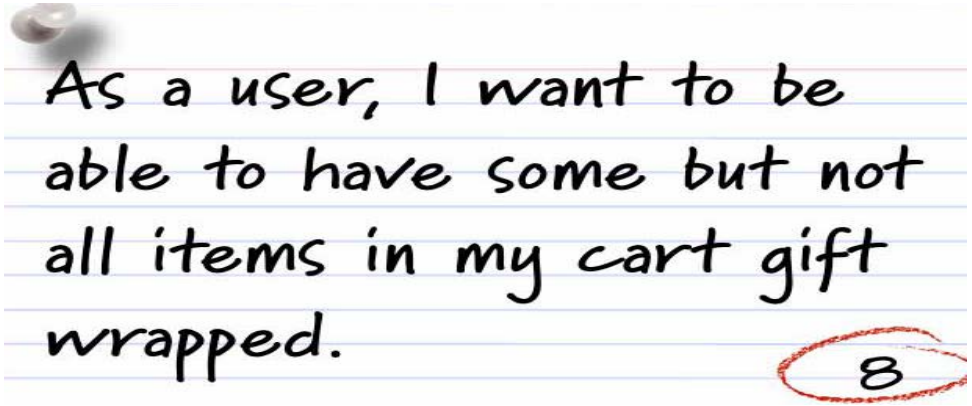
- How long something would take if
  - it's all you worked on
  - you had no interruptions
  - and everything you need is available
- The ideal time of a soccer game is 90 minutes
  - Two 45-minute halves
- The elapsed time is much longer (e.g. 2 hours).

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

Estimate user stories using story points

- Story points are commonly used to represent the effort of completing a user story. The effort is influenced by:
  - How hard a user story is
  - How much there is
- Relative values are what is important:
  - A login screen is a 2.
  - A search feature is an 8.
- Story point estimation are team-specific

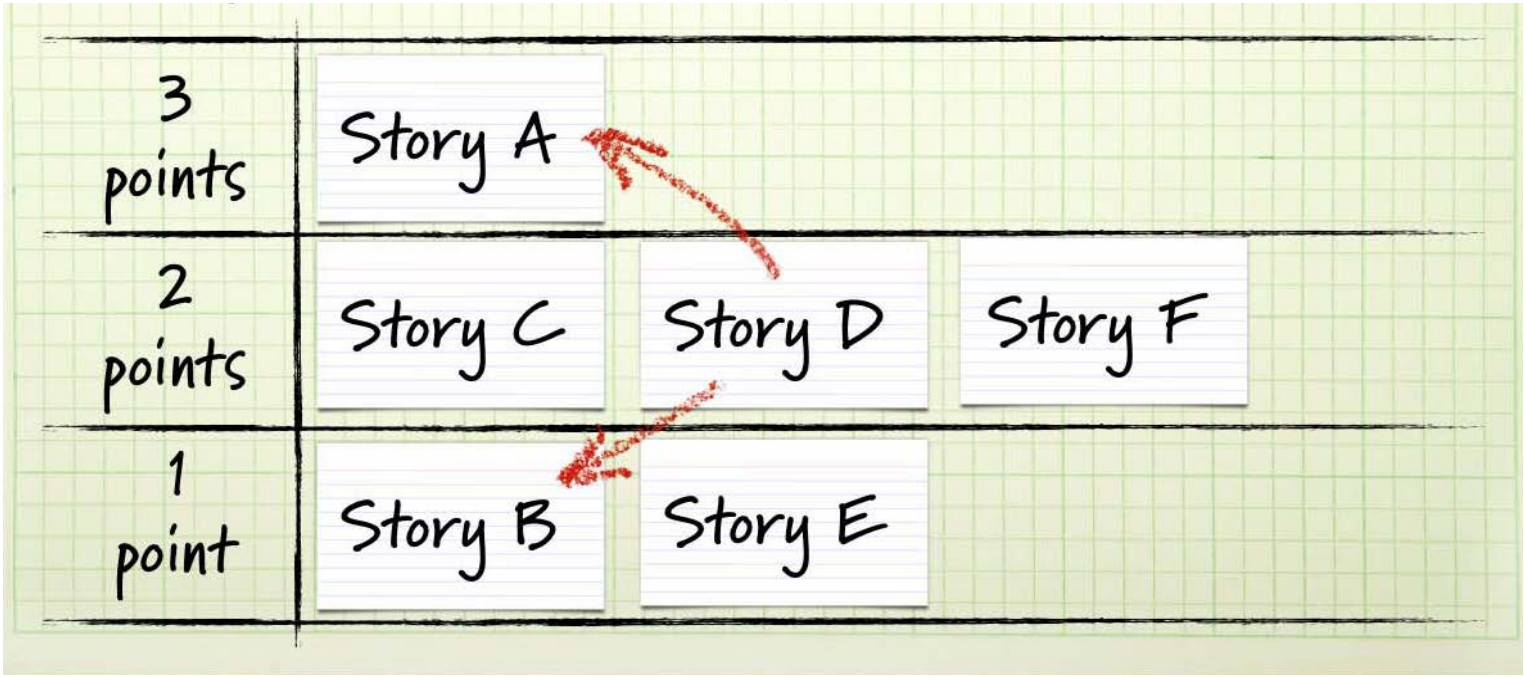


Techniques for estimating user stories

- 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



Use the right units

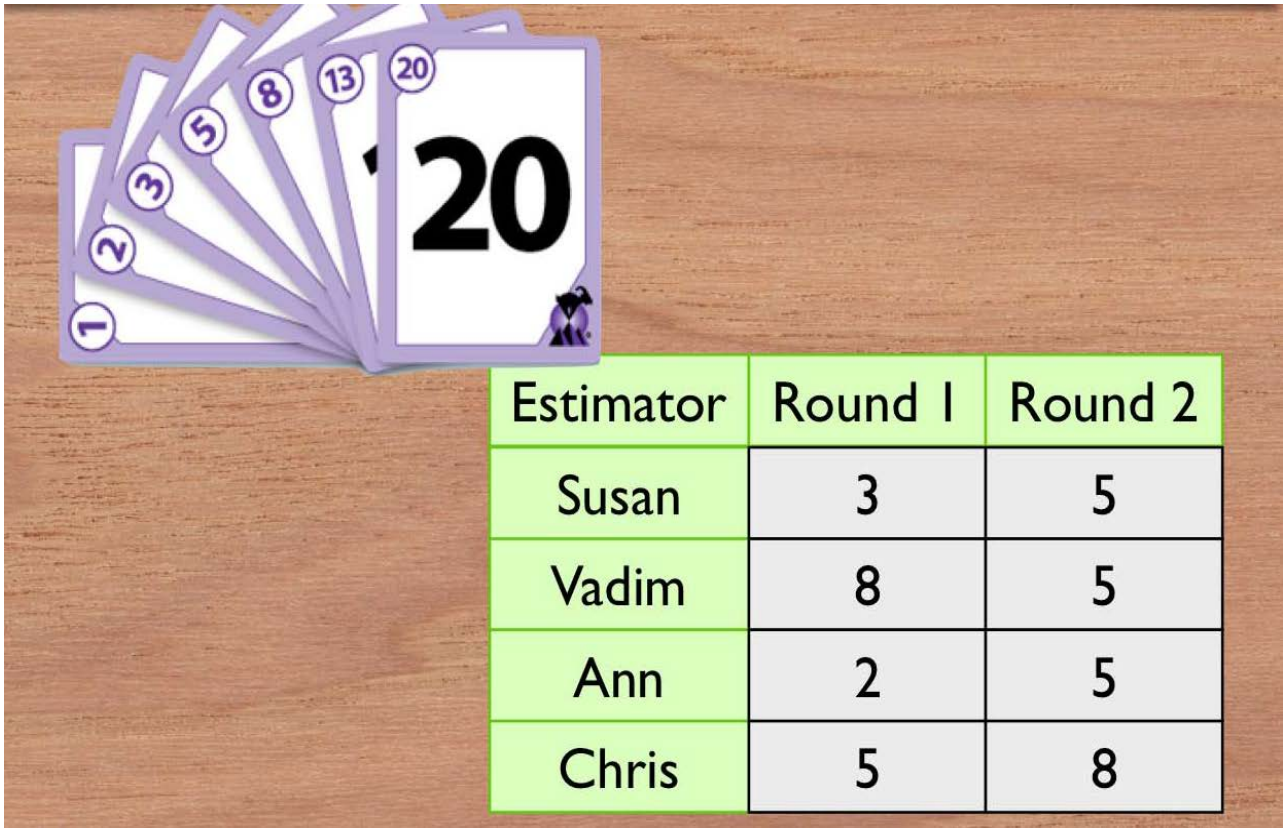
- Can you distinguish a 1-point story from a 2?
  - How about a 17 from an 18?
- Use a set of numbers that make sense.
  - Fibonacci series are commonly used in practice, e.g. 1, 2, 3, 5, 8, 13, ….

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

See Planning Poker in action
https://www.youtube.com/watch?v=cOJ5i4GVZYg

Planning poker - example



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

Let's try

https://play.planningpoker.com/play/game/ZfMXmamb

or https://goo.gl/AxjNUR

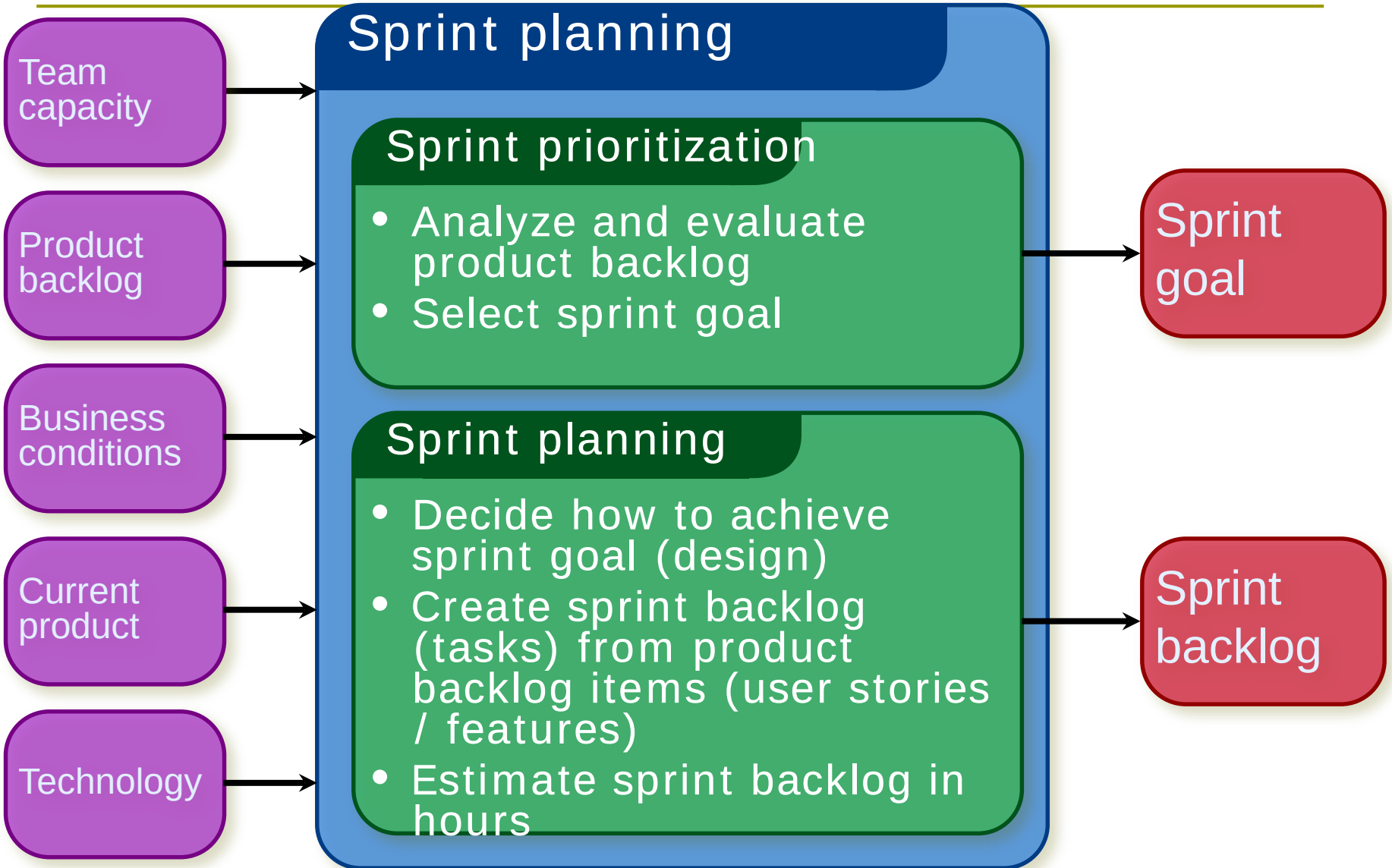
Why Planning Poker works

- Those who will do the work, estimate the work
- Estimators are required to justify estimates
- Combining of individual estimates through group discussion 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

Sprint planning

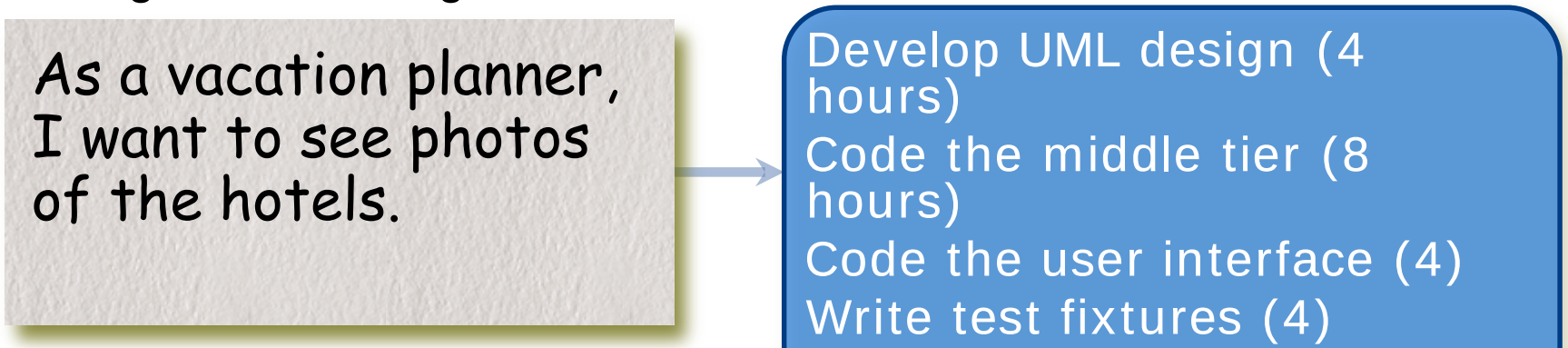
- Watch this video https://youtu.be/En3ifkDYgHM
- Answer the following questions:
  - What is the purpose of sprint planning?
  - What are the main output of sprint planning?
  - What activities are often conducted during sprint planning?

Sprint planning



Sprint planning

- Team decides on the **goal** for a particular sprint, and then selects items from the product backlog they commit to complete to achieve the **sprint's goal**.
- Sprint backlog is created
  - Tasks are identified and each is estimated (e.g. 1-16 hours)
  - Collaboratively, not done alone by the ScrumMaster
- High-level design is considered



User story

Tasks (Example only)

Note: effort estimation can be in **story points**.

The sprint goal

- A short statement of what the work will be focused on during the sprint

Life Sciences

Support features necessary for population genetics studies.

Database Application

Make the application run on SQL Server in addition to Oracle.

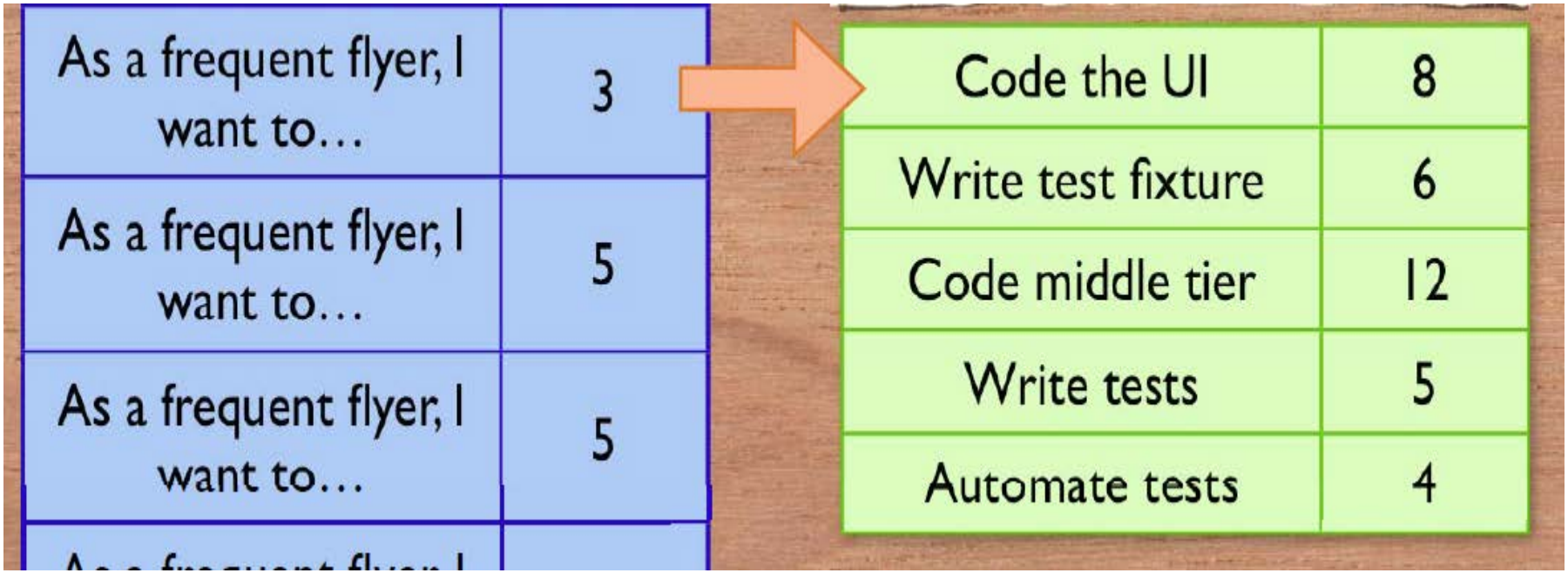
Financial services

Support more technical indicators than company ABC with real-time, streaming data.

Managing the sprint backlog

- Any team member can add, delete or change the sprint backlog
- Work for the sprint emerges
- If work is unclear, define a sprint backlog item with a larger amount of time and break it down later
- Update work remaining as more becomes known (burndown chart)

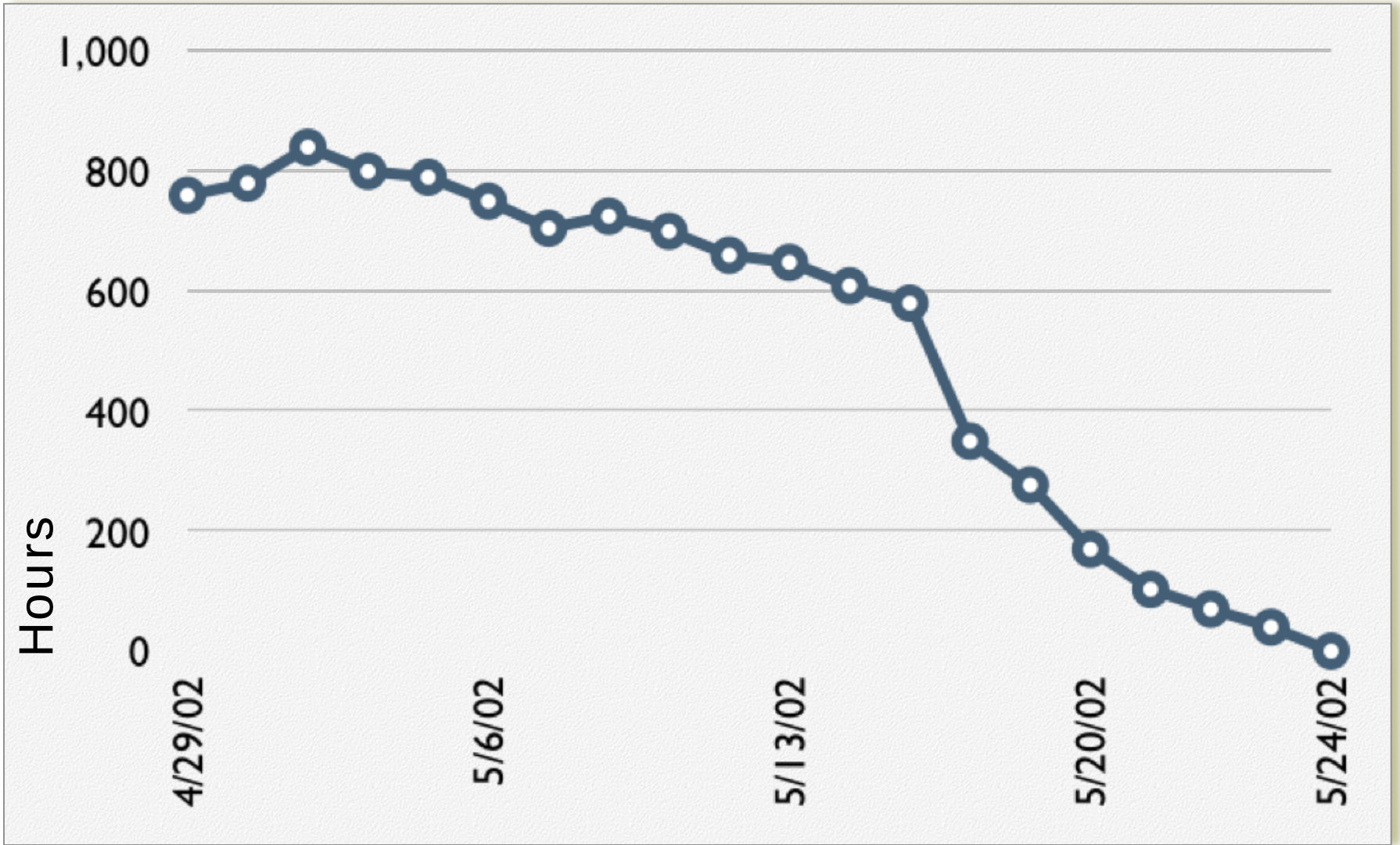
Product backlog vs. Sprint backlog



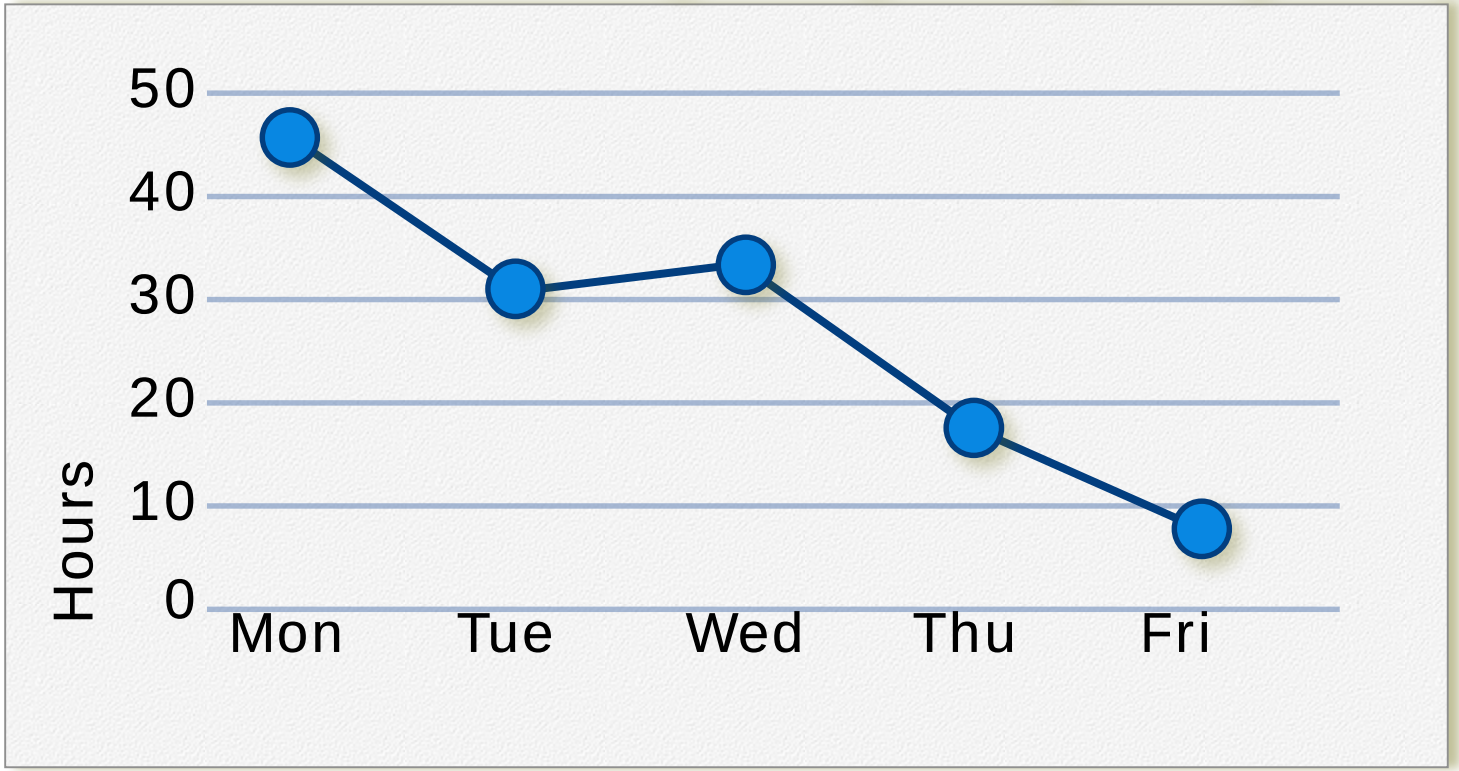
An example of sprint backlog

Tasks	Mon	Tues	Wed	Thur	Fri
Code the user interface	8	4	8		
Code the middle tier	16	12	10	4	
Test the middle tier	8	16	16	11	8
Write online help	12				
Write the foo class	8	8	8	8	8
Add error logging			8	4	

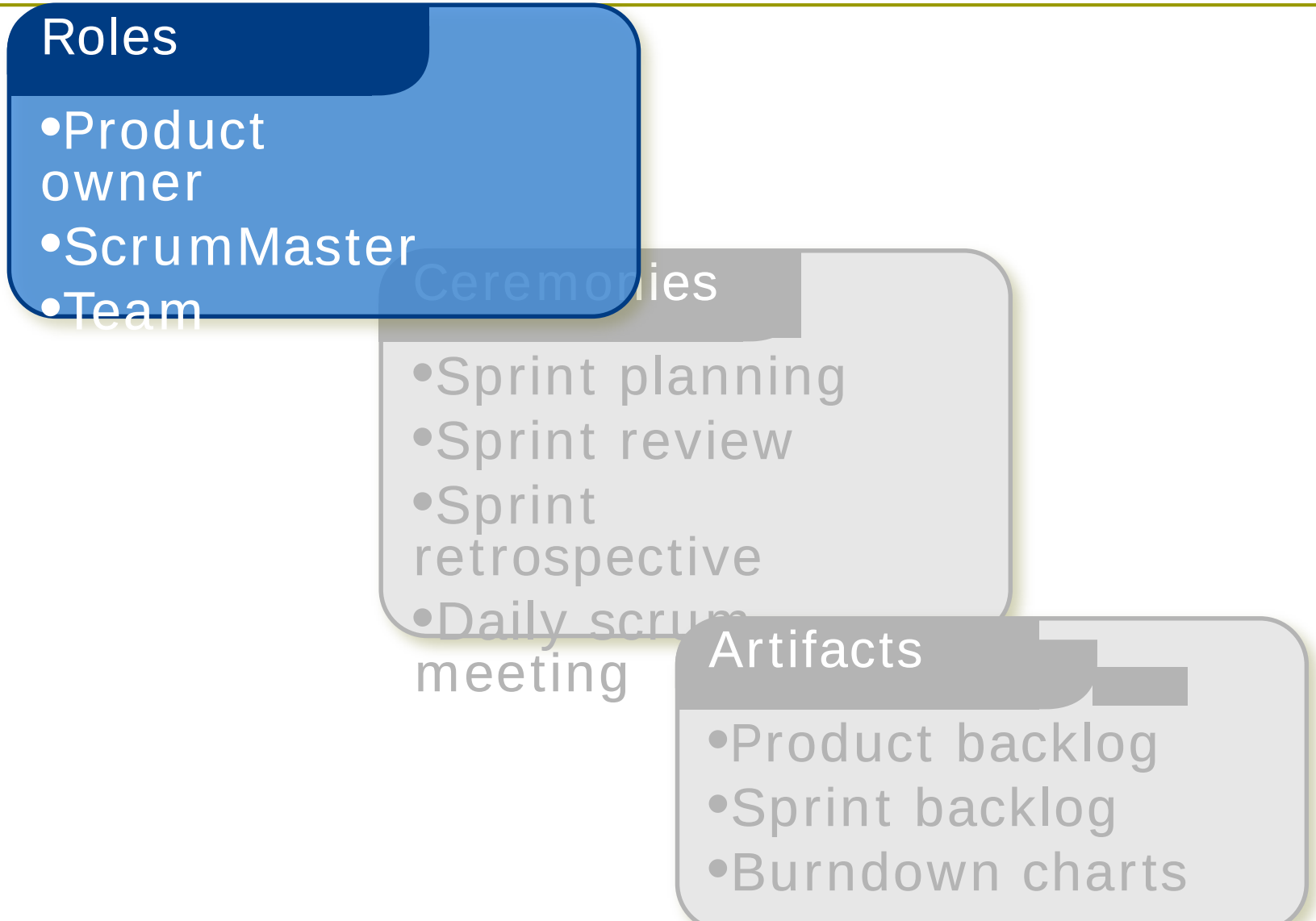
A sprint burndown chart



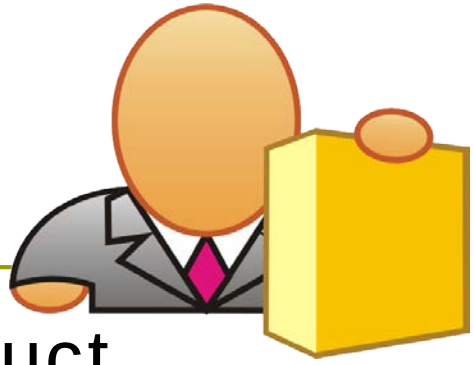
Tasks	Mon	Tues	Wed	Thur	Fri
Code the user interface	8	4	8		
Code the middle tier	16	12	10	7	
Test the middle tier	8	16	16	11	8
Write online help	12				



Scrum framework



Product owner



- Define the **features** of the product
- Decide on **release date and content**
- Be responsible for the profitability of the product (ROI)
- **Prioritize** features according to market value
- Adjust features and priority every iteration, as needed
- Accept or reject work results

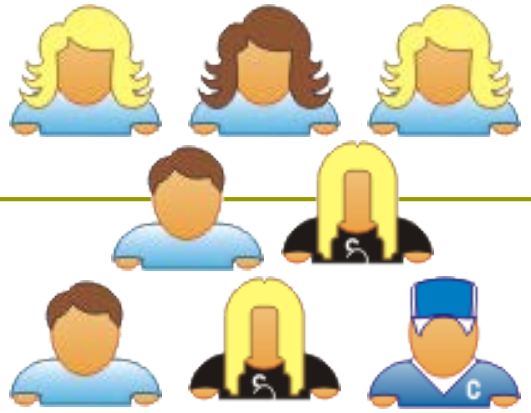
The ScrumMaster

- Represents management to the project
- Responsible for enacting Scrum values and practices
- Removes impediments
- Ensure that the team is fully functional and productive
- Enable close cooperation across all roles and functions

The team

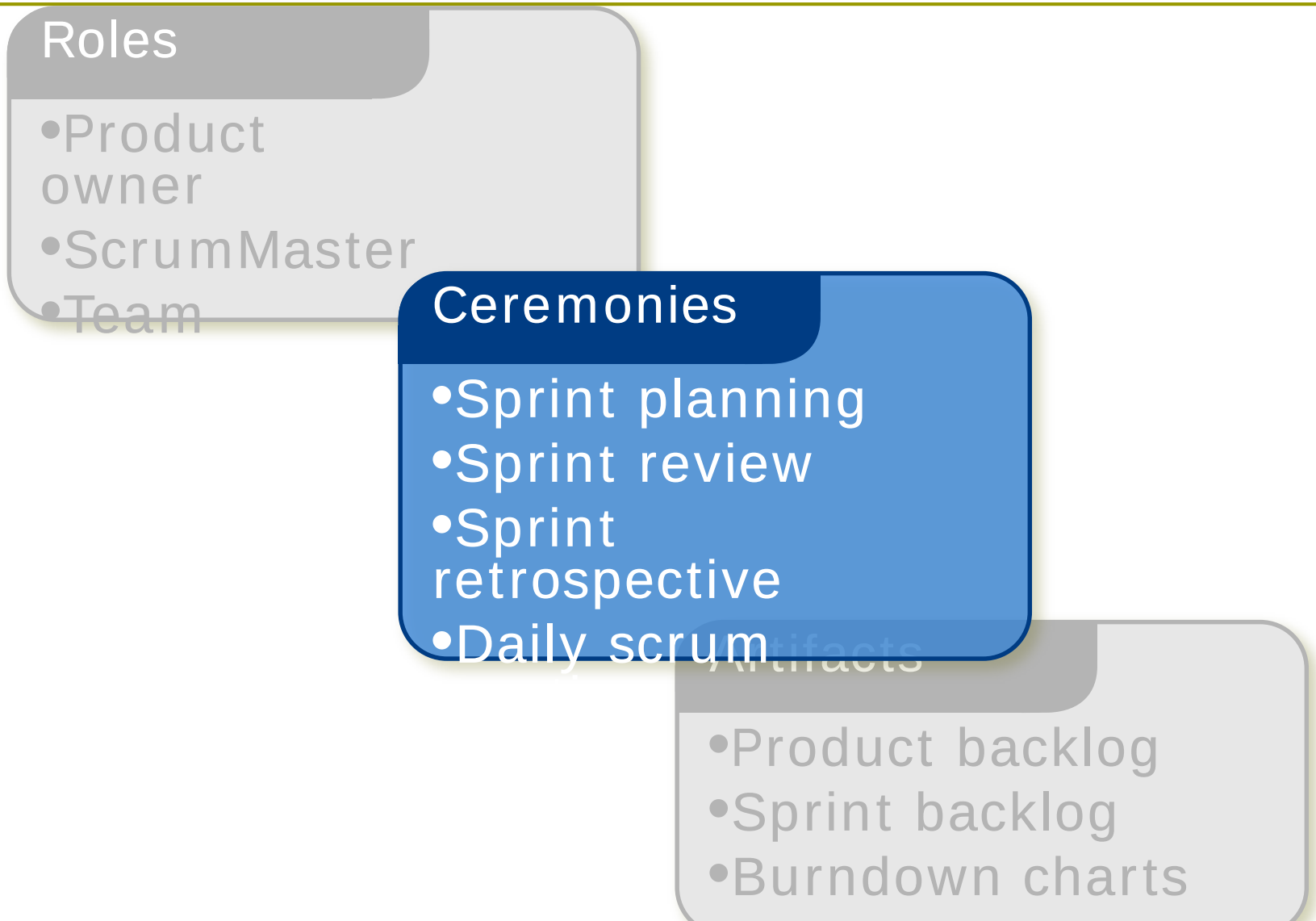
- Typically 5-9 people
- Cross-functional:
  - Programmers, testers, user experience designers, etc.

The team



- Teams are self-organizing
  - Ideally, no titles but rarely a possibility
- Membership should change only between sprints

Scrum framework

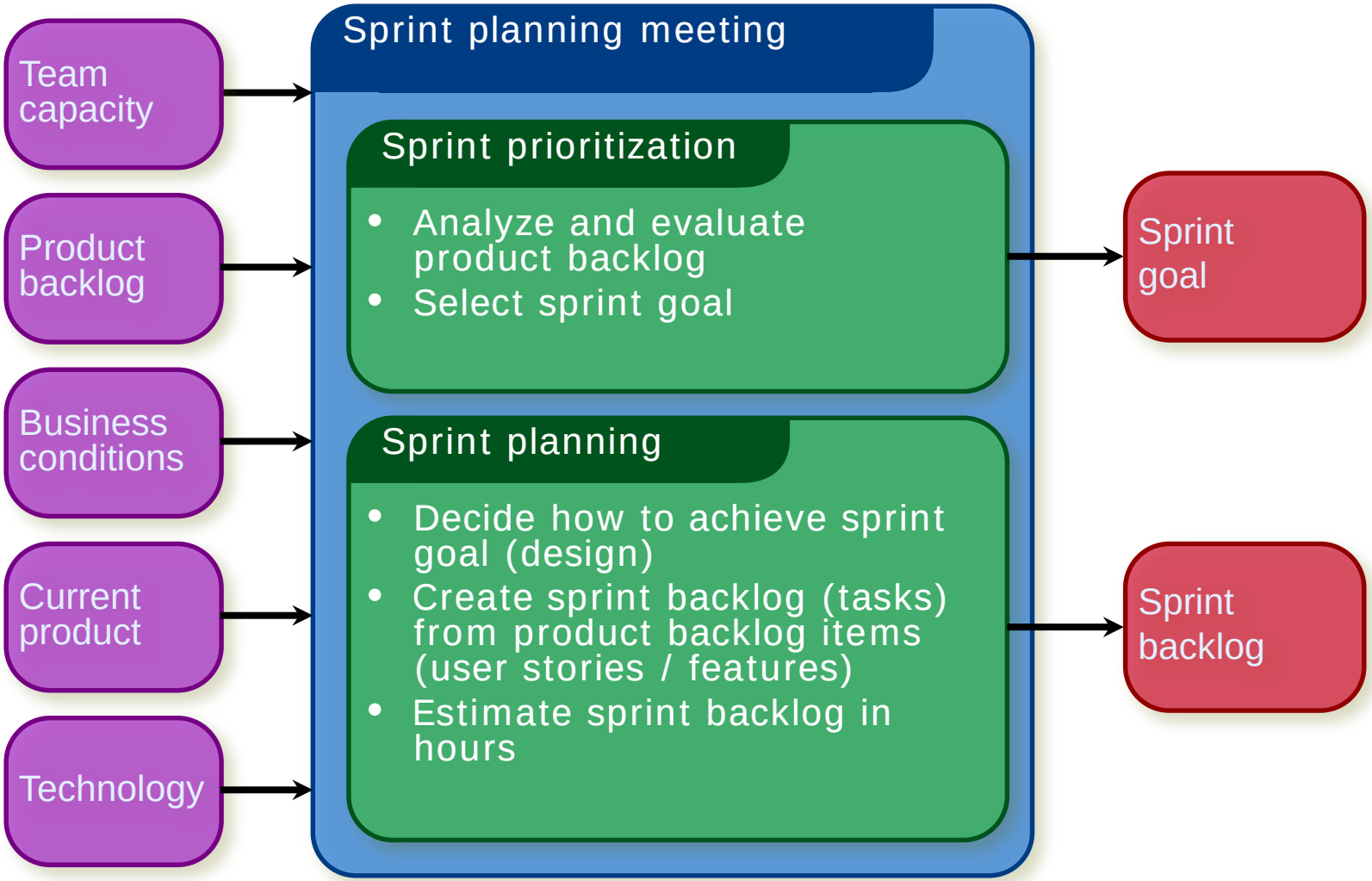


Sprint planning meeting

- Watch this video https://youtu.be/2A9rkiIcnVI

- Answer the following questions:
  - What is the purpose of sprint planning meeting?
  - Who should participate?
  - What should be the outcomes?

Sprint planning meeting



An example of sprint planning in real life https://youtu.be/GivcWpDRlD4

Daily Scrum meeting

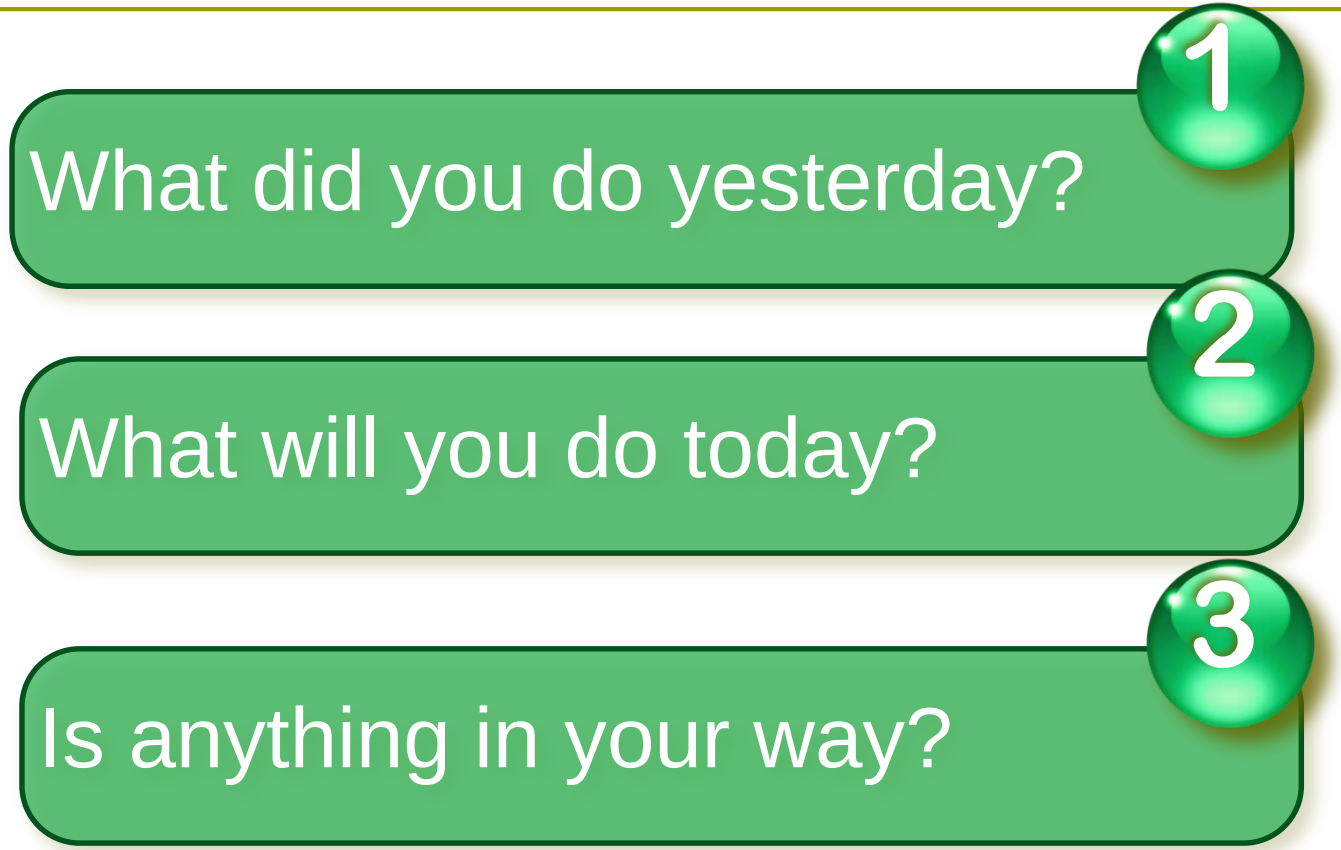
- Watch this video to see how Daily Scrum Meeting in action https://www.youtube.com/watch?v=GzQjGhD5tSU

- Answer the following questions:
  - What are daily scrum meetings for?
  - Who should participate in daily scrum meetings?
  - What are the questions each teach member should address in a daily scrum meeting?

Daily scrum meeting

- Parameters
  - Daily
  - 15-minutes
  - Stand-up
- Not for problem solving
  - Only team members, ScrumMaster, product owner, can talk
- Helps avoid other unnecessary meetings

Everyone answers 3 questions



- These are *not* status for the ScrumMaster
  - They are commitments in front of peers

Sprint review meeting

- Team presents what it accomplished during the sprint
- Typically takes the form of a **demo** of new features or underlying architecture
- Informal
  - 2-hour prep time rule
  - **No slides**
- Whole team participates

Check out this video for some typical scenarios in sprint review meeting
https://youtu.be/cbJinz6TieI

Sprint retrospective meeting

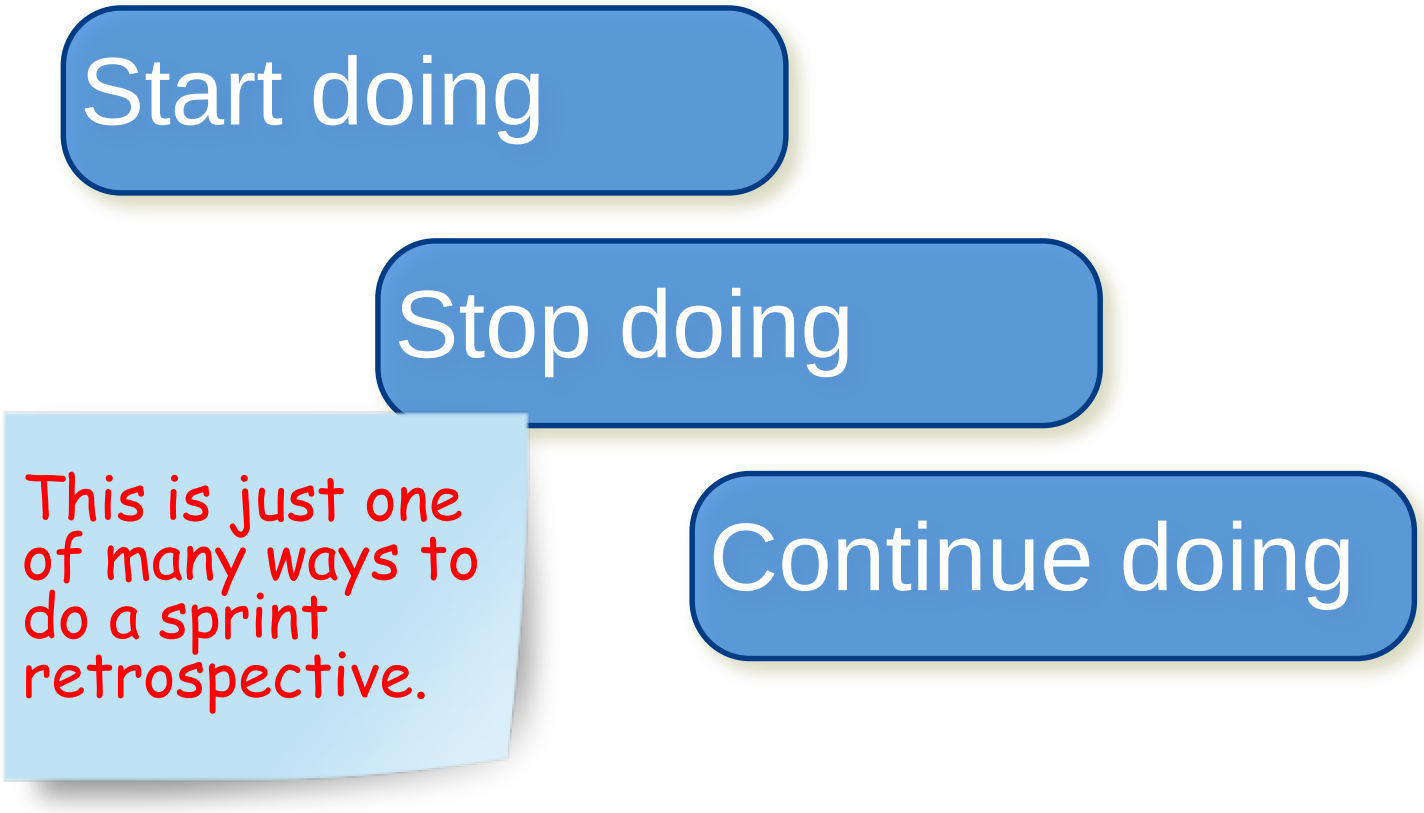
- Watch this video
  - https://youtu.be/n_iu8kuA0XE
- Answer the following questions:
  - What is the purpose of sprint retrospective meeting?
  - Who should participate?
  - What should be discussed?

Sprint retrospective meeting

- Periodically take a look at what is and is not working
- Typically 15–30 minutes
- Done after every sprint
- Whole team participates
  - ScrumMaster
  - Product owner
  - Team
  - Possibly customers and others

Start / Stop / Continue

- Whole team gathers and discusses what they'd like to:



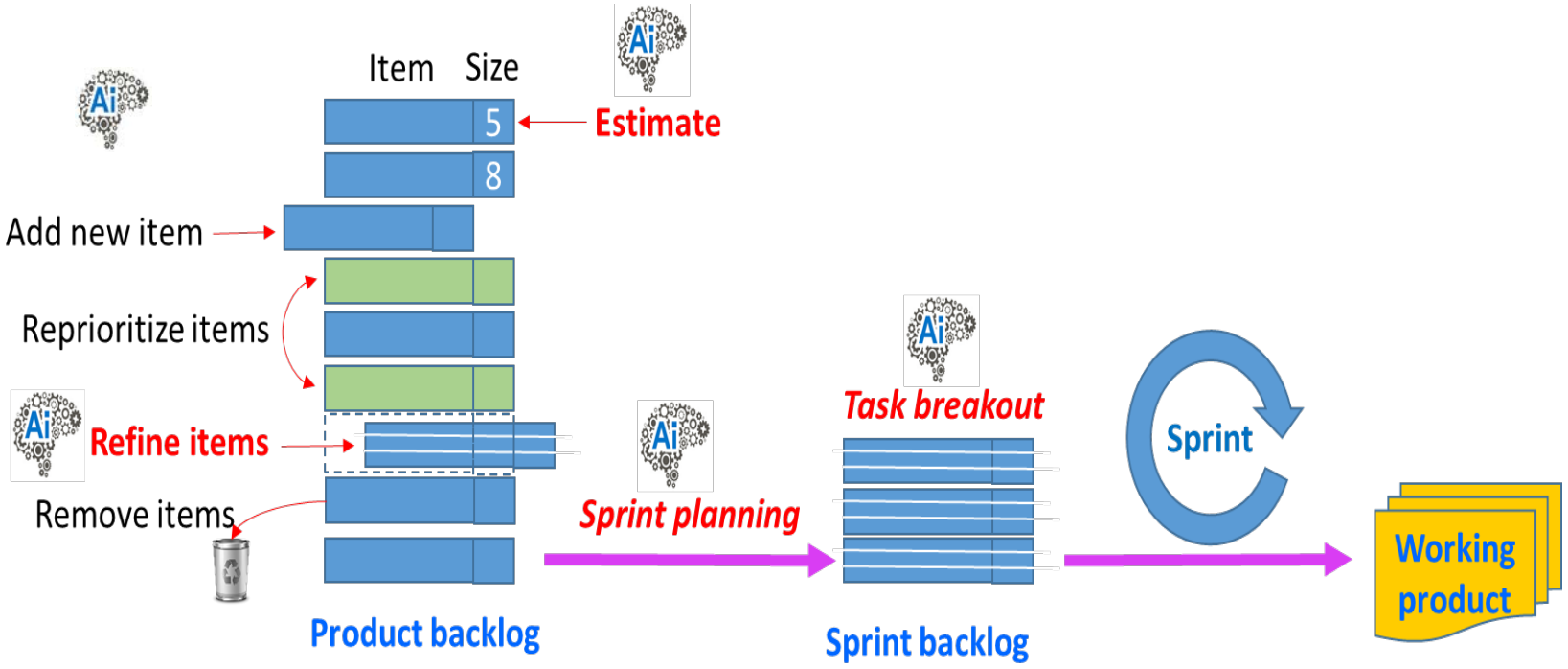
Scrum in 100 words

- Scrum is an **agile process** that allows us to focus on delivering the highest business value in the shortest time.
- It allows us to **rapidly and repeatedly** inspect actual working software (every two weeks to one month).
- The business sets the priorities. Teams **self-organize** to determine the best way to deliver the highest priority features.
- Every **two weeks to a month** anyone can see **real** working software and decide to release it as is or continue to enhance it for another sprint.

Acknowledgement: The following slides on Scrum were adapted from mountaingoatsoftware.com

AI for agile project management

- Read these articles:
  - https://techxplore.com/news/2019-01-framework-ai-powered-agile.html
  - https://blog.developer.atlassian.com/artificial-intelligence-for-issue-analytics-a-machine-learning-powered-jira-cloud-app/



Exit Quiz

QUESTION 1

What kind of software development projects can be executed by Scrum Project Management Framework?

Choice-1: Complete software packages
Choice-2: Customer projects
Choice-3: Sub-systems, components or parts of bigger systems
Choice-4: All kinds of software development projects
Choice-5: None of the given answers

QUESTION 2

What does NOT belong to cornerstones of the agile manifesto?

Choice-1: Individuals and interactions over processes and tools
Choice-2: Working software over comprehensive documentation
Choice-3: Processes over people
Choice-4: Customer collaboration over contract negotiation
Choice-5: Responding to change over following a plan

QUESTION 3

What is defined by the Scrum Framework?
A) Rules & Roles
B) Document guidelines
C) Artifacts and events
Choice-2: B
Choice-3: C
Choice-4: A, B, C
Choice-5: A, C

QUESTION 4

Where are the customer requirements stored?

Choice-1: In the Product Backlog
Choice-2: In the Sprint Backlog
Choice-3: In a database
Choice-4: In a Scrum Product Requirement Specification
Choice-5: Nowhere. The Scrum Product Owner knows them

QUESTION 5

Which ones of the following main roles are defined by Scrum Framework?
A) Scrum Tester
B) The Scrum Team
C) Scrum Manager
D) Scrum Master
E) Scrum Product Owner

Choice-1: A, B, C, D, E
Choice-2: B, C, D, E
Choice-3: B, D, E
Choice-4: A, B, D, E
Choice-5: A, B, C, D

QUESTION 6

Which ones of the following main events are defined by Scrum Framework?
A) Sprint Planning Meeting
B) Sprint Retrospective Meeting
C) Sprint Review Meeting
D) Mid-Sprint Status Review Meeting
E) Daily Scrum Meeting

Choice-1: A, B, C, D, E
Choice-2: A, B, C, D
Choice-3: A, C, D, E
Choice-4: A, B, C, E
Choice-5: A, C, E

QUESTION 7

Which concept is NOT defined in the Scrum Framework?

Choice-1: Scrum Master
Choice-2: Project Manager
Choice-3: Scrum Product Owner
Choice-4: Daily Scrum
Choice-5: Scrum Product Burndown

QUESTION 8

What is important in all Scrum projects?
A) Self-organization
B) Clear hierarchies in the company
C) Communication
D) Continuous improvement

Choice-1: A, B, C, D
Choice-2: A, C, D
Choice-3: A, D
Choice-4: A
Choice-5: A, B

QUESTION 9

In software engineering what are the disadvantages of the classical waterfall model?
A) End-Product has to be fully anticipated beforehand.
B) Some requirements are implemented as defined in the beginning of the project, and yet they are not really needed by the customer.
C) Each phase is strictly separated.

Choice-1: A
Choice-2: B
Choice-3: C
Choice-4: A, B
Choice-5: A, B, C

QUESTION 10
What are the advantages of the Scrum Framework?

Choice-1: Fine-grained requirements are only defined when they are really needed.
Choice-2: All activities to design, build and test a certain functionality are kept together in one phase.
Choice-3: Changes are expected and welcomed by Scrum team.
Choice-4: All of the given answers
Choice-5: None of the given answers