# CS353 – Group Project
# Lecture 1 – SCRUM Introduction

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# We’re losing the relay race

“The… ‘relay race’ approach to product development…may conflict with the goals of maximum speed and flexibility. Instead a holistic or ‘rugby’ approach—where a team tries to go the distance as a unit, passing the ball back and forth—may better serve today’s competitive requirements.”

Hirotaka Takeuchi and Ikujiro Nonaka,
“The New New Product Development Game”,
*Harvard Business Review*, January 1986.

# 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.

# Scrum origins

- Jeff Sutherland
  - Initial scrums at Easel Corp in 1993
  - IDX and 500+ people doing Scrum
- Ken Schwaber
  - ADM
  - Scrum presented at OOPSLA 96 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
- Lockheed Martin
- Philips
- Siemens
- Nokia
- IBM
- Capital One
- BBC
- **Paddy Power**
- 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

# Agile Culture

Agile requires a new culture

- Adventure Works - American Management Implemented Scrum
- The product began to emerge in high-quality, regular increments. Joris (owner) adopted a sustainable pace of work - everyone worked eight-hour days.
- Company was owned by a Japanese company and eight-hour workdays was unacceptable to Japanese management.
- Demanded return to the 12-hour work days that were normal prior to Scrum were restored.
- Defects rose 60 percent so Joris restored Scrum's eight-hour workdays.
- Japanese managers saw empty parking lots and darkened offices, reported that employees were lazy and recommended selling the company. - Sold Adventure Works to its American management.
- Two months later, company sold product for twice the price of the buyout.

# Characteristics

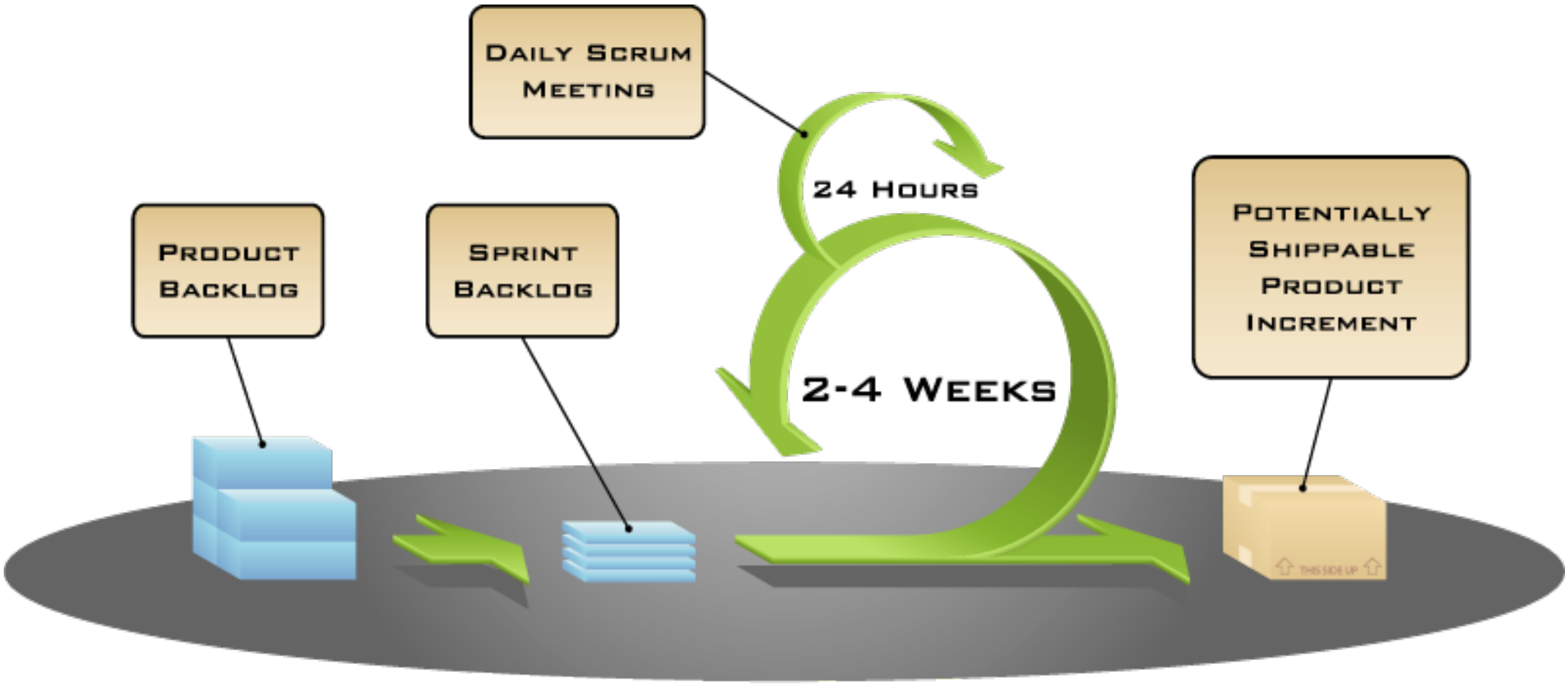
- Self-organizing teams
- Product progresses in a series of month-long “sprints”
- Requirements are captured as items in a list of “product backlog”
- No specific engineering practices prescribed
- Uses generative rules to create an agile environment for delivering projects
  - vs inclusive rules
- One of the “agile processes”

# The Agile Manifesto–a statement of values

| | | |
|---|---|---|
| Individuals and interactions | over | Process and tools |
| Working software | over | Comprehensive documentation |
| Customer collaboration | over | Contract negotiation |
| Responding to change | over | Following a plan |

Source: www.agilemanifesto.org

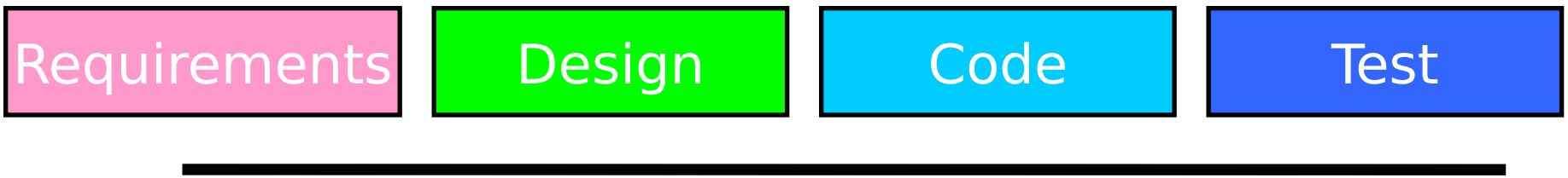
# Putting it all together



# Sprints

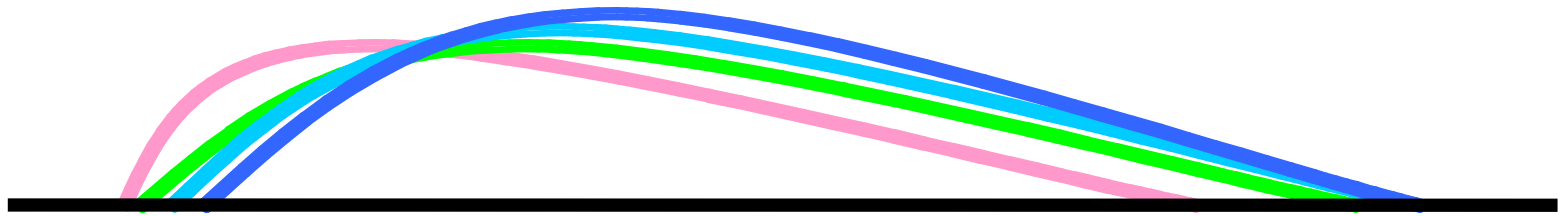
- Scrum projects make progress in a series of “sprints”
  - Analogous to Extreme Programming iterations
- Typical duration is 2–4 weeks or a calendar month at most
- A constant duration leads to a better rhythm
- Product is designed, coded, and tested during the sprint

# Sequential vs. overlapping development



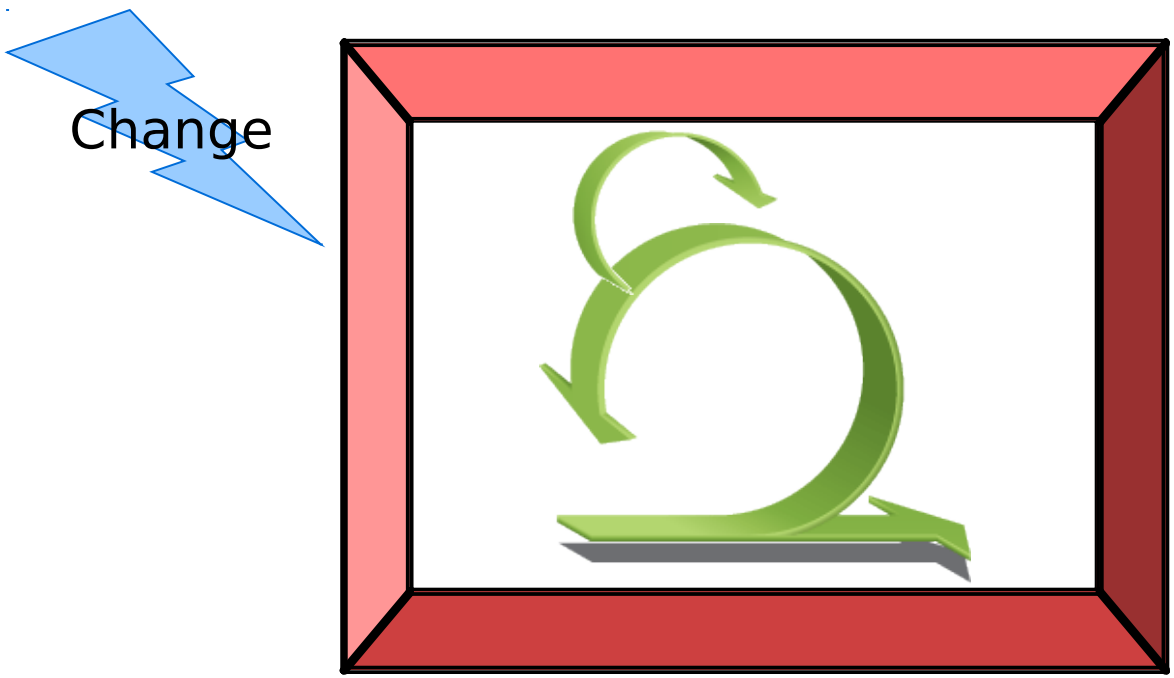

Rather than doing all of one thing at a time...

...Scrum teams do a little of everything all the time



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

## Roles

- Product owner
- ScrumMaster
- Team

## Ceremonies

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

## Artifacts

- Product backlog
- Sprint backlog
- Burndown charts

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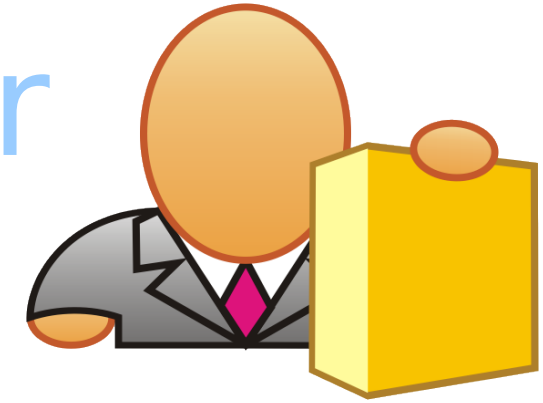
# Product owner



- 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 co-operation across all roles and functions
- Shield the team from external interferences

# The team

- Typically 5-9 people
- Cross-functional:
  - Programmers, testers, user experience designers, etc.
- Members should be full-time
  - May be exceptions (e.g., database administrator)
- Teams are self-organizing
  - Ideally, no titles
- Membership should change only between sprints

# Scalability

- Typical individual team is 7 ± 2 people
  - Scalability comes from teams of teams
- Factors in scaling
  - Type of application
  - Team size
  - Team dispersion
  - Project duration
- Scrum has been used on multiple 500+ person projects
  - Scrum of scrums
  - Scrum of scrum of scrums ...

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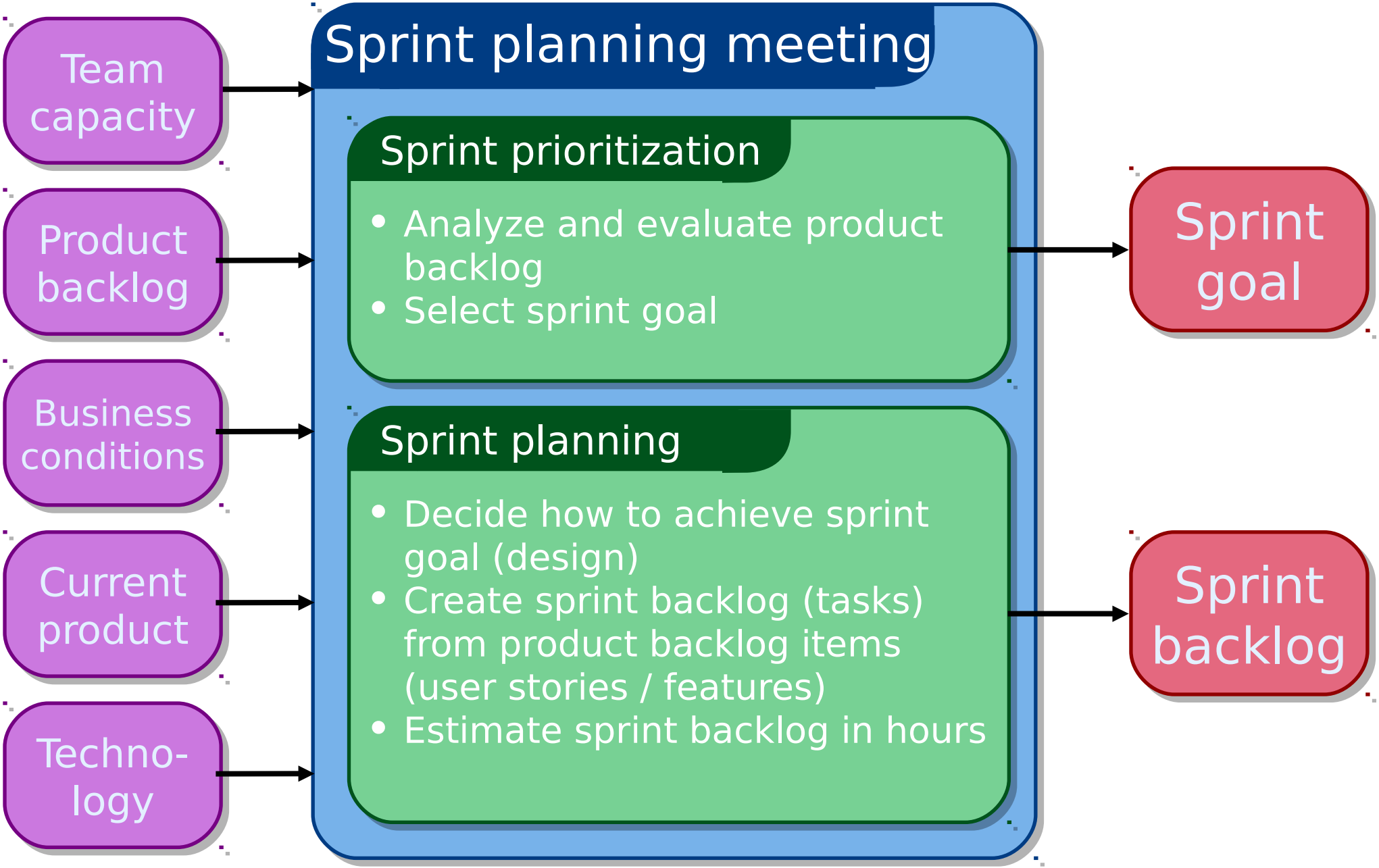
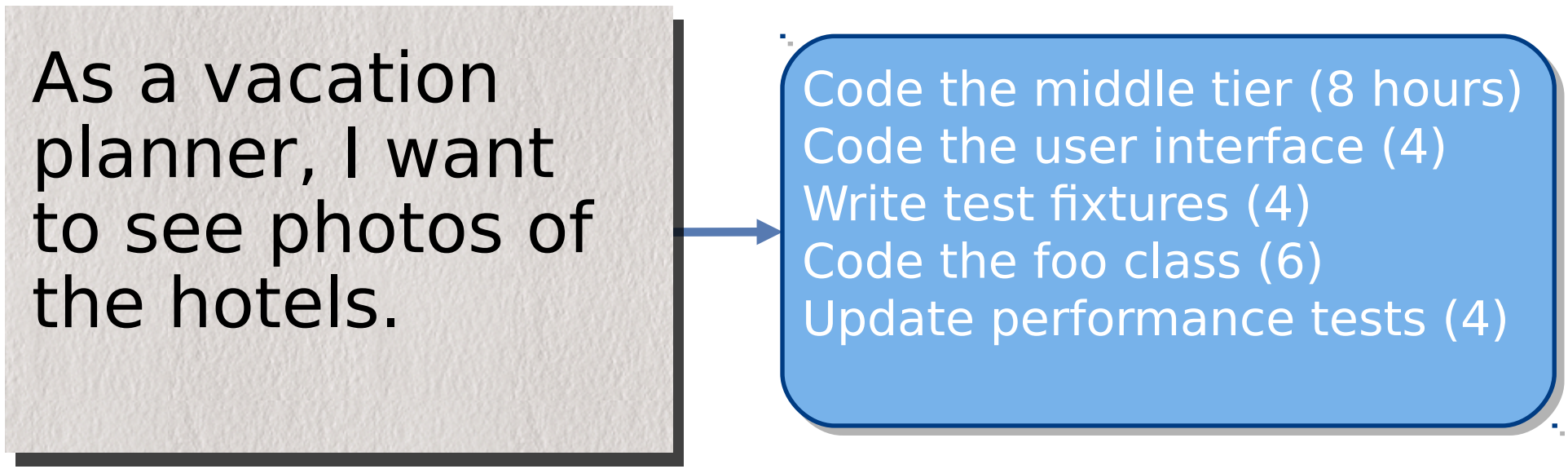

Team capacity
Product backlog
Business conditions
Current product
Techno-logy
Sprint planning meeting
Sprint prioritization
• Analyze and evaluate product backlog
• Select sprint goal
Sprint planning
• Decide how to achieve sprint goal (design)
• Create sprint backlog (tasks) from product backlog items (user stories / features)
• Estimate sprint backlog in hours
Sprint goal
Sprint backlog

# Sprint planning

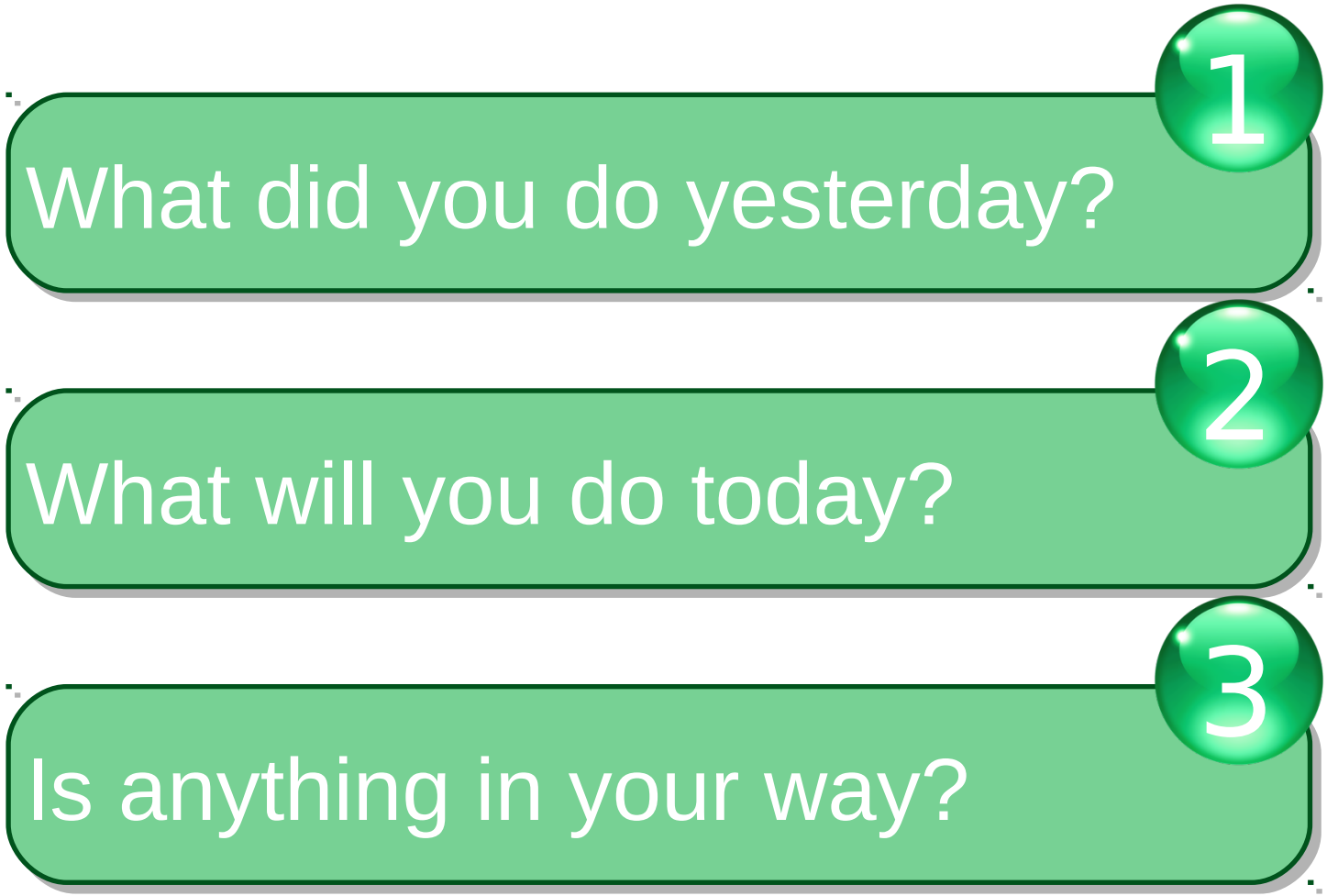
- Team selects items from the product backlog they can commit to completing
- Sprint backlog is created
  - Tasks are identified and each is estimated (1-16 hours)
  - Collaboratively, not done alone by the ScrumMaster



# The daily scrum

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

# Everyone answers 3 questions




- These are commitments in front of peers

# The sprint review

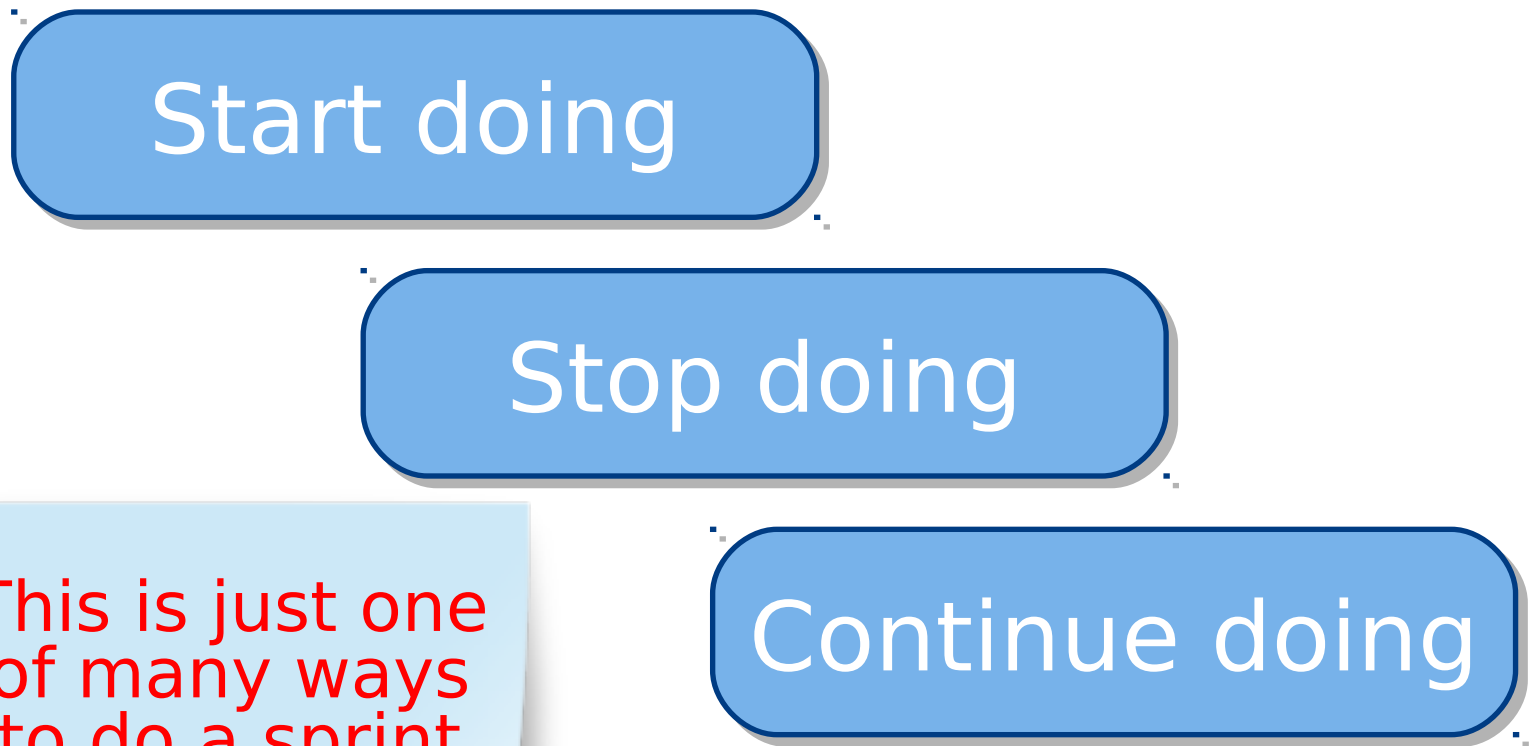
- Team presents what it accomplished during the sprint
- Typically takes the form of a demo of new features or underlying architecture
- Informal
  - 2-hour prep time rule
  - No slides
- Whole team participates
- Invite the world

# Sprint retrospective

- 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:



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# Product backlog


This is the product backlog

- The requirements
- A list of all desired work on the project
- Ideally expressed such that each item has value to the users or customers of the product
- Prioritized by the product owner
- Re-prioritized at the start of each sprint

# 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 |
| ... | 30 |
| ... | 50 |

# 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.

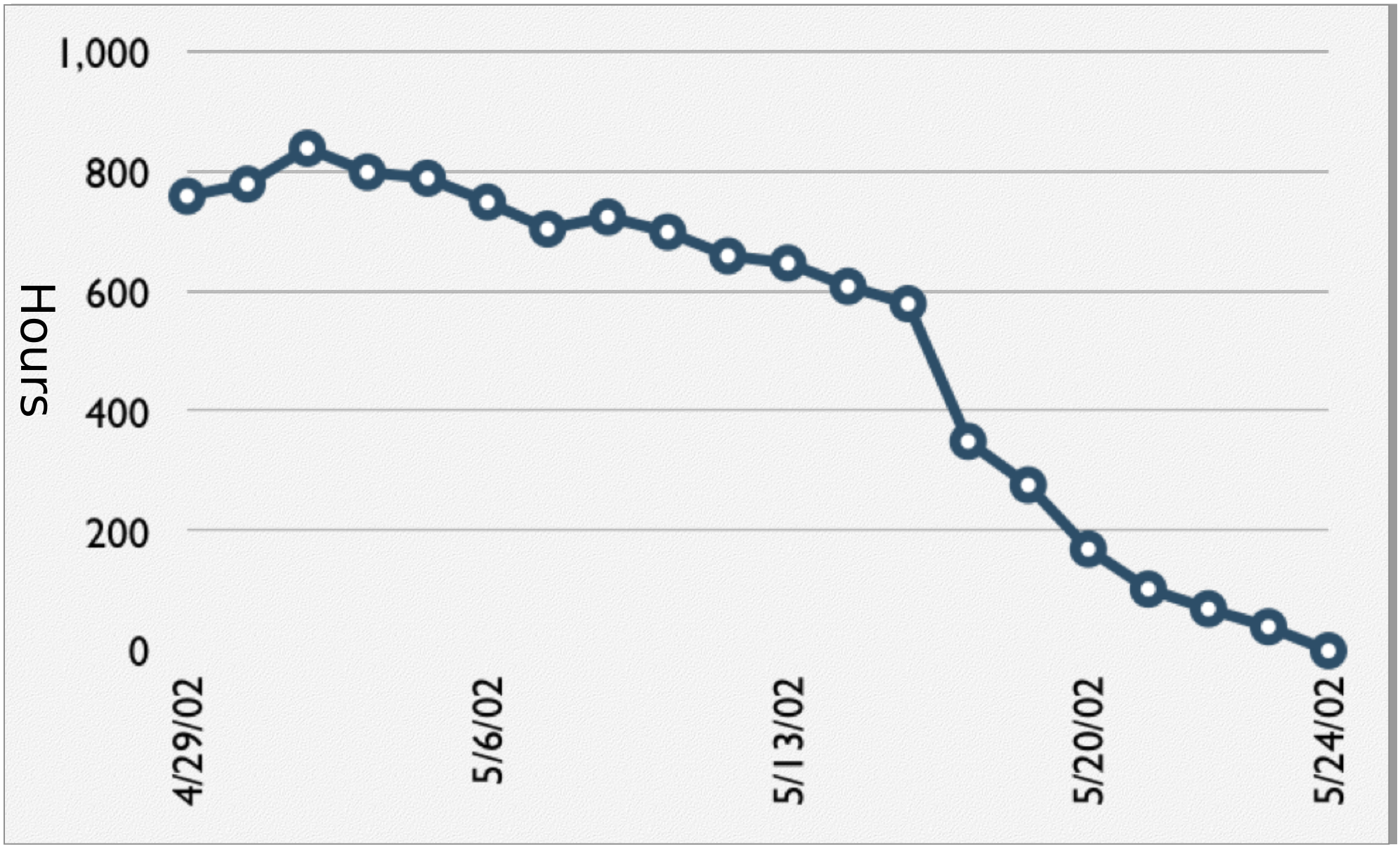
# Managing the sprint backlog

- Individuals sign up for work of their own choosing
  - Work is never assigned
- Estimated work remaining is updated daily
- 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

# A 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 |
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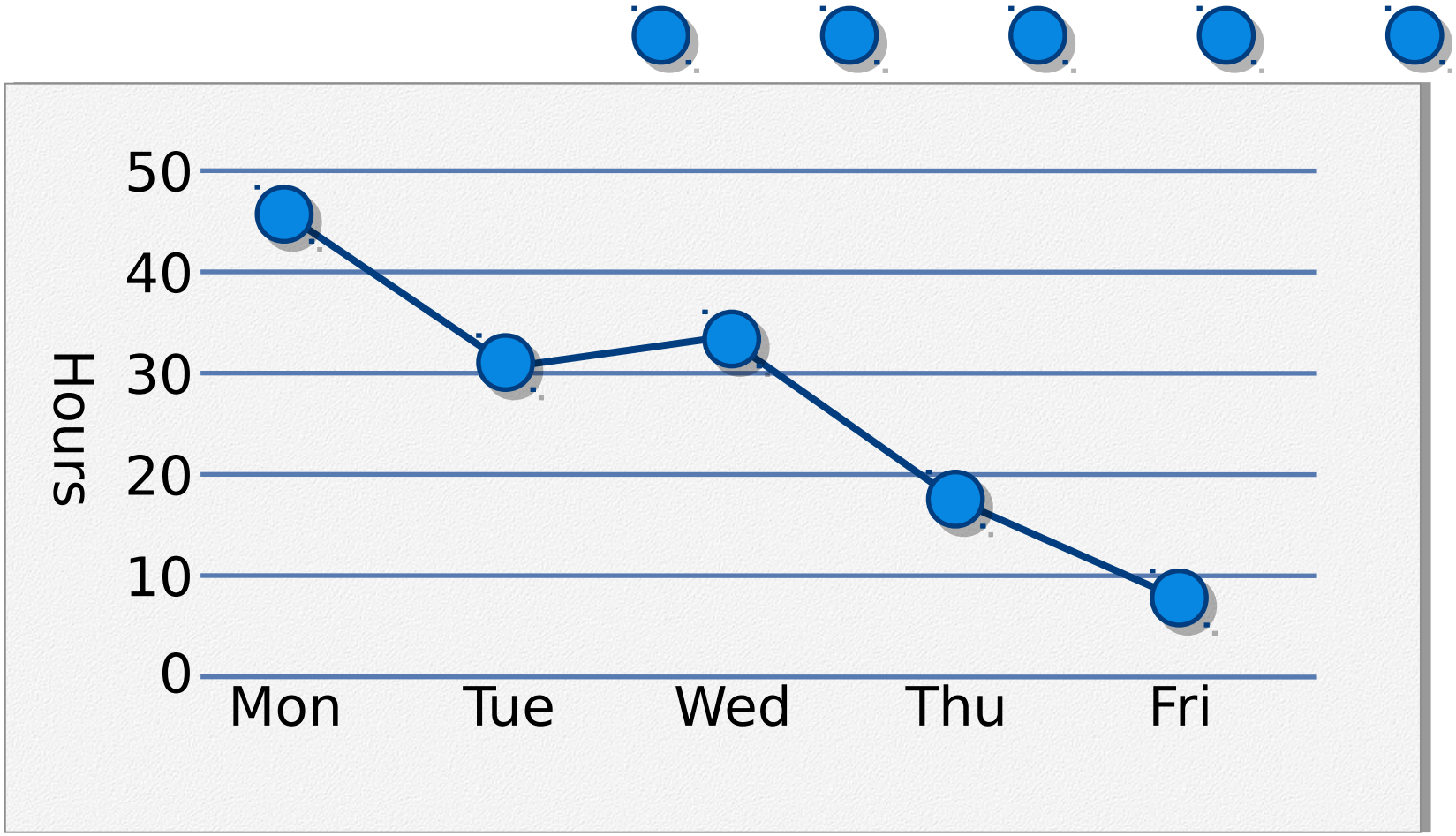
| Code the user interface | 8 | 4 | 8 | | |
| Code the middle tier | 16 | 12 | 10 | 7 | |
| Test the middle tier | 8 | 16 | 16 | 11 | 8 |
| Write online help | 12 | | | | |



# Estimating Tasks

- A sprint or product backlog item takes up space on the y-axis
- This space is proportional to how long (or difficult) a backlog item is
- Measured in:
  - Hours
  - Points
  - Gummi bears, foot-pounds, NUTs (Nebulous Units of Time)

≈

# Estimating Tasks

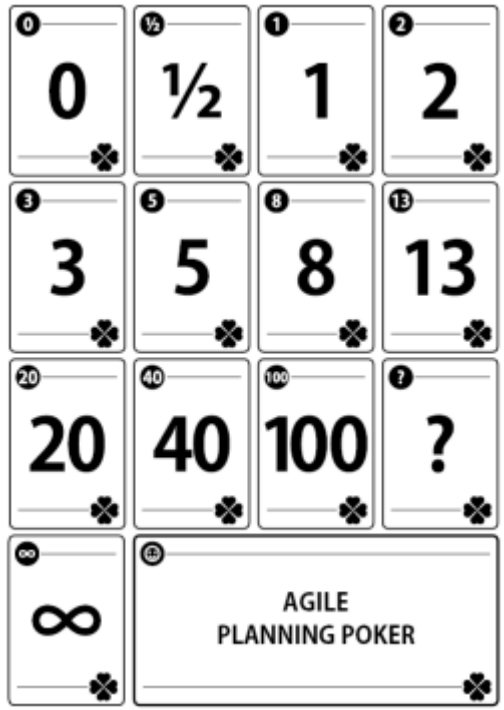
- Two broad categories of estimation methods:
  - 1: Model based – e.g. COCOMO
    - Uses models usually built from observations
    - Perhaps tailored to the current domain
  - 2: Expert (consensus) based – e.g. Wideband Delphi
    - Uses experts and their experience

# Planning Poker

- A variation of Wideband Delphi
  - 1: Assemble a group of experts (around 10)
  - 2: Give each estimator a deck of cards (usually 0, 1, 2, 3, 5, 8, 13, 20, 40, and 100)
  - 3: Moderator reads a description of the user story. The product owner can answer questions from estimators.
  - 4: Each estimator selects a card and places it face down on the table. When all estimates are in, the cards are flipped over.
  - 5: If the estimates vary widely, the owners of the high and low estimates discuss the reasons why their estimates are so different. All estimators should participate in the discussion.
  - 6: Repeat from step 4 until estimates converge to within some predetermined threshold.

# Planning Poker

- How effective is it?:
  - One study found that estimates obtained through the Planning Poker process were less optimistic and more accurate than estimates obtained through mechanical combination of individual estimates for the same tasks.




Planning poker cards
(click for PDF)

# Your Project

- Project theme:
  - *To build a (server/DB backed) Web Application*
  - **Must use SCRUM**
    - Generate documentation on all SCRUM-related activities
    - **Must use Github** (see https://education.github.com/pack)
    - **Must use some form of Test Driven Development**
    - **Must use telegram messenger for communication**
    - Use the opportunity to learn new technologies
      - Ideas: deploy to a cheap VPS, use Firebase
      - For example if you have not use web frameworks before – check them out.
      - JS libraries like Jquery/Bootstrap/React.js/Express (Node.js)

# Your Team

## Team size

- SCRUM works best for small teams
- You will be working in pre-assigned groups of 5 students
  - Just like industry
    - “You can choose your friends but you can't choose your ~~family~~ co-workers”
  - And just like industry
    - *Make it work*

# Assessment - Provisional

## 65% Team Mark

- Team Presentation 15%
- Co-op Evaluation 5%
- Group Report 35%
- Prototyping 5%
- Product Backlog/Test Driven Development 5%

## 35% Individual Mark

- Log Book 25%
- Attendance 10%

# General Tips

- Use class time for teamwork
  - Recommended: at least one other SCRUM meeting per week
- Appoint a SCRUM Master each week
  - Work out schedule in advance
- Effort
  - At least 4 hours student work outside classroom
  - 7 hours x 10 weeks x 5 students = 350 person hours
  - You can build something worthwhile together

# Lab Format

- Sign into lab
- Present your logbook for marking
- SCRUM meeting – followed by teamwork/dev
- SCRUM Master updates lecturer on status
- Pick up your logbook
- Sign out of the lab

- In the early stages, there will be occasional short presentations to help get you started

# Week 1

## Before you are assigned teams next week:

- Think of an idea for an application
- Start with the 2-minute vision (see next slide)
- Document the idea. Use the following headings:
  - UI sketches (good for communicating with team)
  - Project scope (what it does – what it does not do)
  - Schedule (*very* rough estimate. Use Gantt chart)
  - Risks (technical? complexity? understanding end-user?)
  - Feasibility (how likely is the project to succeed?)
  - Hardware and software
    - Development tools, libraries etc...

# 2-minute vision

**For** (target customer)

**Who** (needs or where is opportunity)

**The** (proposed product name)
**is a** (product category)

**That** (key benefit/compelling advantage).

**Unlike** (primary competitive alternative)

**Our product** (differentiating factors)

# Example – 2-minute vision for Moodle

**For** universities

**Who** need a way to deliver learning online

**The** moodle system
**is a** web based virtual learning environment

**That** is open source and free.

**Unlike** Blackboard

**Our product** supports plug-ins, LaTeX markup, etc.

# End

- Further reading/viewing:
  - Ken Schwaber's Google Tech Talk
  - Iterative vs Incremental Developement
  - Scrum in 10 minutes
  - Jeff Sutherland's SCRUM Handbook
  - The SCRUM Primer

Mountain Goat Software, LLC

*Adapted from material contributed by Mountain Goat Software LLC*