CS 4530: Fundamentals of Software Engineering
Module 1.2: User Stories

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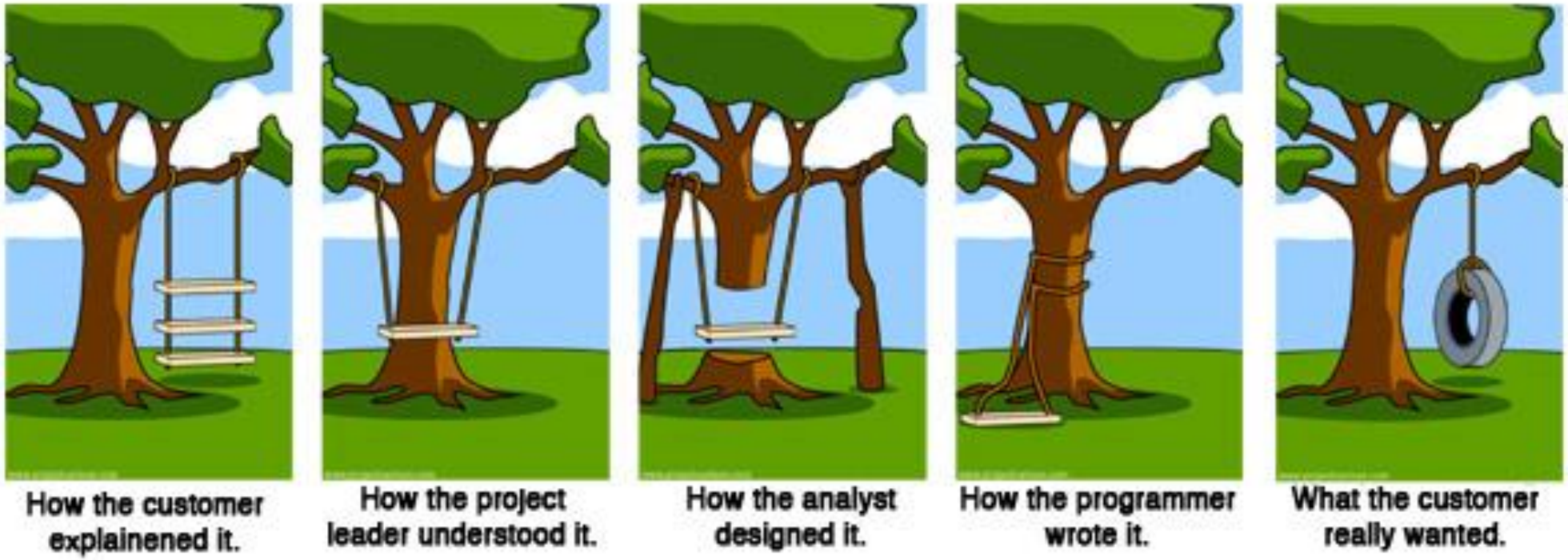
Learning Goals for this Lesson

- At the end of this lesson, you should be able to
  - Explain the structure of a user story
  - Identify and fix user stories that don’t have the correct structure
  - Define the relationship between conditions of satisfaction and user stories, and the difference between essential, desired, and extension conditions of satisfaction
  - Explain the difference between functional and non-functional requirements, and give examples of each

User stories come from analyzing the user's requirements



User stories come from analyzing the user's requirements

As a(n) active outdoor park-goer
I want a safe way to fly through the air under a tree
so that I can feel the wind in my hair

What are user stories?

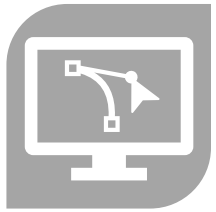
- …a least-common-denominator approach documenting the requirements of users when **planning** projects
- …a tool for keeping large collaborative teams on the same page when **organizing** projects
- …formulaic statements of this form:

As a <role>
I want <capability>
so that I can <get some benefit>

User stories in software engineering

PEOPLE

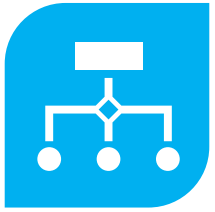
PROCESSES



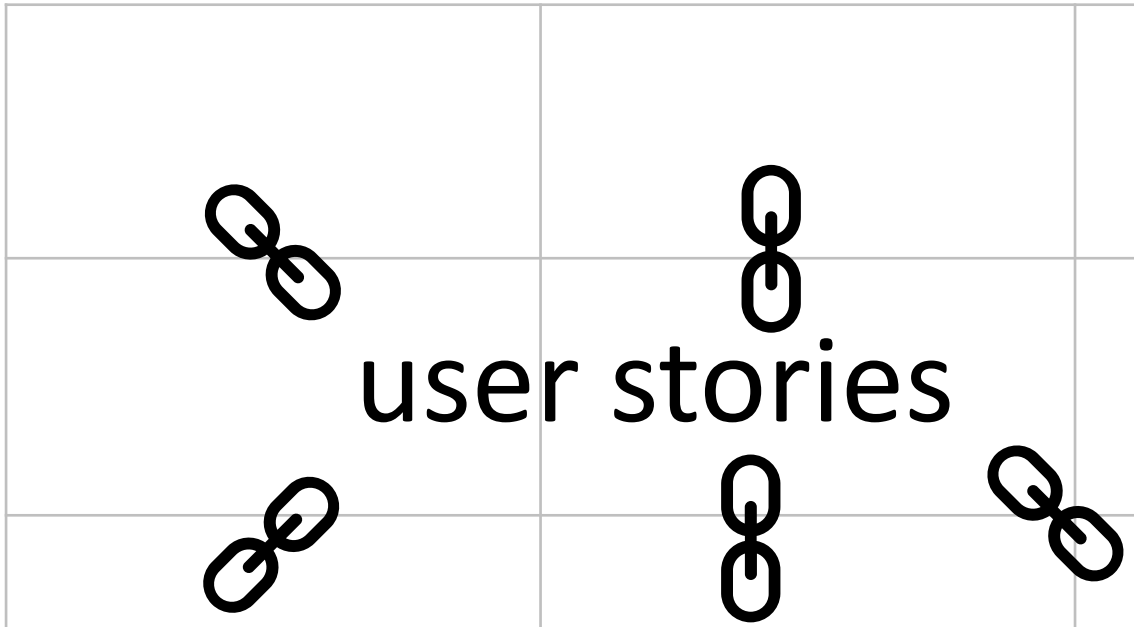
PROGRAMS

PLANNING

ORGANIZING



IMPLEMENTING



Components of a user story

As a(n) active outdoor park-goer
I want a safe way to fly through the air under a tree
so that I can feel the wind in my hair

As a <role>
I want <capability>
so that I can <get some benefit>

Roles: “who”

- Roles are positions or functions that people inhabit!
  - “As a web server…” is not a user story!
  - “As a human being…” is better, but that’s still not a role
  - “As a user…” is almost always a cop-out

- The person is not you!
  - You may want to build software to develop skills, or to make a codebase more maintainable. That’s good, but it doesn’t fit as a user story.

As a <role>
I want <capability>
so that I can <get some benefit>

Capabilities: "what"

- A capability is a specific thing I want to be able to *do*
  - Because we're building software, this is usually an action we can provide by using software, otherwise let's not build software
- A capability relates to a role
  - "As a teacher at Northeastern, I want to be able to access a laser cutter so I can finish an art project" is not a good user story.

As a <role>
I want <capability>
so that I can <get some benefit>

Capabilities: “what”

- A capability is not a product
  - “As a College Administrator, I want a web application that does <this> and <that> so that I can…” is not a user story!
  - Better: “I want to be able to see student’s grades” or “I want a way to track course enrollment over time”
  - This is easy to get wrong in practice! Sometimes you really want to build a tic-tac-toe game.
  - You’re supposed to ask, “do I even need to build this?”

As a <role>
I want <capability>
so that I can <get some benefit>

Benefit: “why?”

- Benefits are key for user stories actually focusing on what matters to the user.
- If a specific feature doesn’t relate to the benefit…
  - …maybe that feature isn’t worth building.
  - …maybe that feature is part of a different user story. (Maybe we should prioritize that different user story instead?)

As a <role>
I want <capability>
so that I can <get some benefit>

Properties of a good user story

- short: fits on a 3x5 card
- may have prerequisites
- has *conditions of satisfaction* that expand on the details
- satisfies the INVEST+E criteria (more on this later)

Good Examples of User Stories

- As a College Administrator, I want to keep track of students, the courses they have taken, and the grades they received in those courses, so that I can advise them on their studies.
- As a driver, I want to be able to report potholes to the city so that the town can more quickly act to keep me safe.
- As a pedestrian, I want to be able to report potholes to the city so that drivers stop dangerously swerving onto the sidewalk when I'm walking.
- As a card game enthusiast, I want to be able to play blackjack online so that I can…

Conditions of Satisfaction fill in details of the desired behavior

- Each condition of satisfaction
  - Describes a testable behavior, from the user's point of view
  - Must have a priority
  - Should be numbered within its user story
- There may be *multiple* options for filling in the details with conditions of satisfaction: this is a design problem!

Conditions of Satisfaction Have Priorities

- **Essential (E)** means the project is useless without it.
- **Desirable (D)** means the project is less usable without it, but it is still usable.
- **Extension (X)** describes a CoS that may not be achievable within the scope of the project. These might be things you'd want "in the next version".

Worked Example: Pothole reporting system

A town is designing a system where citizens can a report potholes and the town can monitor progress on repairing them.

User Story #1

- As a car commuter, I want to be able to report potholes to the city so that the town can more quickly act to keep me safe.

Conditions of Satisfaction

- As a car commuter, I want to be able to report potholes to the city so that the town can more quickly act to keep me safe.
  - 1.1 I should be able to report the location of a pothole to the system (E)
  - 1.2 I should be able to see whether the pothole I report has been repaired (E)
  - 1.3 I should be able to see whether others have reported potholes near me (D)
  - 1.4 I should be able to see an estimated time when the pothole should be repaired (X)

User Story #2

- As a pothole-repair-truck driver, I want the system to display the potholes I should be working on today.

Conditions of Satisfaction

- As a pothole-repair-truck driver, I want the system to display the potholes I should be working on today.
  - 2.1 I should be able to see my list of potholes for today (E)
  - 2.2 I should be able to report that I repaired a given pothole (E)
  - 2.3 I should be able to report that I was unable to repair a given pothole, and to supply a reason (E)
  - 2.4 My daily list of potholes should be listed in an order that cuts down the time I spend driving from job to job (D)

User Story #3

- As a maintenance supervisor, I want to be able to control the order in which potholes are repaired

Conditions of Satisfaction

- As a maintenance supervisor, I want to be able to control the order in which potholes are repaired
  - 3.1 I should be able to give a higher priority to potholes on a particular street (E)
  - 3.2 I should be able to give a higher priority potholes in a particular neighborhood (E)
  - 3.3 Anyone not a maintenance supervisor **should not** be able to change pothole priority (E)
  - 3.4 I should be able to see on a map where there are a lot of potholes (D)
  - 3.5 I should be able to see on a map which potholes that have been reported multiple times (D)

Writing User Stories: INVEST + E

- Independent
- Negotiable
- Valuable (has value to client)
- Estimable (able to estimate development effort)
- Small
- Testable

As a <role> I want <capability> so that I can <get some benefit>

- Ethical (connects with our & users' values)

User stories aren’t everything!

- User stories roughly describe the **functional requirements**
- The **non-functional requirements** are other properties that are also important to users and to other stakeholders
  - How quickly can a transcript be retrieval? (Performance)
  - How many student transcripts can our system store? (Scalability)
  - How long did I spend on the phone with support to set up the software? (Usability)
  - After my system is setup, is the access controlled at all? (Security)
  - Are these any times when I can’t use this system? (Availability)
  - How expensive will it be to adapt the system to new requirements? (Maintainability)

Other non-functional requirements

- Availability
- Capacity
- Efficiency
- Extensibility
- Maintainability
- Performance
- Privacy
- Response Time
- Response Time
- Scalability
- Security
- Supportability
- Testability
- Usability

Minimum Viable Product

- Once you decide on a set of user stories, the Essential (E) conditions of satisfaction for those user stories constitute the minimum viable product (MVP)
- A user story is "implemented " when all its essential COSs are implemented.
- Caution: when proposing a project, don't make your MVP too hard to complete (but don't make it too easy, either)

Review

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