Introduction to User Stories

CSCI 5828: Foundations of Software Engineering
Lecture 05 — 09/09/2014

Goals

- Present an introduction to the topic of user stories
  - concepts and terminology
  - benefits and limitations
  - examples

User Stories

- User stories are a means to capture requirements during the analysis phase of software development
  - whenever that phase occurs during your particular software life cycle
  - (in agile life cycles, analysis can happen at any time)
- They are a lightweight mechanism for spreading decision making out across a software development project with respect to individual features
  - We know we need feature A but we don't know much about it?
    - name it and put it in a user story
  - We learned a little bit more about feature A today?
    - add a short note to the user story (or even better write a test)

Background (I)

- Agile life cycles evolved the notion of a user store because capturing software requirements is a communication problem
    - Those who want new software need to communicate what they need to those who will build it
    - Many stakeholders will provide input to the process
        - customers, users, and domain experts
        - business and marketing
        - developers

Background (II)

- If any group dominates this discussion, the whole project suffers
  - if business dominates, it may mandate features and schedules with little regard to feasibility
  - if the developers dominate, a focus on technology may obscure business needs and the developers may miss important requirements
- Furthermore, the goal is to understand the user's problem and ensure the software meets their needs
  - both business and developers will move on, the users have to live with the produced software day in and day out

Background (III)

- Another important issue during this phase is resource allocation (who should work on what and when and supported by $x amount of funds)
  - If developers have this responsibility, they may
    - trade quality for more features (or vice versa)
      - only partially implement some features
      - or make decisions on their own when they should have sought feedback from business and from the users
- If business has this responsibility, they may
  - generate way too many features on too small of a budget
    - leading to (lots of) features being removed as the project progresses

Background (IV)

- Furthermore, everything about the project is in flux
  - We still don't understand exactly what the user needs
    - Their domain is complex; they are experts, we are novices
    - We'll get things wrong and need to be corrected
    - We'll get to a certain point and then they will remember things that they forgot to tell us
    - We'll show them prototypes and they'll come up with new ideas
- We don't have enough information to make accurate estimates
  - what we thought would be easy, turns out to be very complex

Background (V)

- But, we must make progress!
  - And, so we have to make decisions based on the information we have
- We set our scope small (one feature, for instance) and our development life cycle short (one week, for instance)
  - and then we show the customer what we have
- By then, new information will be available and we'll have feedback on the work we've done so far
  - With that input, we identify the new scope and start a new iteration
- We thus spread out the decision making
  - It's not "everything up front" but "a little at a time"

User Stories: The Basics (I)

- That's where User stories come in; they describe **functionality that will be valuable to the user and/or customer**
  - Note the distinction:
    - user: the people who actually use the produced software in their work
    - customer: a person, not necessarily a user, who is responsible for purchasing the software for a set of users
    - Sometimes they are one and the same, but not always
- Note also the use of the word "valuable"
  - We do NOT implement a feature because it is "cool"
    - we implement features to provide value to users

Who is the customer?

- The person or persons playing the role of the customer can vary across development contexts
  - This is very important because sometimes the answer will be hard to pin down
    - Consider a case where you are asked to develop a website for a small business
      - The owner of the small business is clearly the customer at first
        - he/she is providing requirements and paying for the work
      - But when the website is deployed, who becomes the customer?
        - The customers of the small business

Customer == User

- HCI and CSCW research shows that systems live or die by how happy the "end users" are with the system
    - The customers of the small business in this case are the end users
        - However, in the initial development project, we will only have access to the owners of the small business and we'll have to go by what they say
        - In the future, they will be hearing from their customers about the utility and usability of our website and they will convey that feedback to us
- What's the difference between utility and usability?

Other Types of Customers

- You (!)
  - Often for only small scale software
- CTOs
  - Acquiring enterprise level systems for an organization
    - Who are the end users in this situation?
- New Application Development (be it desktop, web, mobile)
  - For version one: development team
    - How can you avoid this? Who are the end users?

Customer Team

- Our book addresses this concern in a short section in Chapter 1 (and will go into more detail in Chapter 5)
  - The Customer Team
    - If you can't have a user sit on your development team then assemble a team of employees whose job is to represent the customer
      - testers, product managers, usability and interaction designers
      - these people work hard to understand the customer and represent their needs as best as possible in each iteration

- **Important** because: The **highest priority** of an agile life cycle is **meeting a customer's needs** via early and frequent delivery of working software

User Stories: The Basics (II)

- User stories consist of
  - a **short written description** of a feature used for planning and a reminder
  - **conversations** about the feature used to flesh out its details
  - **software tests** that convey details about functionality and help us determine when the story is completely implemented
- Ron Jeffries calls these three aspects Card, Conversation, and Confirmation
  - He says “card” because traditionally users stories are written on index cards and put up on a wall in the shared space of a development project
    - Using index cards **forces** you to keep the story brief!

User Stories: The Basics (III)

- Example users stories for a website that helps a person's job search
  - A user can post a resume to the website
  - A user can search for jobs
  - A company can post new job openings
  - Users can restrict access to their resume
- Important:
  - User stores are written so that **customers value them**
  - This helps maintain a customer perspective within the development team

User Stories: The Basics (IV)

- So, is this a good use case?
  - The software will make use of a bloom filter to determine if a desired data element is in our data set before we perform disk I/O to retrieve it

It depends

- Is your customer a distributed systems researcher?
  - Then, yes, this may be a good user story
    - (as it is for Cassandra, a popular NoSQL database)
- But, in general, technical details like this do NOT make good user stories
  - These details may change
    - we need to switch from this framework to this other framework to be compatible on a wider range of devices
  - while the fundamental user story does not change
    - Users need to access schedule information

How do we track details?

- The users stories for an application can often be written simply at a high level of abstraction (known as **epic user stories** or **epics** for short); for our jobs website
  - A user can search for jobs
  - A company can post job openings
- But, you need to specify details at a lower level of abstraction
  - how do we do that?
- Two places
  - in the conversations around a user story; we will converge on details
  - more users stories!

More users stories

- You can take an epic like “A user can search for a job” and split it into new stories
  - A user can search for a job by attributes (such as …)
  - A user can view information about a job found by a search
  - A user can view profile information about a company offering a job
- On the epic, you note that it’s covered by these other stories and then you go work on those stories
- The challenge: getting the balance right
  - We want to resist the temptation to document everything on a user story
    - Our conversations are the key element where details live (since the details **WILL change** while the user story remains the same)

Confirmation

- At the start of a user story, the “tests” might exist as a set of customer expectations written on the back of a card
    - Try feature with an empty job description
    - Try feature with a really long job description
    - etc.
- In this form, the tests can come and go as we learn more about the feature
    - As this particular user story is worked on and implemented
        - these expectations are transformed into unit tests and integration tests that tell us when the feature is completely implemented
            - We’re not done until all tests have passed!

Overview of a Process

- A software development process driven by user stories feels very different than traditional life cycles; for instance, customers are included throughout the process (they do not disappear on you!)
  - to get a project started, a story writing workshop is held to brainstorm what features are valuable to the customer for an initial release
  - developers will assign initial estimates to each story using “points”
  - customers and developers set an iteration length (e.g. 2 weeks)
  - developers then determine their velocity (how much work they can get done in a single iteration)
  - customers assign priorities to the stories
  - iterations are formed by grouping stories by velocity based on their priorities and estimates

Midcourse Adjustments (I)

- This process is tunable (i.e. customizable)
  - It has to be because the developers will make mistakes with respect to
    - the points they assigned to a user story
    - the velocity (number of points per iteration) they chose
- At the end of each iteration
  - they will know more about their true velocity and
  - they will know more about the skills of their team
    - and thus have different opinions about the estimates that should be assigned to each user story

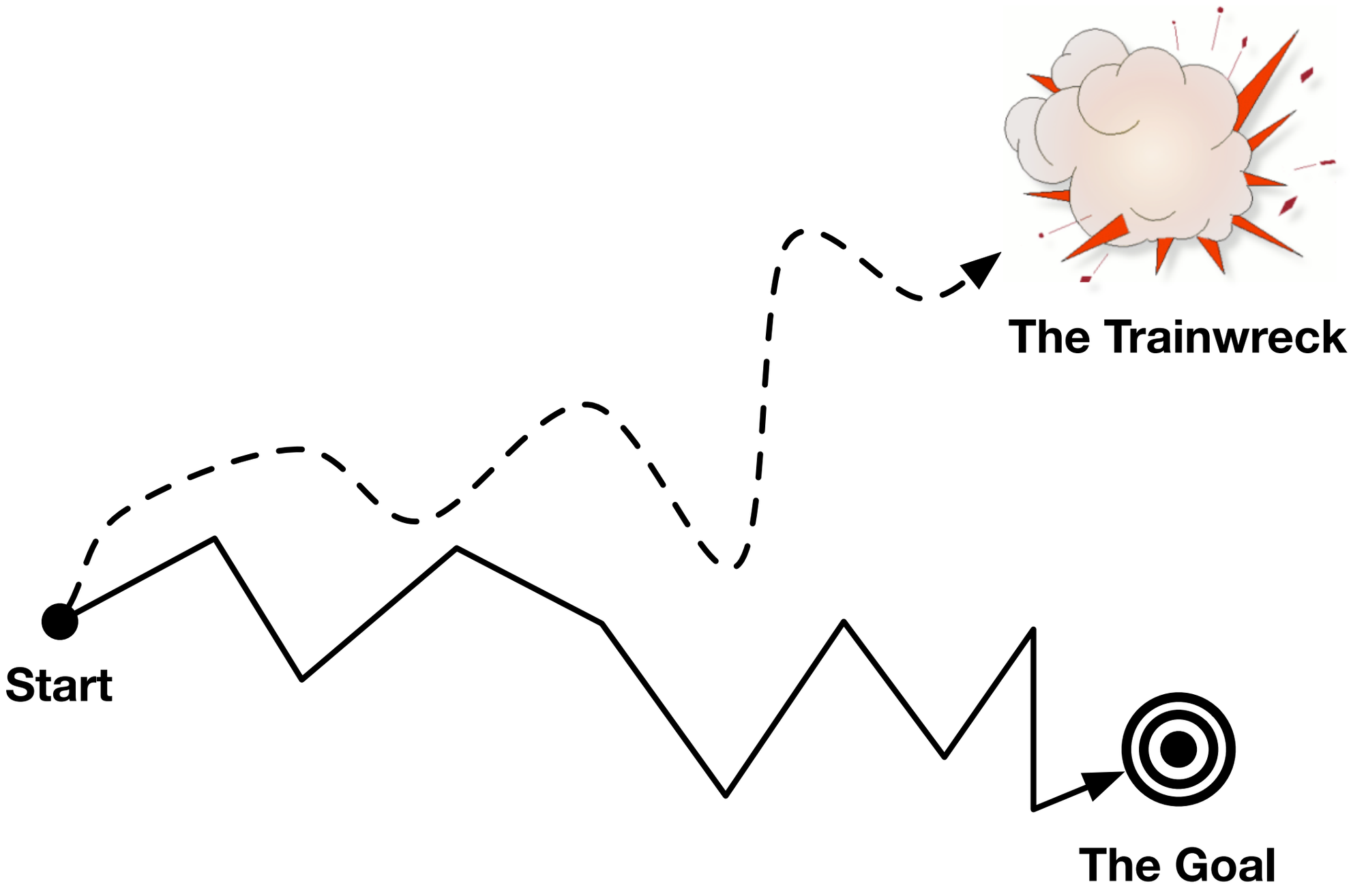
Midcourse Adjustments (II)

- With this new information, you can
  - return to the remaining groups of user stories (i.e. iterations) and
  - rebalance them
    - stories will get new estimates
    - stories may get new priorities (low to high and vice versa)
    - new stories may get added
    - existing stories may get removed
      - “Our user doesn’t care about this anymore”
    - existing stories may get moved forward or pushed backward

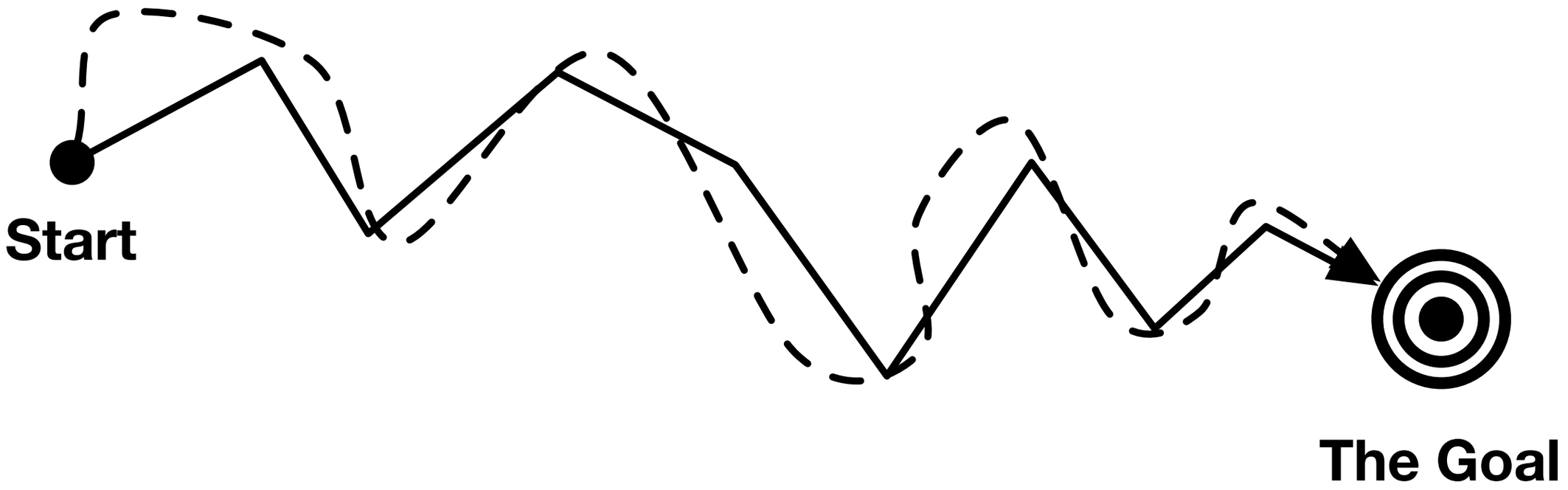
Releases and Iterations

- An agile life cycle is thus broken down into planning releases and planning iterations
  - A release is some major group of functionality that can be put into production (used by its users)
  - A release is composed of many iterations which contain users stories that are going to be implemented during that iteration
- Iterations always last the same amount of time and produce a working system that can be reviewed by the customers
  - Customers provide feedback and midcourse adjustments are made
  - The next iteration begins
  - Reminder: A user story is complete when it passes its user-specified tests

Iteration is important because requirements CHANGE



With iteration a project can make course corrections as requirements change so that what's delivered matches what's needed



Benefits

- Our book ends Chapter 1 with a short list of benefits for user stories
  - They emphasize verbal rather than written communication
  - They are comprehensible by customers and developers
  - They are the right size for planning
  - They encourage and “work” for iterative development
  - They encourage deferring details until you have the best understanding of what you really need to implement a feature

- What do you think (so far)? Anyone have experience using user stories?

Summary

- User stories are short statements of customer-valued functionality
  - The story serves as a visible reminder about a particular feature
  - While that reminder is important, it is not as important as the conversations around the story
    - it is the conversation that helps us track details and understand what the customer wants
    - this conversation is supported and tracked by tests that can be executed and tell us how close we are to being done
- User stories can drive software development via the concepts of releases and iterations
  - these are formed by assigning estimates and priorities to individual stories and by determining an iteration length and the team's velocity

Coming Up Next

- Lecture 6: User Stories, Part 2
- Lecture 7: Concurrency: Threads and Locks

- Homework 2 Due on Thursday