Software Engineering Introduction

CSCI 5828: Foundations of Software Engineering
Lecture 06

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Agenda

- Product background
- Goals
  - Product
  - Business
  - Non-goals
- Risks
- Actors/activities
- Stories
- Estimation and prioritization

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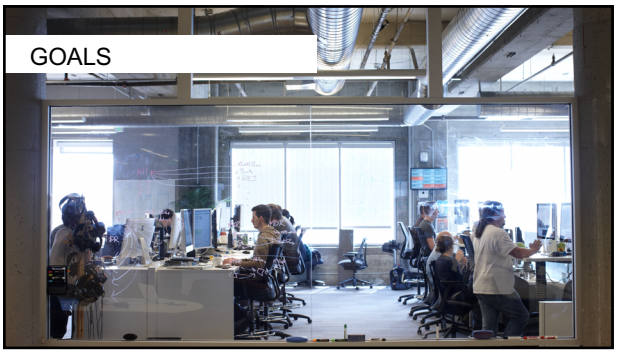
GOALS



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What does success look like?

Financial success; you're making money, you're saving money

Adoption; people and/or systems are using your software

How do we ensure we're building the right software?

- iterate and adjust quickly based on user feedback (one of many techniques)

How do you iterate quickly while adjusting to feedback?

Small list of prioritized stories - but how do you get there?

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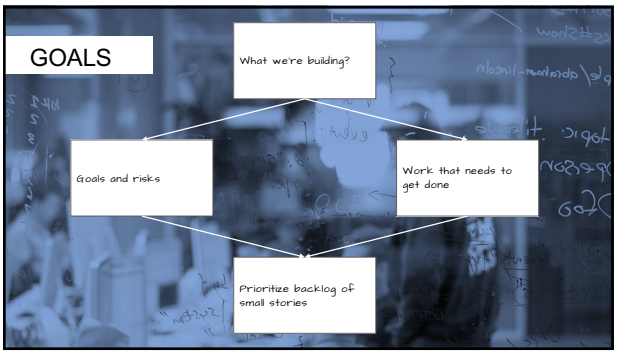

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Introduction to goals

Common goals

- Business goals
- Product goals
- Non-goals

What does a win look like?

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Business Goals

Example business goals

- Grow revenue by 15% in one year
- Reduce operational costs by 50%
- 10% increase in user adoption in the first 3 months
- Land 3 new partnerships per quarter

Goals are typically measureable
Did you achieve your goal?

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Product Goals

Example product goals

- Easy to use, easy to understand
- No product training required (Gmail for example)
- Support 200 concurrent users
- 500 millisecond response time

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Non-Goals

Example Non-Goals

- Support for multiple languages
- Highly available
- Highly scalable
- Broad browser support

Think first release, and not building too much too early w/out feedback!

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Why goals are important

Why should I care about goals?

- Helps bring product and engineering together
  - One set of common goals
  - Meet delivery timelines
- Important for engineers to understand what they're building
  - So engineers are focused
  - So that you could better prioritize a backlog of small stories
  - So engineers can push back on work that may be out of scope

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Goals Exercise

Let's walk through a product description

As you listen add any goals that you can identify to this shared document.

+1 when you see a similar goal

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Goals Exercise

Let's review

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AVOIDING RISKS

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Intro to Risks

What could keep us from accomplishing the goals?

- Competition; just another Twitter feature
- Too big of scope for current timeline and/or team size
- External dependencies; other teams, integrations (single sign-on)
  - Especially those that have not been built yet or dependent on other teams to build
- Choice of technologies; immature language, framework, etc
- Existing technical debt; no tests
- Federal regulations; PCI compliance

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Why are identifying risks are important?

Why should I care about risks?

- May push out timeline
- May increase cost
- May have unrealistic dependency; tools, teams, etc

Because we may prioritize our work based on our ability to mitigate risks!

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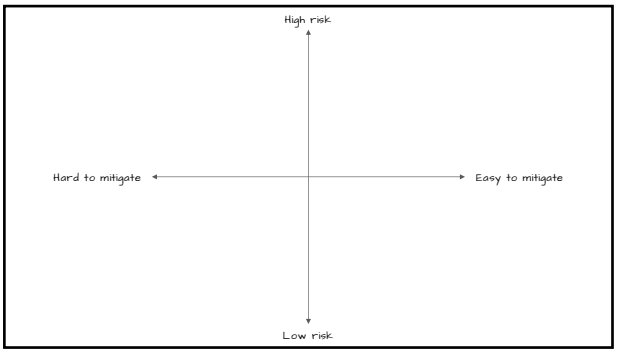

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Risks Exercise

Write down 2-3 risks

+1 when you see a similar risk

Add any risks that you can identify to this shared document.

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Tackling risks

How do we mitigate risks?

- Increase budget
- Increase timeline
- Reduce scope and deliver high-value business value first
- Reduce integrations
- Tackle risky areas early
- Create communication patterns to mitigate dependencies

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User stories - lecture goals

Present an introduction to the topic of user stories

- concepts and terminology
- benefits and limitations

Present an introduction to iteration planning

- Estimating User Stories
- Planning a Release
- Planning an Iteration
- Measuring and Monitoring Velocity

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Credit Where Credit is Due

This material is drawn from the below textbook -

"User Stories Applied" by Mike Cohn
Publisher: Addison-Wesley/Pearson Education ISBN-13: 978-0-321-20568-1

It's a great book for going in depth on the topic of user stories

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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
- that said -- analysis can really happen at any time -- and it does in practice!!!

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 X 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 X today?
  - add a short note to the user story (or even better, write a test)

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Background (I)

The notion of a user story evolved 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

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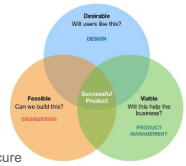
Background (II)



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 - is it **desirable** and **viable**

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 developed software day in and day out

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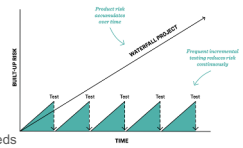
Background (III)



Furthermore, everything up front about the project is slightly impossible -

- 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

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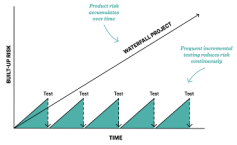
Background (IV)



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"

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User Stories: The Basics (I)

That's where User stories come in; they describe functionality that will be valuable (desirable) 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" or "desirable"

- We do NOT implement a feature because it is "cool"
  - we implement features to provide value to users

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User Stories: The Basics (II)

User stories consist of

- a short written **description** of a feature used for planning and a reminder (140 characters)
- **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!

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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

INVEST

- Independent
- Negotiable
- Valuable
- Estimable
- Small
- Testable

Important:

- User stories are written so that **customers value them**
  - This helps maintain a customer perspective within the development team

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User Stories: The Basics (IV)

So, is this a good user story?

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

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Not Really

Is your customer a distributed systems researcher?

- Then, yes, maybe, this might be a good user story

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**

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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 example:

- *A user should be able to **manage projects***

But, you need to specify details at a lower level of abstraction

- how do we do that?

A few places

- in the **conversations** around a user story; we will converge on details
- more users stories!

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More users stories

You can take an epic like "*A user should be able to **manage projects***" and split it into new stories (aka CRUD)

- Create
- Read (List, Show)
- Update
- Delete

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)

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Tests are integral to User Stories

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 project description**
- Try feature with a **really long project 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!

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Benefits

User stories provide the following benefits -

- They emphasize verbal rather than written communication
  - Placeholder for a conversation!
- 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

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Stories Exercise

Let’s write some stories

As you listen add any stories that you can identify to this shared document.

Look for duplicates!

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Questions?

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User Stories

INVEST

- Independent
- Negotiable
- Valuable
- Estimable
- Small
- Testable

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User Stories

Look for activities and actions

- **"Assign an owner"** to a project
  - Add project owner
  - Remove project owner
- **"Assign contributors"** to a project
  - Add user to project
  - Remove user from project

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User Stories

Typical story flow -

- Product owner **creates** work
- Engineers, designers, etc **start** work
- Engineers, designers, etc **delivery** work to a review environment
- Product owner **accepts** or **rejects** the work
- Story should be **restarted**
- Product owner pushes to production environment

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