CLEMSON UNIVERSITY

CPSC 3720
Lesson 3

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School of COMPUTING

Today's Objectives

- To understand how the pre-requisite courses are related to this course
- To develop a definition of Software Engineering
- Learn about the role of the software engineer
- Discuss software engineering and complexity
- Begin discussion of software lifecycle and processes

Software Engineering Courses @ Clemson

2150 vs. 3720

- CPSC 2150 (software development aspects)
  - Module design principles and introduction to design by contract
  - Significant programming with OO concepts
  - Some reusable components and design patterns
  - Intro to specification, testing, and reasoning

- CPSC 3720 (software lifecycle aspects – software in the "large")
  - Communication and team development
  - Some programming of components with focus on validation
  - Component-based implementations as considered in the larger context of quality assurance

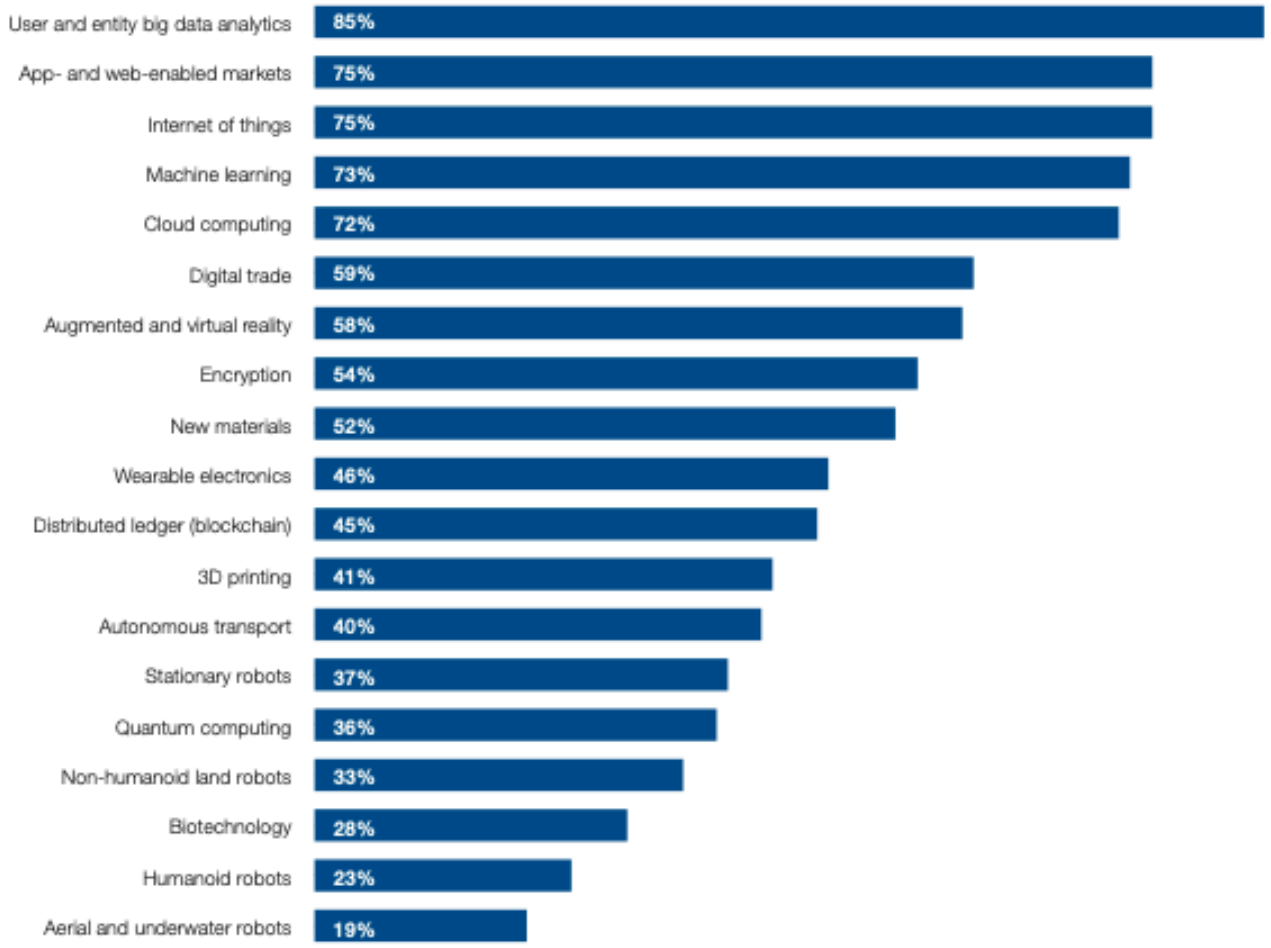
Why Did You Decide to be a Software Engineer?

Pick your top 3 reasons:

- Money
- Love programming
- Liked Math
- Enjoy using technology
- Like puzzles
- Job security
- Flexibility
- I was good at it
- My parents made me do it
- Didn’t have a better option

Regardless of reason, you made a good choice...

Figure 2: Technologies by proportion of companies likely to adopt them by 2022 (projected)



Source: Future of Jobs Survey 2018, World Economic Forum.

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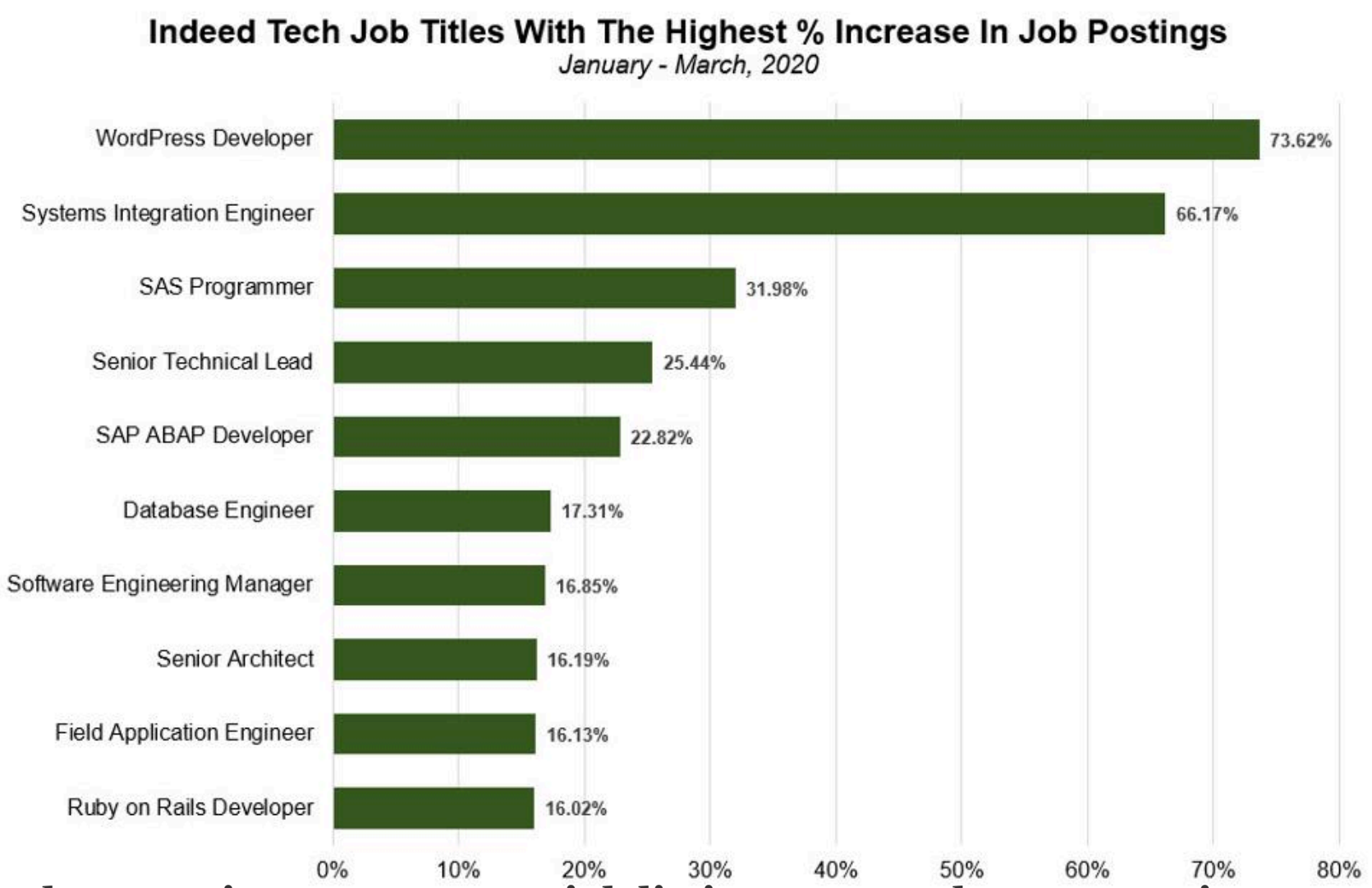


There are just over 29,000 job listings across the ten most in-demand positions today.

Remember Spiderman: *"with great power comes great responsibility"*

- You're responsible for the software you produce
  - You want it to be high quality software
  - You need to verify your system does what is required
  - You need to ensure that the software is properly tested and maintained

- Otherwise you can have:
  - Angry customers
  - Wasted money and time
  - Even worse (Boeing 737 Max)

Is Software Development a Craft or Engineering?

- Breakout teams
- 10 min
- Do you agree with Fred Brooks' perspective that software development is a craft? Why or Why Not?
- Pick someone to report out your key takeaways

The Job of A Software Engineer/Developer

Software Engineer

Our mission is to develop products and technology that serve the needs of our diverse audience.What you will bring to the table is more than just your technical skills — your unique perspectives, ideas, and cultures will help us create better products and services.

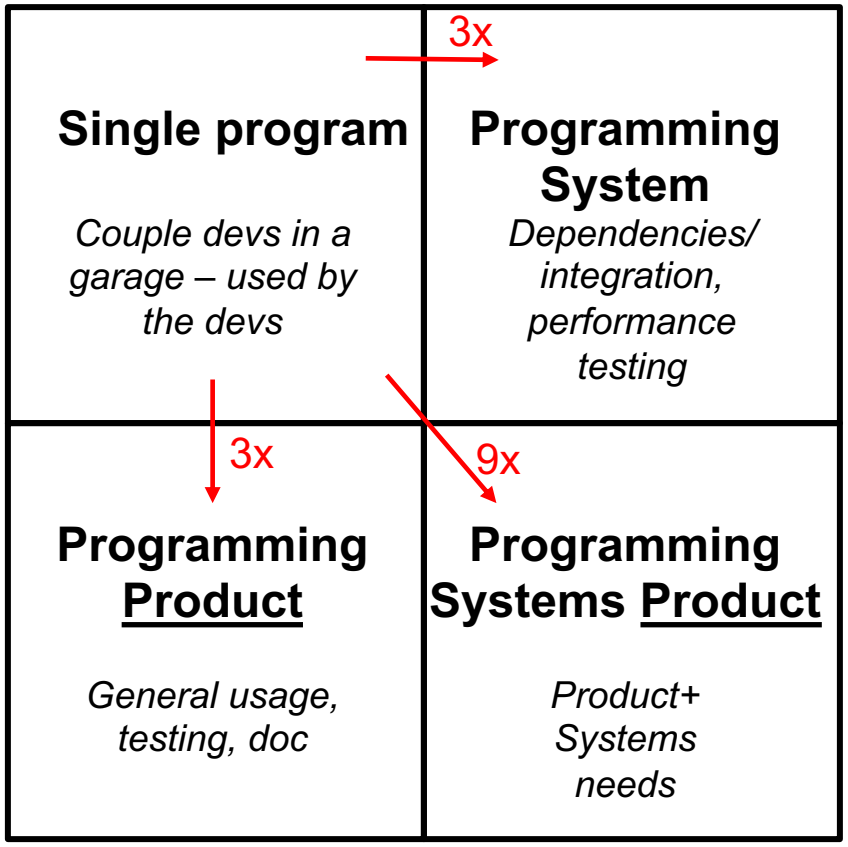
What you'll do:
- Work closely with your team to design and develop features that will empower our users
- Measure and improve site performance and scalability
- Write well-tested code that is resilient to heavy iteration
- Manage individual project priorities, deadlines and deliverables.

What we're looking for:
- University and/or Higher Degree in Computer Science, Information Systems, or adequate
- Strong programming skills and verifiable mastery of at least one of the following languages: Java, PHP, Python, C/C++, C#, Ruby, Go, JavaScript, and TypeScript
- Ability to work independently and in groups

Benefits:
- Competitive salary
- Flexible work hours
- Investment in growth and education

Instead of filling specific needs, we hire talented engineers first and then work with them to map out areas of potentials and growth. **Apply Now!**

The Tar Pit – Complexity of a Program vs. Product



The Tar Pit – Complexity of a Program vs. Product

Single program *Couple devs in a garage – used by the devs*	**Programming System** *Dependencies/ integration, performance testing*
Programming <u>Product</u> *General usage, testing, doc*	**Programming Systems <u>Product</u>** *Product+ Systems needs*

3x

3x

9x

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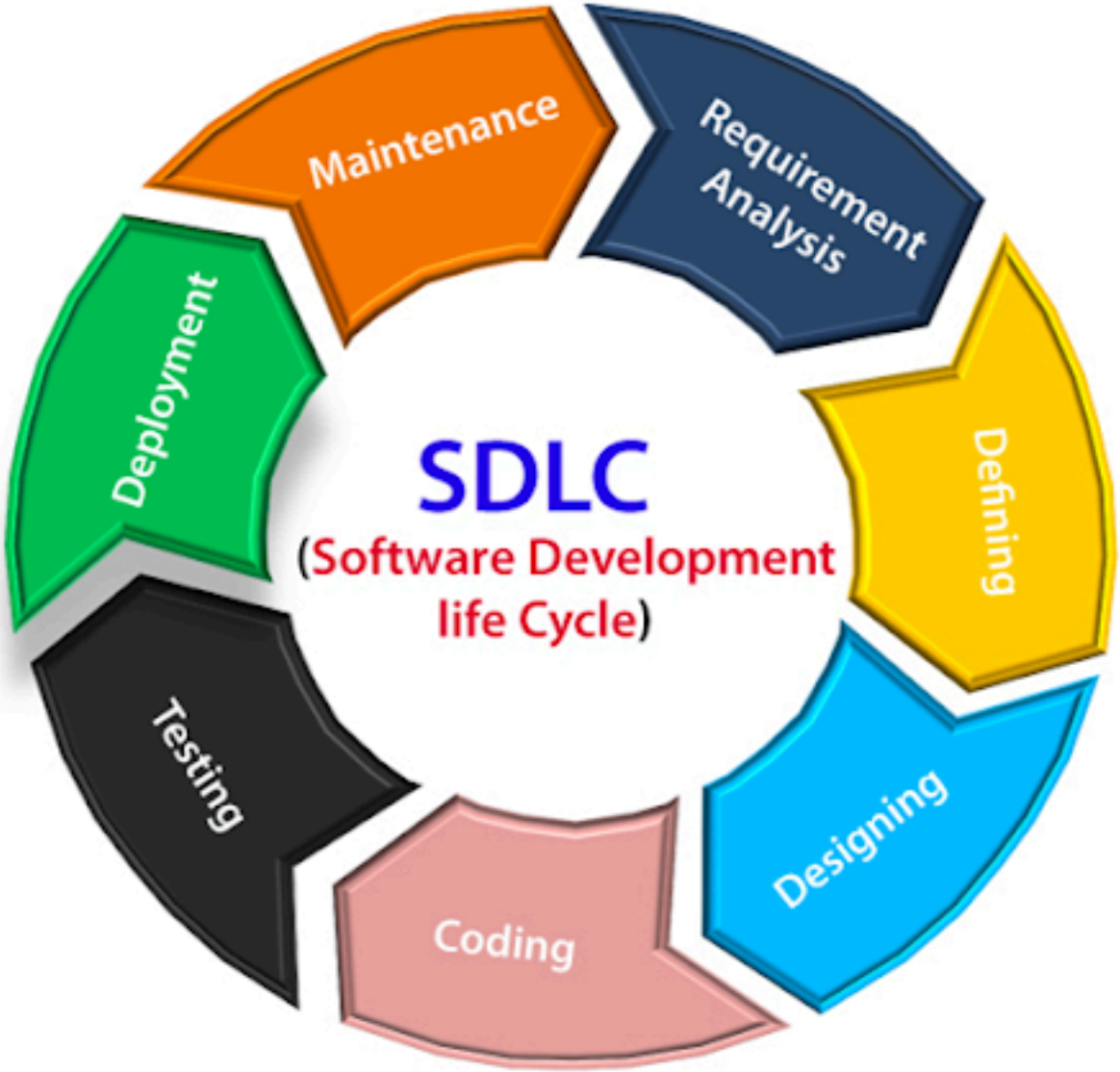
How do we manage this complexity??

Software Development Process

Software Process: a way of breaking down this overall software development work into manageable sub-tasks; systematic and somewhat formal

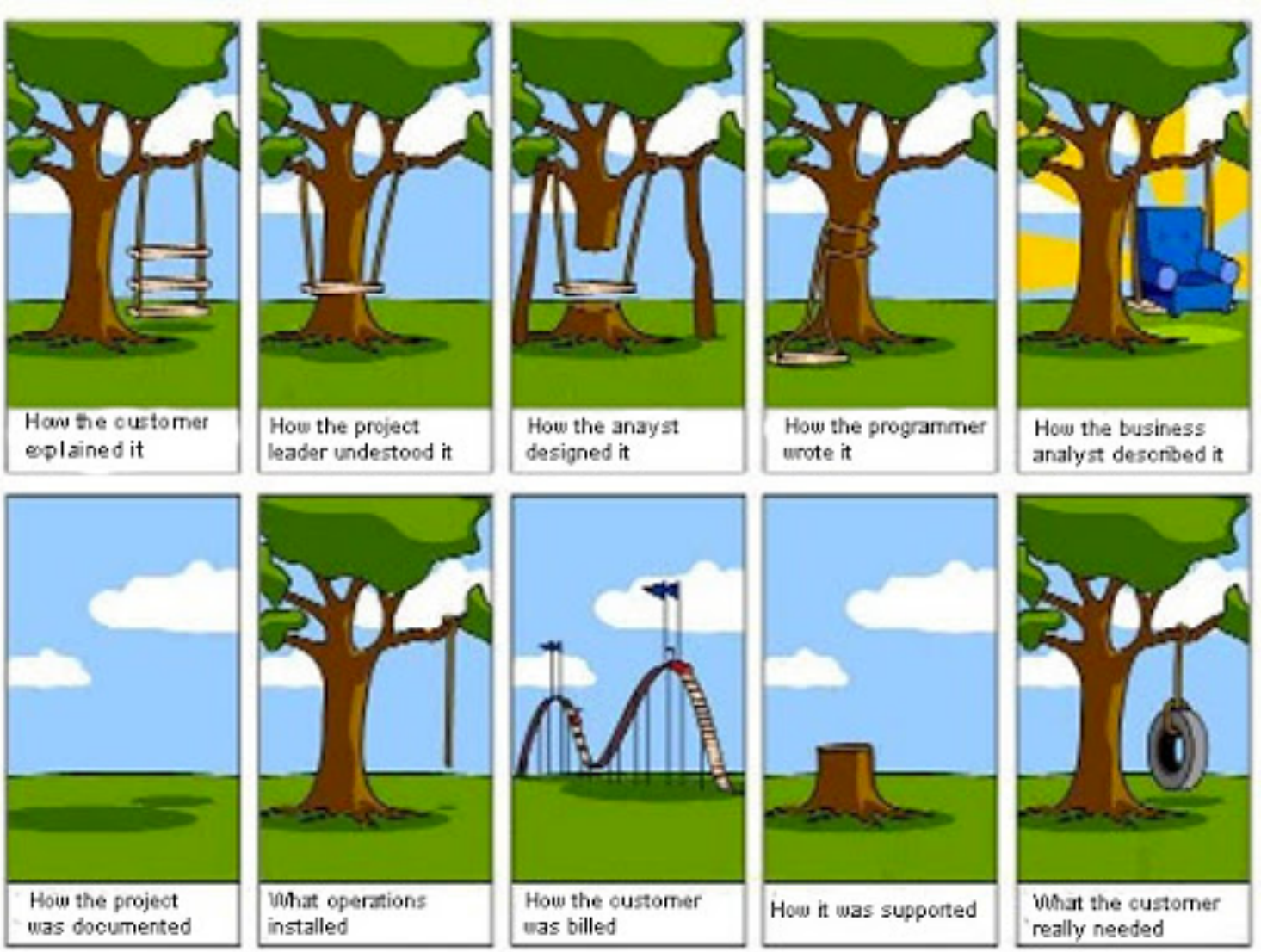
Building a House

Software Development Process Steps



SDLC: Requirements Analysis

Requirements Analysis



SDLC: Requirements Analysis

- The WHAT? and the WHY?
- Understanding what the customer wants or what they "think" they want (Ask WHY?)
- Focus on the business problem you are trying to solve
- Understand what is most important to the customer to enable prioritization
- Can be documented in various ways depending on the process:
  - Formal requirements specifications
  - Wireframes
  - Use case documents
  - Prototypes

SDLC: Requirements Analysis

"Software engineering IS requirements discovery"

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Before Next Class

- Reading: Agile Manifesto and Principles -
  - https://agilemanifesto.org/
  - https://agilemanifesto.org/principles.html