Building User Interfaces

Course Introduction

Professor Bilge Mutlu

About Me

» Associate professor of computer science, psychology, and industrial engineering

» Background that bridges design and computer science

» Director of the Human-Computer Interaction Lab and co-director of the Collaborative Robotics Lab

What is this course about?

UX Development — software engineering + UX design.

What does a software engineer do?

which is devoured in a
large quantity.

Definition: A software engineer is a person who applies the principles of software engineering to the design, development, maintenance, testing, and evaluation of computer software.[2]
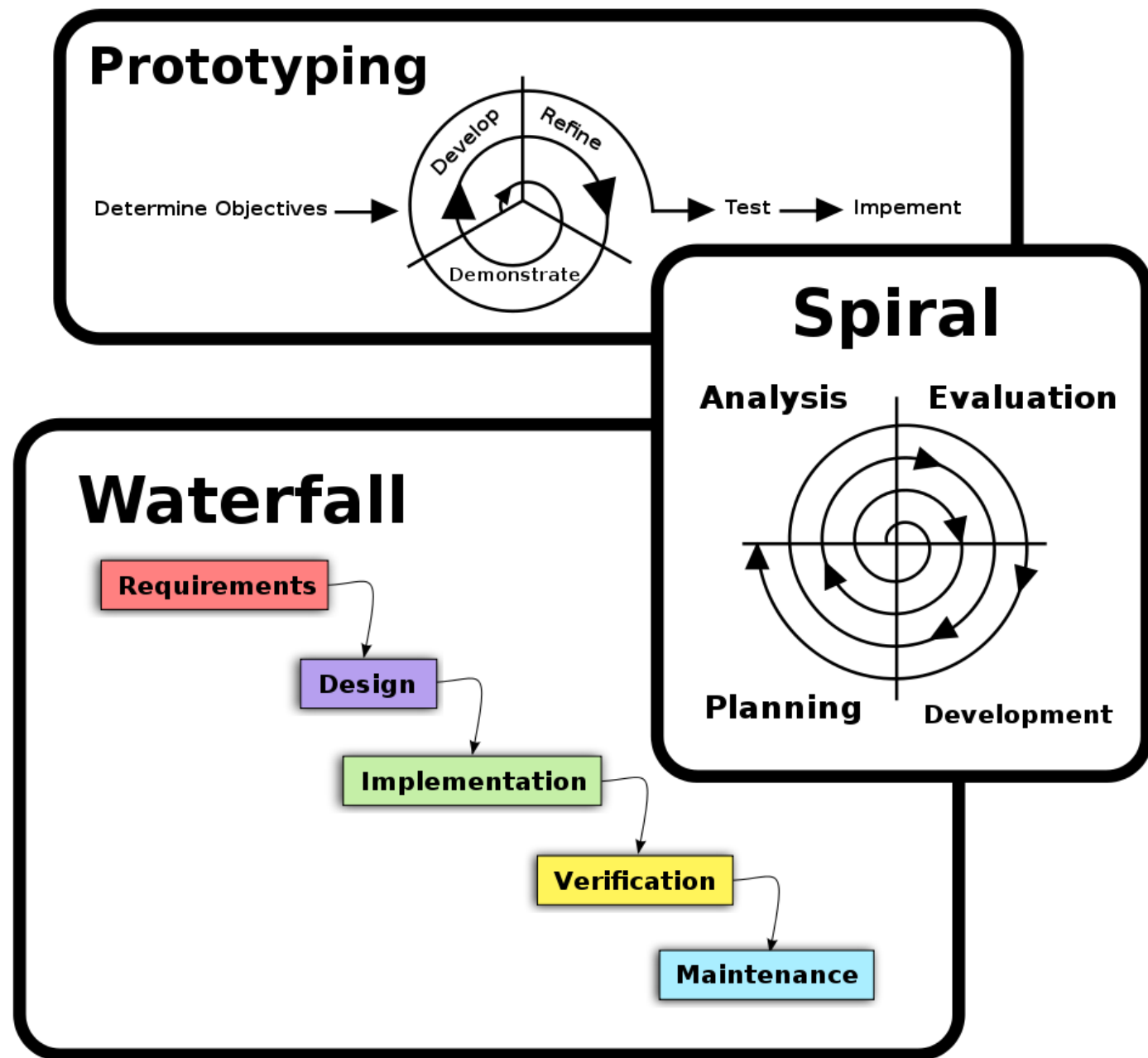
What are the principles of software engineering? Can you name one?

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[2] Wikipedia: Software engineer

Pro Tip: Principles of software engineering include:
1. Separation of concerns
2. Modularity
3. Abstraction
4. Anticipation of change
5. Generality
6. Incremental development
7. Consistency

What process do software engineers follow? Can you name a step?

Prototyping

Determine Objectives → Develop → Refine → Demonstrate → Test → Impement

Spiral

Analysis | Evaluation
Planning | Development

Waterfall

Requirements → Design → Implementation → Verification → Maintenance

3

[3] Wikipedia: Software development process

What does a UX designer do?

Definitions: User experience (UX) design is the process design teams use to create products that provide meaningful and relevant experiences to users.

A *UX designer* is concerned with the entire process of acquiring and integrating a product, including aspects of branding, design, usability and function.[5]

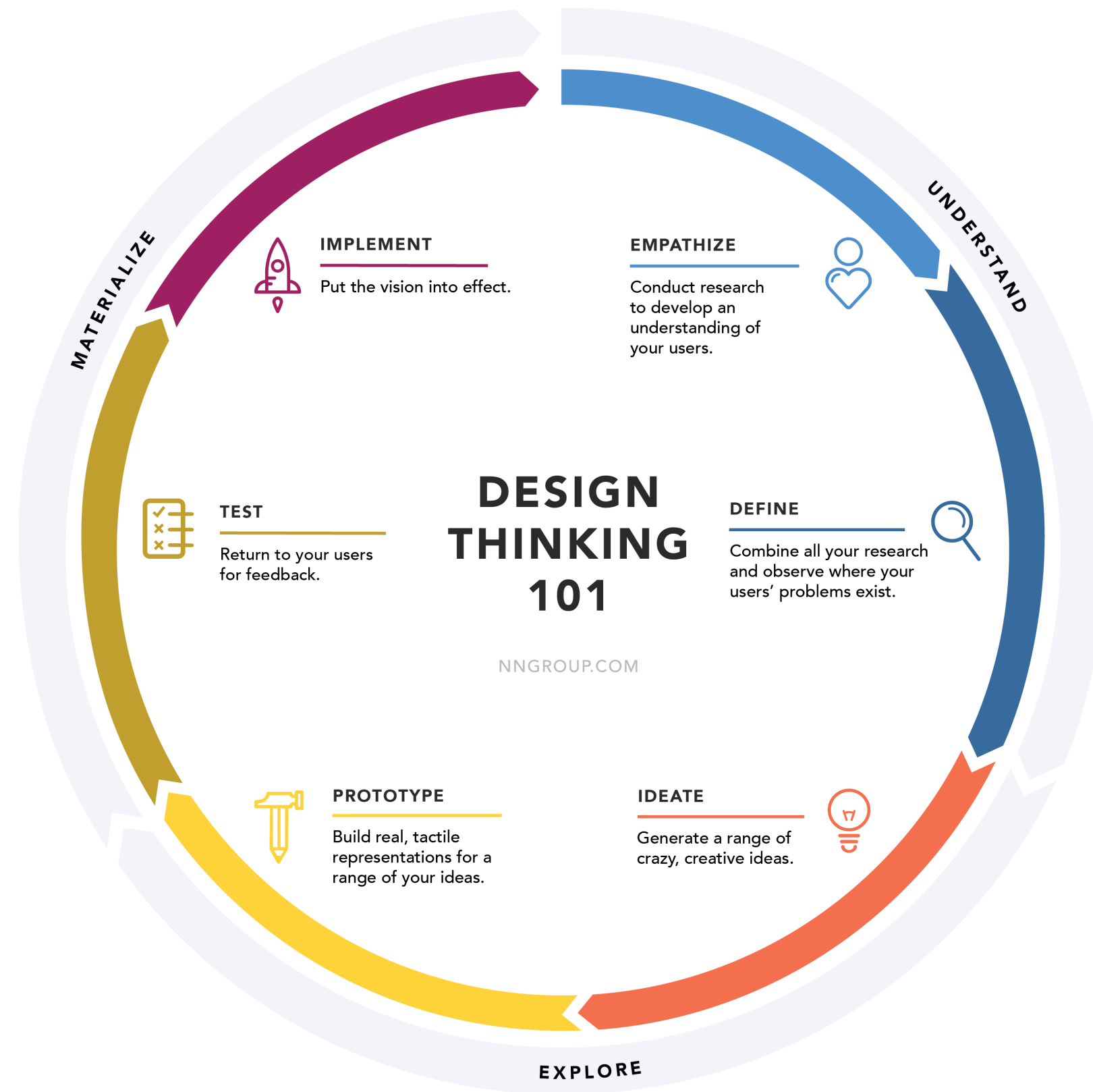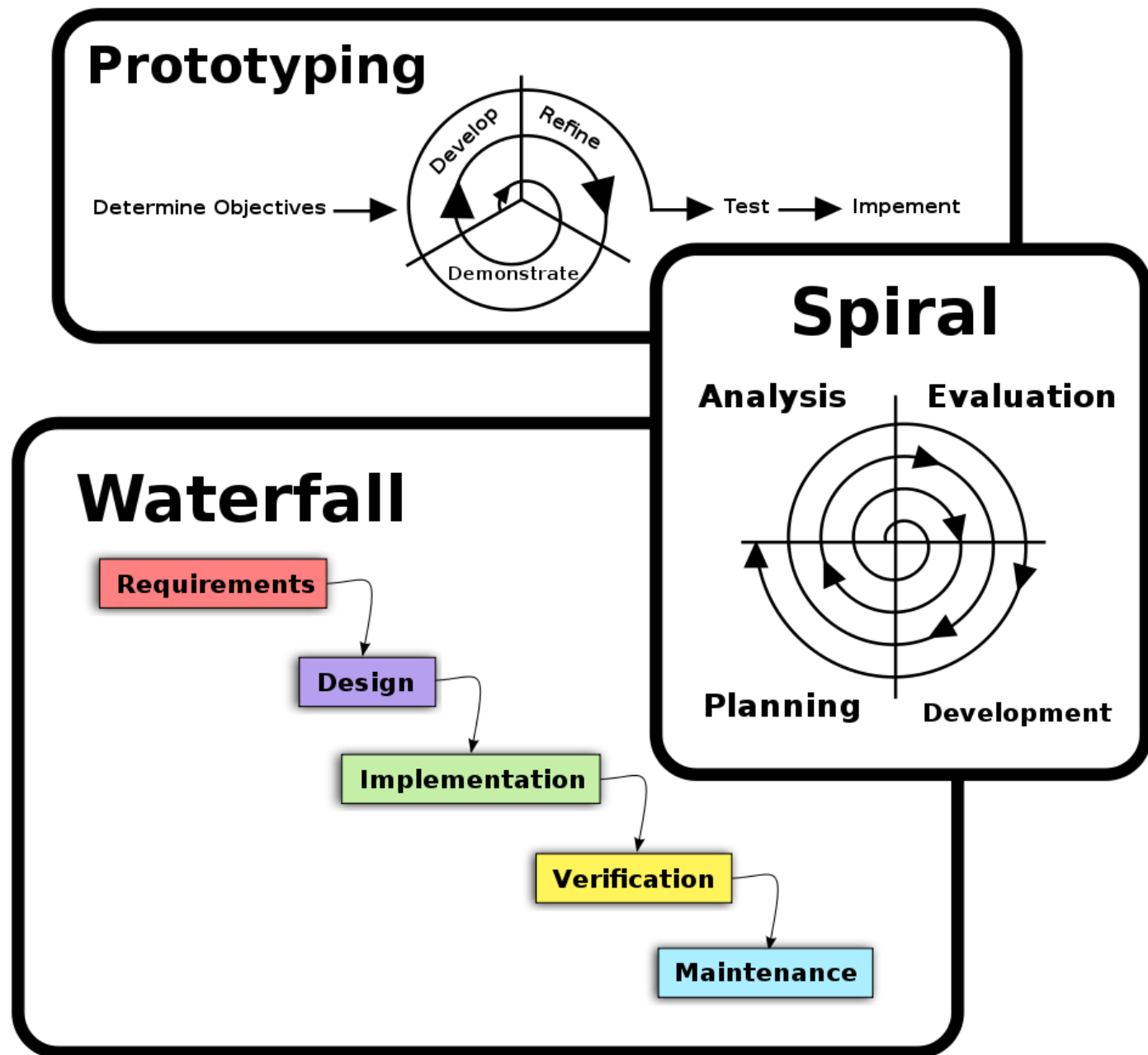What does this process involve? Can anyone name a step?

[5] Interaction Design Foundation
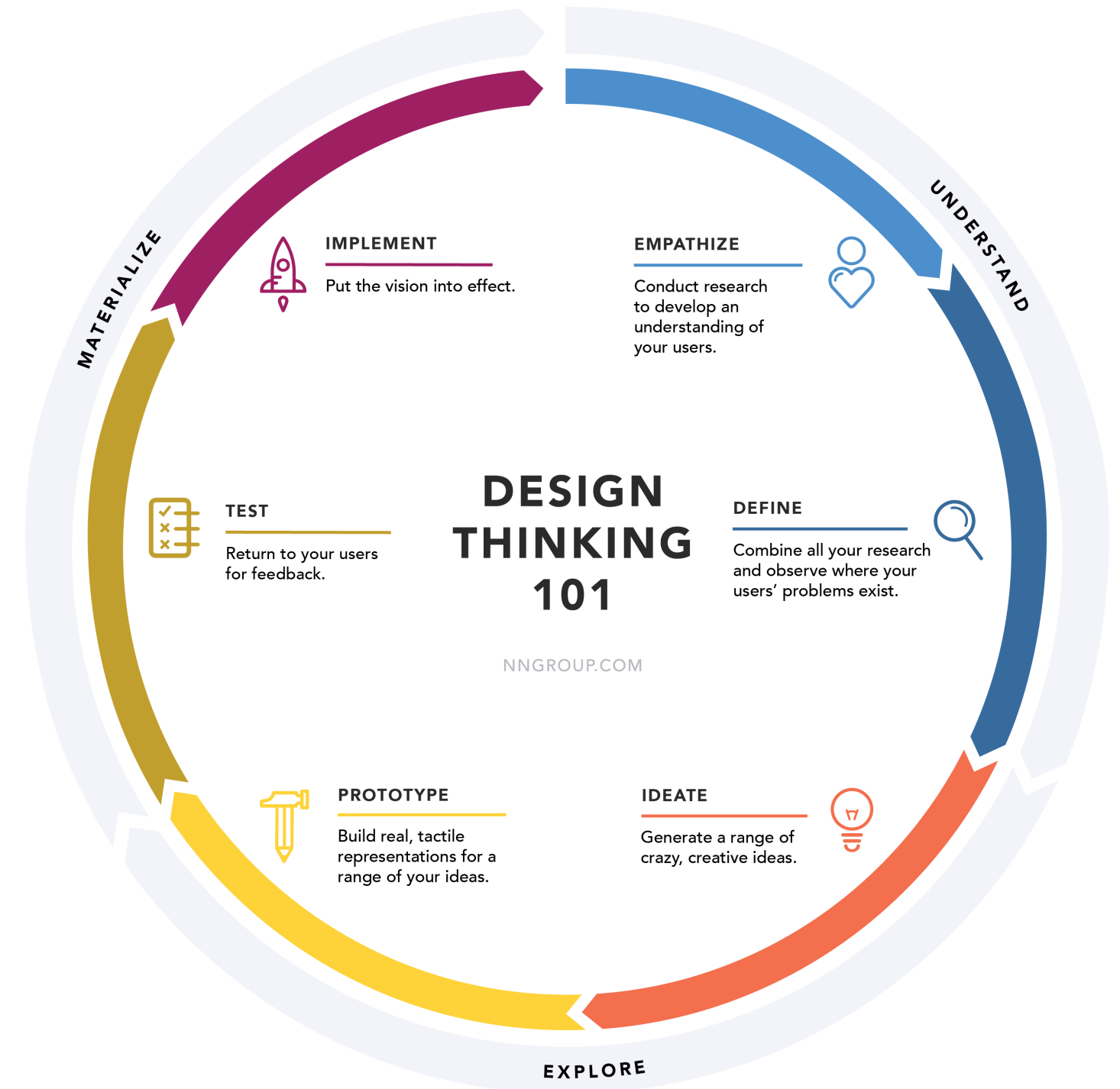
Pro Tip: UX design usually involves the steps:[6]

1. Empathize
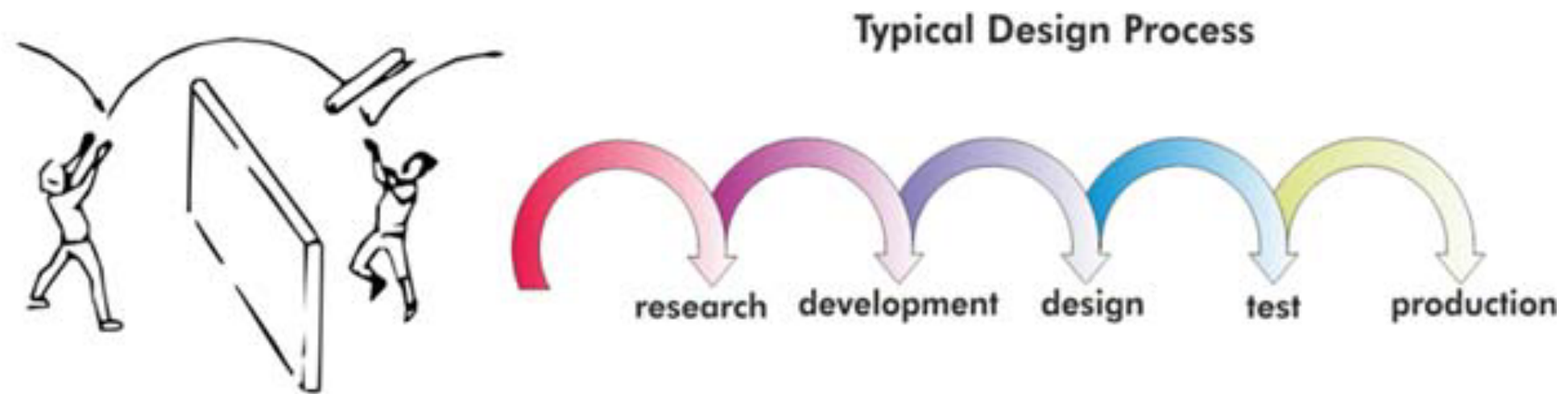2. Define
3. Ideate
4. Prototype
5. Test
6. Implement

Wait a minute! Some of these steps sound familiar!

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[6] NN/g Design Thinking

Prototyping

Determine Objectives → Develop / Refine / Demonstrate → Test → Impement

Waterfall

Requirements → Design → Implementation → Verification → Maintenance

Spiral

Analysis — Evaluation — Development — Planning

DESIGN THINKING 101

NNGROUP.COM

MATERIALIZE

IMPLEMENT — Put the vision into effect.

TEST — Return to your users for feedback.

PROTOTYPE — Build real, tactile representations for a range of your ideas.

UNDERSTAND

EMPATHIZE — Conduct research to develop an understanding of your users.

DEFINE — Combine all your research and observe where your users' problems exist.

IDEATE — Generate a range of crazy, creative ideas.

EXPLORE

How do *designers* and *developers* work within this process?

DESIGN THINKING 101

NNGROUP.COM

MATERIALIZE

IMPLEMENT
Put the vision into effect.

TEST
Return to your users for feedback.

PROTOTYPE
Build real, tactile representations for a range of your ideas.

UNDERSTAND

EMPATHIZE
Conduct research to develop an understanding of your users.

DEFINE
Combine all your research and observe where your users' problems exist.

IDEATE
Generate a range of crazy, creative ideas.

EXPLORE

Typical Design Process

research   development   design   test   production

UX Development Trajectories

» One-person development team to build full-stack applications

» A developer who speaks the language of the designers

» A designer who can also build native prototypes

» A bridge/translator between designers and developers in large/complex organizations

Ok, 👍, but what does that look like?

Let's look at some examples

Example 1: Clocks[8]

>> <u>Binary clock</u>

>> <u>World clock</u>

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[8] <u>React Examples</u>

MATEO

day 10:13

st 19.21°C

TORONTO

Friday 13:13

Clouds 23.01°C

PARIS

Friday 19:13

Clear 26.59°C

SYDN

Saturday 0

Rain 11.4

Example 2: Musical Instruments[9]

» Xylophone

» Electric guitar

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[9] CSS Tricks: Introduction to Web Audio API

Questions about the Course Topic?

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Course Mechanics and Logistics

Design thinking, ideation, modeling, & sketching
Visual design
Structure, layouts, navigation
Design paradigms
Platform-specific design: web
Heuristic evaluation

Web

Prototyping
Design patterns and languages
Platform-specific design: mobile
UX diagnostics

Mobile

Experience prototyping, mapping
Platform-specific design: voice
Creating agents, personalities
Usability Evaluation

Voice

Tuesdays

Design

Thursdays

Build

Web

JS 1
JS 2
React 1
React 2
React 3
React 4

Midterm

Mobile

React Native 1
React Native 2
React Native 3

Voice

DialogFlow 1
DialogFlow 2 (Video)
DialogFlow 3

Design

We will learn design methods and techniques that will give you the best bang for the buck. Examples:

1. **Week 2:** How to quickly empathize with your users through a think-aloud

2. **Week 9:** How to use existing design patterns and languages to improve UX

3. **Week 7:** How to quickly identify the majority of the usability problems in your designs

Build

We will learn the most popular implementation frameworks/libraries for each platform:

1. **Web** — *JavaScript, React*
2. **Mobile** — *React Native*
3. **Voice** — *DialogFlow*

Mostly introductory, but these will get you started.

How they are put together

Across three modules—web, mobile, voice—you will work on individual projects where you will incrementally and iteratively design and build user interfaces.

The Anatomy of a Week
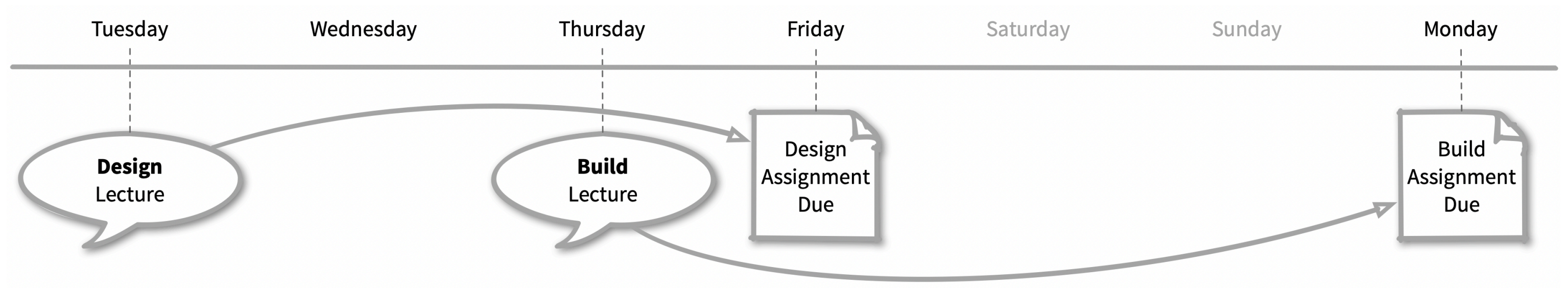
Assessment

1. Weekly *design* and *build* assignments

2. Midterm (October 24) and final (December 18)

3. In-class quizzes and participation

Grading

Assignment	Points
Weekly assignments	50
Midterm	15
Final	25
Attendance & classroom participation	10
Total	**100**

Systems we will use

1. **Course website** for content (lectures, assignments, etc.)

2. **GitHub Classrooms** to share/ submit *build* code

3. GitHub Classrooms to submit *design* assignments

4. **Microsoft Teams** for communication and Q&A

5. **TopHat** for attendance and participation
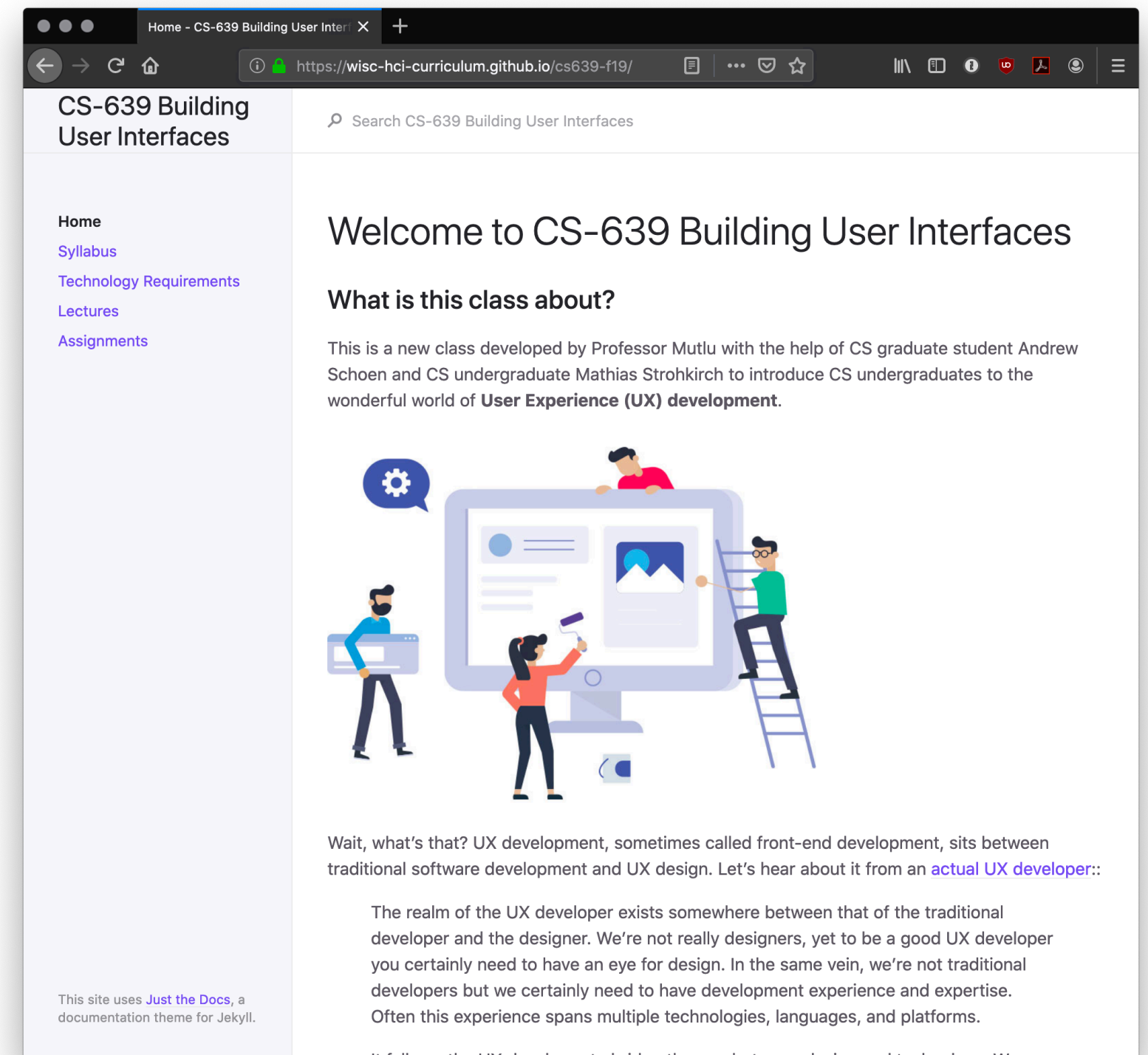
Microsoft Teams — *Join Code*[10]

6k403jx

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[10] Click **Create and join teams** below your teams list and look for the **Join a team with a code** card

Top Hat — *Join Code*

086485

Top Hat Attendance

Instructional Team

Professor: Bilge Mutlu
TAs: Andrew Schoen, Hanna Strohm
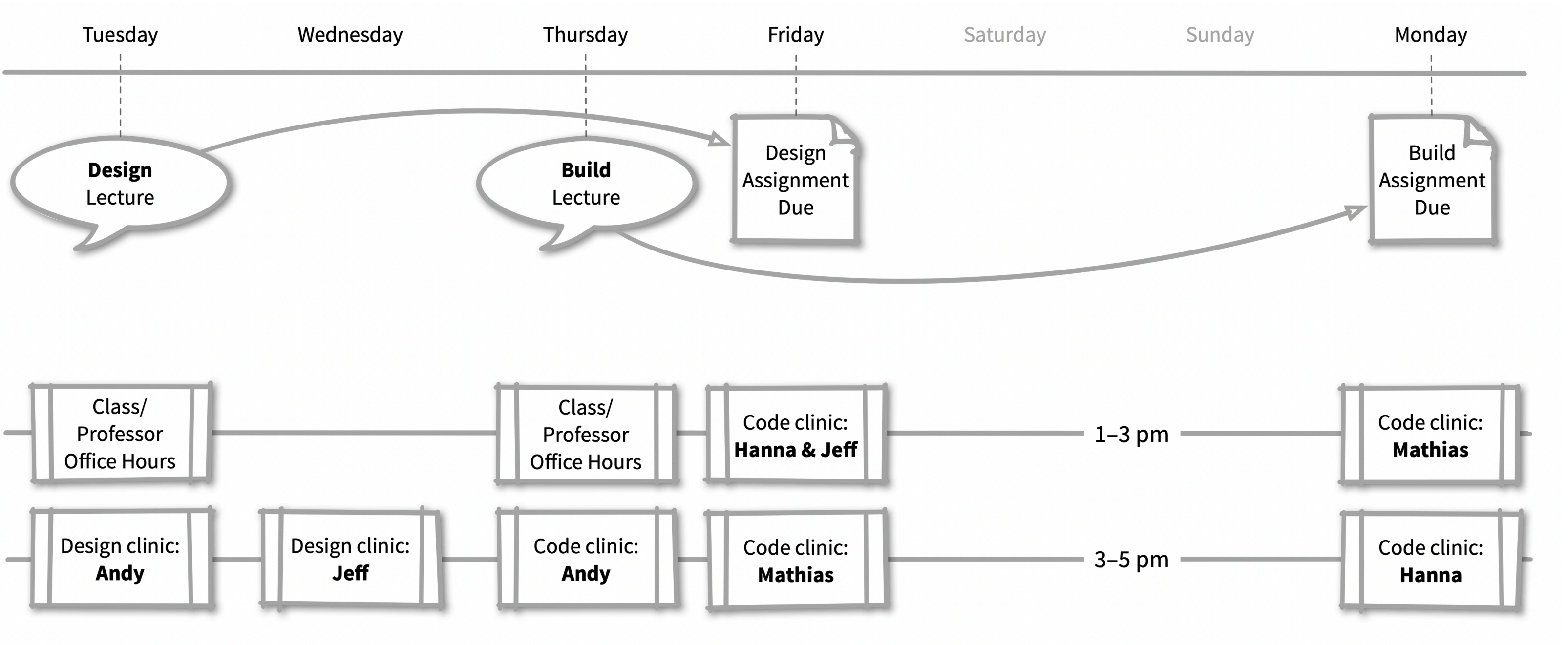**Peer Mentors:** Mathias Strohkirch, Jeff Ma

Clinics[11]

You will have a lot of help through *clinics*:

» **Code** clinics

» **Design** clinics

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[11] UW–Madison News

Workshops[12]

We will also offer several workshops on auxiliary topics that are not covered in class.

Entirely optional — but extremely useful!

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[12] UW–Madison News

Questions about Course Mechanics?

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What's next?

» We'll hit the ground running on Tuesday with the first **design** lecture: *Design Thinking*

» Review the course website and meet technology requirements

» Check the schedule for next week's workshops:

   » HTML + CSS + Git/Github