

# The COS 333 Project

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Robert M. Dondero, Ph.D.  
Princeton University

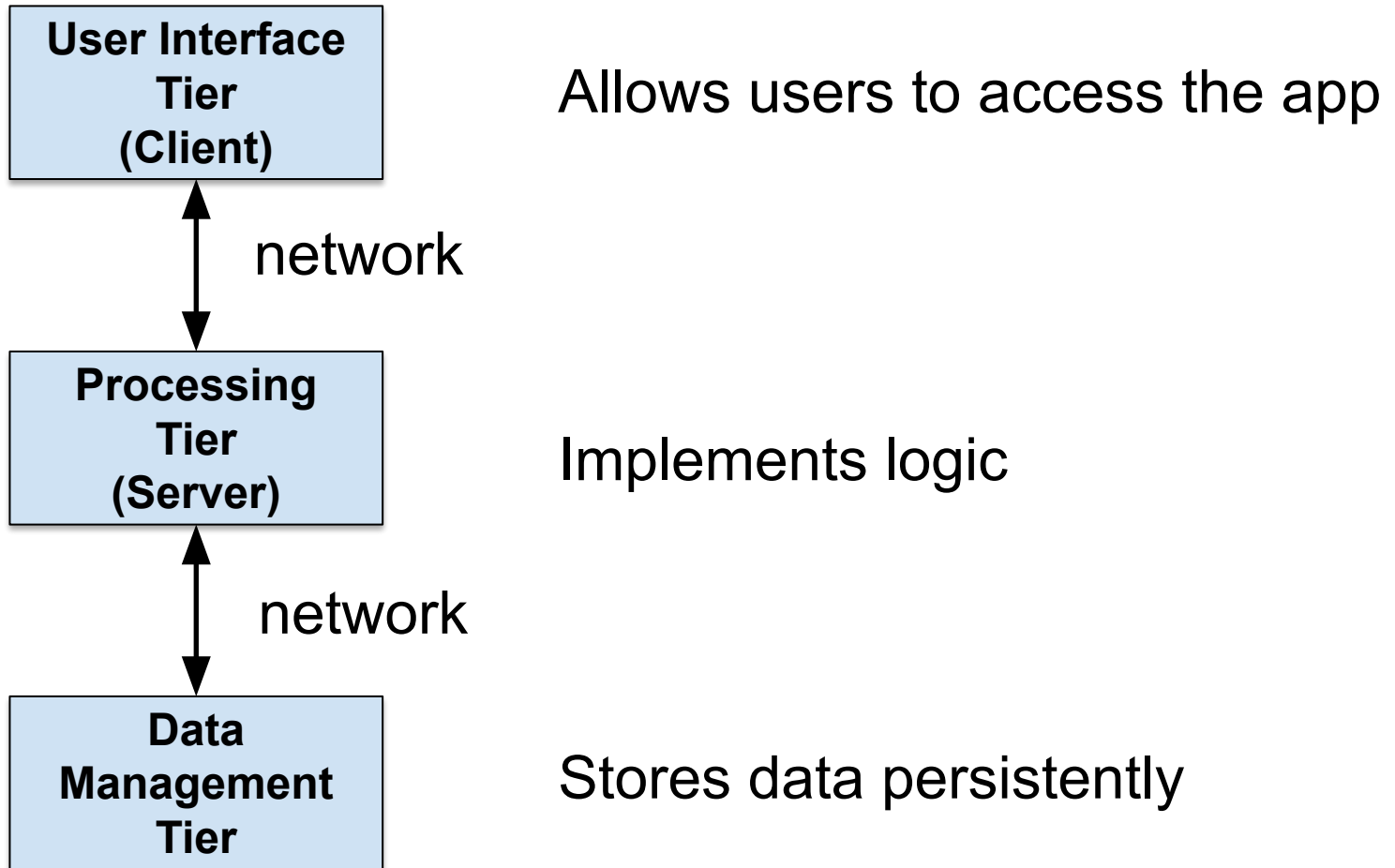
# Agenda

- **Overview**
- Process
- Deliverables

# Overview

- A simulation of reality
- In teams of 3-5 people...
  
- Build a substantial networked *three tier* application

# Overview



# Overview

- Working with instructors
  - First-level adviser: your TA
    - Will monitor & help
    - Will not manage
  - Second-level adviser: the lead instructor
    - Will monitor & help, directly or through your TA
    - Will not manage

# Agenda

- Overview
- **Process**
- Deliverables

# Process

- This is **not** a process:
  - Chat about the app for an hour or so
  - Hack some code together
  - Test it a bit
  - Do some debugging
  - Fix the obvious bugs
  - Repeat until the semester ends

# Process

- Formal software engineering process models
  - Waterfall, agile, extreme,...
- Recommended informal 7-step process...



# Process: Get Started

- **Step 1: Get started**
  - Find a topic
    - Check out *Previous Projects* web page
    - Check out *Project Ideas* web page
    - Look both inward and outward
    - Think both big and small

# Process: Get Started

- **Step 1: Get started**
  - Form a team
    - Use ProjectFinder app (required)
    - Use Ed (optional)

# Process: Get Started

- **Step 1: Get started**
  - Choose a leader
    - Goal: *conceptual integrity* (Brooks)

# Process: Define Requirements

- **Step 2: Define requirements**
  - **Who** are the users?
    - Identify them by name
  - **What** should the app do?
    - Gather requirements
      - Interview users
      - Watch users work
    - Structure requirements
      - Compose scenarios
      - Compose wireframes, storyboards
  - **Involve the users!!!**

# Process: Design

- **Step 3: Design**
  - **How** will the app work?

# Process: Design

- **Step 3: Design**
  - Design “both ends toward the middle”
    - Early in the project: design your **UI**
    - Early in the project: design your **DB**
    - Rest of the project: connect the two

# Process: Design

- **Step 3: Design**
  - Design module interfaces
    - Module = interface + implementation
    - Interface
      - The **public** part of a module
      - A module's **contract** with clients
      - Hides design decisions

# Process: Design

- **Step 3: Design**
  - Choose technologies

Course goal	Use default technologies	Use non-default technologies
Learn many technologies	-	+
Learn software engineering	+	-



# Process: Design

- **Step 3: Design**
  - Choose **user interface tier** technologies

<b>Desktop app</b>	Python**, PyQt5*, Java, Swing, ...
<b>Web app</b>	HTML**, CSS**, Bootstrap**, JavaScript**, AJAX**, jQuery**, React**, ...
<b>Native mobile app</b>	Java*, Kotlin, Android*, Objective-C, Swift, iOS, JavaScript**, ReactNative, ...

\*\* Default technology (covered in lectures & asgts)

\* Covered in lectures or lecture appendices or optional lectures

# Aside: React

- **React is:**
  - (pro) Hot!
  - (pro) Good for large projects
  - (con) Overkill for small projects
  - (con) Harder to learn than jQuery

# Process: Design

- **Step 3: Design**
  - Choose **processing tier** technologies

<b>Language</b>	Python**, Java, JavaScript*, ...
<b>Framework</b>	For Python: Flask**, Django*, ... For Java: Spring*, ... For JavaScript: Express*, ...
<b>Hosting service</b>	Render**, Heroku*, ...

\*\* Default technology (covered in lectures & asgts)

\* Covered in lectures or lecture appendices or optional lectures

# Process: Design

- **Step 3: Design**
  - Choose **data management tier** technologies

<b>Data store</b>	Relational DBMS: PostgreSQL**, MySQL, ... NoSQL DBMS: Redis, MongoDB, ... Another app API <b>Don't use SQLite!</b>
<b>Hosting service</b>	For PostgreSQL: Render**, Heroku* For MongoDB: Atlas

\*\* Default technology (covered in lectures & asgts)

\* Covered in lectures or lecture appendices or optional lectures

# Process: Design

- **Step 3: Design**
  - Suggestions for choosing technologies:
    - Talk with course instructors
    - Do many simple tech experiments early

# Process: Implement

- **Step 4: Implement**
  - Compose module implementations
  - **Rule 1:** You need not compose all of the code, but the overall product must be your work
  - **Rule 2:** Every team member must compose a substantial amount of code

# Process: Test

- **Step 5: Test**
  - Does the app work as **you** intend?
  - Integrated with Implementation step
  - Additional distinct step at the end

# Process: Evaluate

- **Step 6: Evaluate**
  - Does the app work as its **users** intend?
  - Does the app fulfill the users' needs?



# Process: Document

- **Step 7: Document**
  - Integrated with previous steps
  - Additional distinct step at the end
    - *Grader's Guide* document
    - *Product Eval* document
    - *Project Eval* document

# Process: General Advice

- Iterate
  - Iterate between **Implement** and **Test** frequently
  - Revisit **Define Requirements** and **Design** less frequently

# Process: General Advice

- Do *least-risk design*
  - Minimize risk
  - The module to develop next should be the one with maximal risk
  - The module to develop next should be the one which, if problematic, will have the largest negative impact on the app as a whole

# Process: General Advice

- Use a version control system for all code
  - **Git** is mandatory
  - **GitHub** is mandatory

# Process: General Advice

- Allocate time for “overhead” activities
  - Changing your mind
  - Disaster
  - Sickness
  - Health!
  - Deliverables...

# Agenda

- Overview
- Process
- **Deliverables**

# Deliverables

- Deliverables
  - See *Project* web page for details
  - See *Schedule* web page for due dates
  - All deliverables are graded

# Deliverables

When	Deliverable
Pre-project	ProjectFinder entry
Pre-project	Project pre-approval meetings (optional)
Pre-project	<b><i>Project Approval Meeting</i></b>
Early project	<b><i>Team Directory</i></b>
Early project	<b><i>Project Overview</i></b> document



# Deliverables

When	Deliverable
Mid-project	Weekly status meetings
Mid-project	<i>Timeline</i> document
Mid-project	<i>Wireframes</i>
Mid-project	Demo of <i>Prototype</i>
Mid-project	Demo of <i>Alpha version</i>
Mid-project	Demo of <i>Beta version</i>

# Deliverables

When	Deliverable
Reading Period	<i>Presentation</i>
Dean's Date	<i>Grader's Guide</i> doc
Dean's Date	<i>Product Eval</i> doc
Dean's Date	<i>Project Eval</i> doc
Dean's Date	The application

# Keys to Success

- Keys to success in COS 333:
  - Find a good project
  - Find good teammates