



# **Senior Design Server/Client Development for Project Matching (Phase 2)**

Team 18

Client & Advisor: Akhilesh Tyagi

# Team Introductions



**Haylee Lawrence**  
Software Engineering

UI Designer & Lead  
Presenter



**MyTien Kien**  
Software Engineering

Team Organization &  
Client Interaction



**Sanjana Amatya**  
Software Engineering

Individual Component  
Design & Report  
Manager



**Alec Elsbernd**  
Software Engineering

Lead Researcher &  
Floating Help

# Project Vision

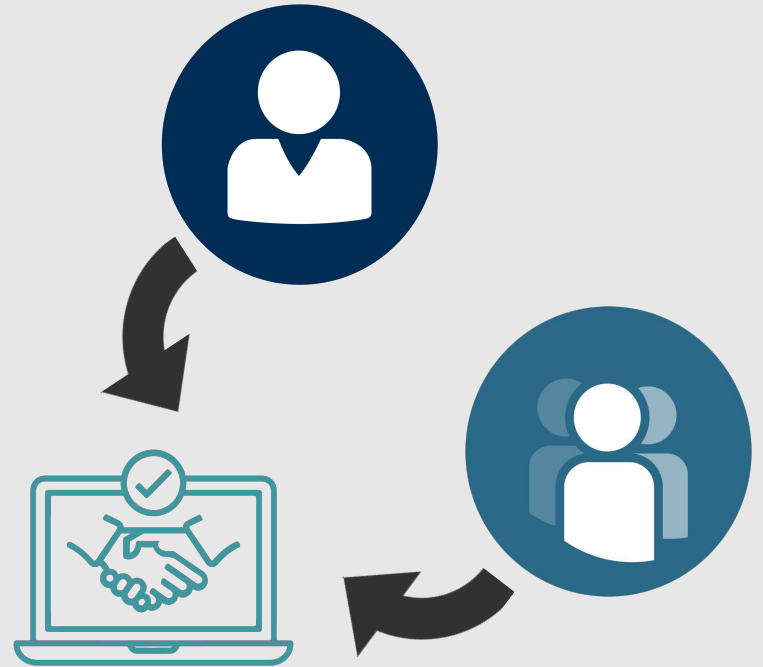
## Senior Design Project Matching Phase 2

Currently...

- Matching process time consuming
- Can lead to client/student dissatisfaction

Main Use Cases

- **Clients:** Submit Project Proposals
- **Students:** Input Project Preferences
- **Instructors:** Create optimal Project Groups



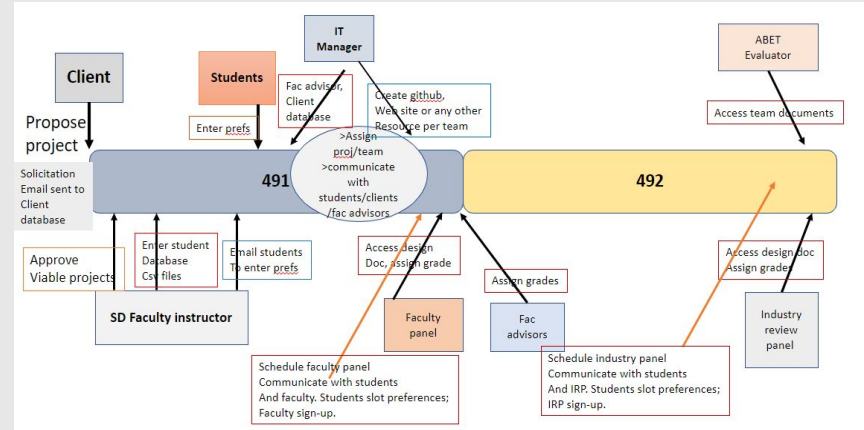
# Conceptual / Visual Design

## What?

- A system that captures the senior design cycle from beginning to end
- Main focus on the project matching system
- Easier experience for everyone involved in the process

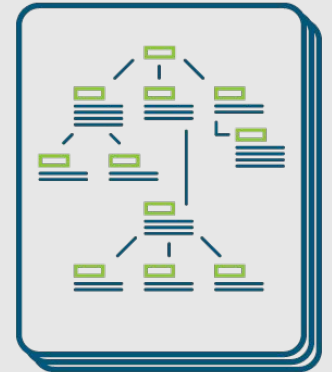
## What's so unique?

- Project matching is an example of a classical assignment problem
- Using Auctions algorithm as a solution



# Functional Requirements

- **Project Clients**
  - Submit Project Proposals
  - View Proposal status
  - View Project Assignment Information
- **Students**
  - Submit Project/Team Preferences
  - View Project Assignment Information
- **IT**
  - Access/Edit database and Users
- **Senior Design Instructors**
  - General Admin
  - Review Project Proposals
  - Run Project Assignment Algorithm
- **Faculty Advisors**
  - View their Team Assignment(s) information
- **Faculty/Industry Review Board**
  - Sign up for review times
  - View Team(s) information



# NFR's & Constraints



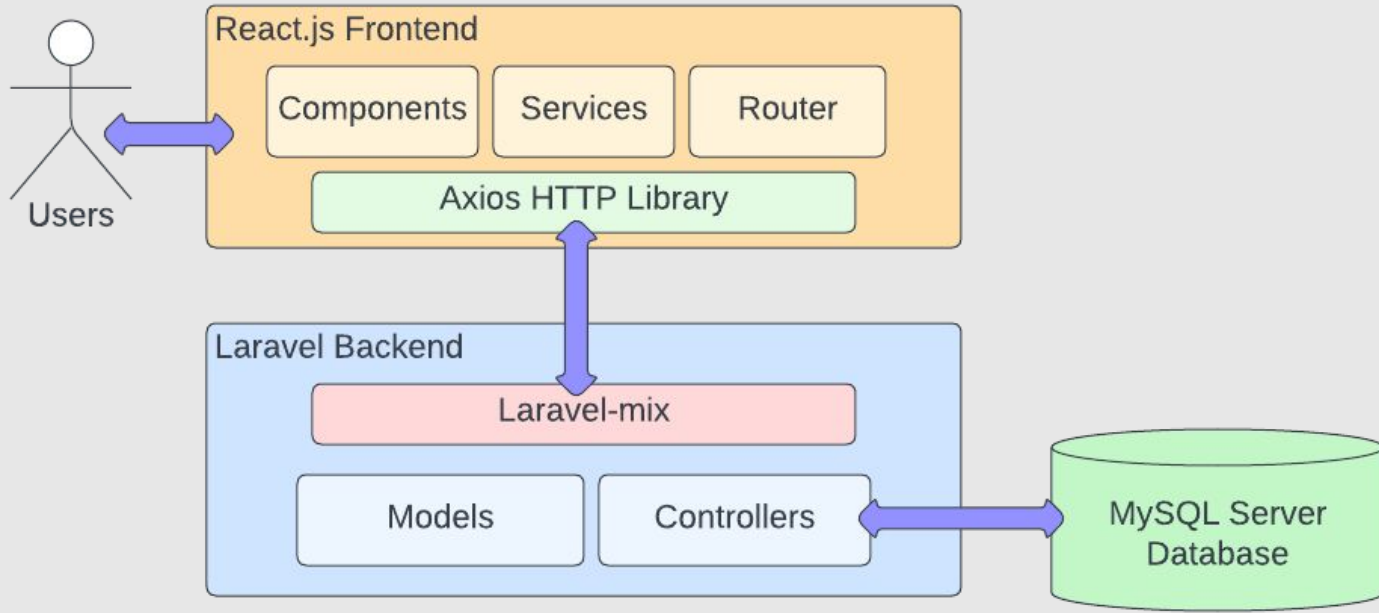
## Non-Functional Requirements

- **Usability**
  - Intuitive Design
  - Accessible Design
- **Performance**
  - Fast loading speeds
- **Security**
  - Secure Database
  - Proper Records Retention

## Constraints

- **Time**
- **Technology & Tools**
  - Reusing previous Teams work
  - Tools we are familiar with

# Conceptual Design Diagram



# Project Plan

- Key Tasks
  - Ensuring Past Backend Components Work For Us
  - Making backend Adjustments
  - Finalizing UI
  - Connecting Database to Backend
  - Coding Algorithm



# Project Plan

			October 2022			November 2022				December 2022		January 2023					February 2023				March 2023				
Reference Number	Task Name	Est. time commitment	8-14	15-21	22-28	29-4	5-11	12-18	19-25	26-2	Dead Week	Finals Week	31-6	7-13	14-20	21-27	28-3	4-10	11-17	18-24	25-3	4-10	11-17	18-24	
1	Design																								
1.1	Determine the project's architecture style	1 week		█																					
1.2	Evaluate previous projects and determine reusable components	3 weeks			█	█	█																		
1.3	Determine Testing plan	2 weeks						█	█																
1.4	Finalize design documents	2 weeks							█	█															
2	Backend																								
2.1	Determine the backend language	1 week			█																				
2.2	Determine the backend framework	1 week			█																				
2.3	Previous Groups - Backends Eval	1 week				█																			
2.4	Choose Backend codebase to Reuse	1 week											█												
2.5.1	Make Backend Adjustments as Needed	9 weeks													█	█	█	█	█	█	█	█	█	█	█
2.5.2	Ensure Previous Components are Working	4 weeks																█	█	█	█				





# Project Plan

- **Risks**
  - Learning curves w/ Laravel
  - Auctions algorithm
- **Rationale**
- **Progress Thus Far**

# System Design

## Prior Work

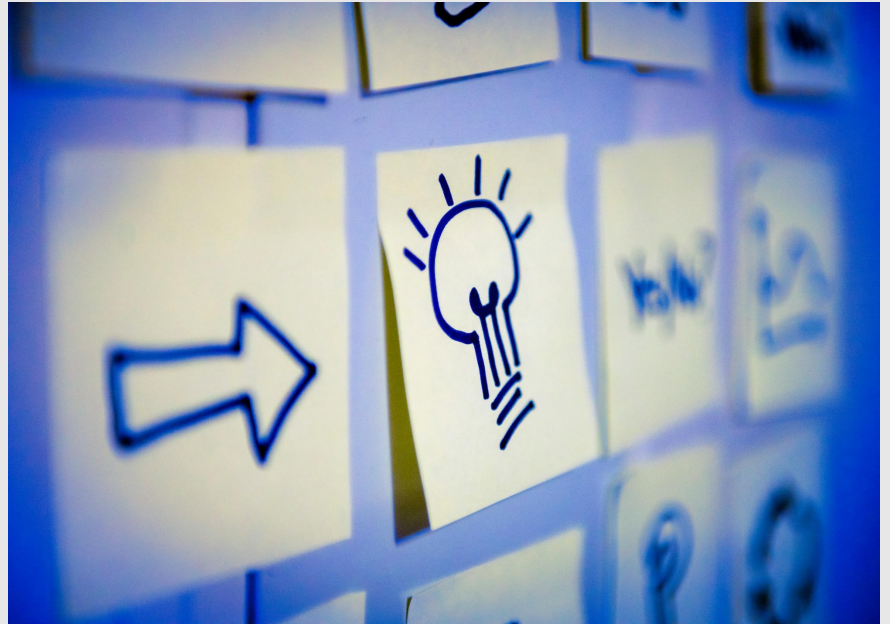
- Phase 1 began last semester
- Two teams
- Similar ideas, different ways to go about it

## Proposed Design

- Fully functional website
- Beginning to end process of project matching

## Design Analysis

- Wireframe of website
- Major design decisions



# Prototype Implementations

- Wireframed In Figma
  - Client
  - Student
  - SD Instructors
- In Progress
  - SD Instructors
  - Faculty Advisors
  - Faculty/Industry Board Members

IOWA STATE UNIVERSITY Senior Design Project Matcher: Student Home Sign Out

My Preferences

Project Preferences	Submission Status	Due Date
Senior Design Student Project Preferences Form	Submitted	September 9th, 2022

My Senior Design Group

Project Name	Group ID	Team Mass Email	Project Website
Senior Design Serve/Client Project Matching	sdmay23-45	sdmay23-45@iastate.edu	https://sdmay23-45.sd.ece.iastate.edu

Approved Projects List

Project Name	Project ID	Required Majors	Client/Company/Organization
Senior Design Serve/Client Project Matching	sdmay23-proj01	Software Engineering	Software Corp.
Self Driving Robo Car	sdmay23-proj02	Computer Engineering, Electrical Engineering, Software Engineering	Small Cars Company
AI Security Logging	sdmay23-proj03	Cybersecurity Engineering, Software Engineering	the Government
Microelectronics Project	sdmay23-proj04	Electrical Engineering, Computer Engineering	Microelectronics Ltd.

[View All](#)

Hello

All Figma Wireframes available on our site: <https://sdmay23-18.sd.ece.iastate.edu/>

# Prototype: Client Figma Walkthrough

## Client Logs In

IOWA STATE UNIVERSITY.

Sign In

Username

Password

[Sign In](#)

[Help](#)



## Dashboard View

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### My Proposals

Project Name	Submission Status	Review Status
<a href="#">Senior Design Server/Client Project Matching [Phase 2]</a>	Not Submitted	Not Submitted
<a href="#">Power Grid Simulator</a>	Submitted	Pending Review
<a href="#">Location Tracking Dog Collar</a>	Submitted	Review In Progress
<a href="#">Butterfly Tracker App</a>	Submitted	Accepted
<a href="#">Student Program of Study Planner</a>	Submitted	Denied

### My Senior Design Groups

Project Name	Group ID	Group Mass Email
<a href="#">Butterfly Tracker App</a>	sdmay23-45	sdmay23-45@iastate.edu

# Prototype: Client Figma Walkthrough

Dashboard

Project Submission Form

Project Group Info

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Home Sign Out

## Senior Design Project Submission Form

Project Name	Submission Status	Review Status
Senior Design Server/Client Project Matching [Phase 2]	Not Submitted	Not Submitted

### Client/Company/Organization \*

Iowa State University

### Submitter Name \*

Please Fill Out Form

### Email \*

Please Fill Out Form

### Project Contact \*

Please Fill Out Form

### Email \*

Please Fill Out Form

### Project Title \*

Senior Design Server/Client Project Matching [Phase 2]

### Project Abstract \*

Please Fill Out Form

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Home

Project Name	Submission Status	Review Status
Butterfly Tracker App	Submitted	Accepted

### Client/Advisor Information

Role	Name	Email
Client	Ole Broberg	obro@company.com
Client	Dorthe Jensen	dorthe@company.com
Faculty Advisor	Judith Berthelsen	jberthelsen@iastate.edu

### My Senior Design Groups

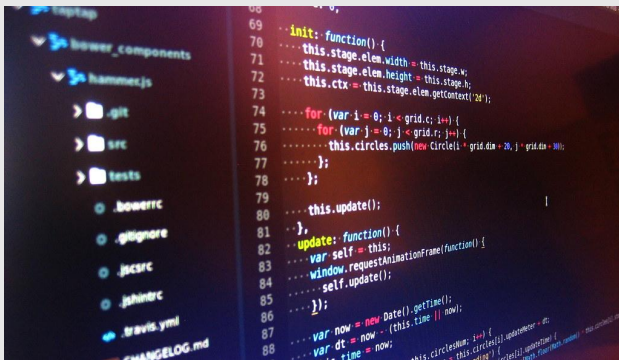
Name	Major	Email	Minor	Skills
John Grubbs	Software Engineering	jgrubbs@iastate.edu		Frontend coding, backend coding, database creating, testing
Antonia Mckay	Cybersecurity Engineering	amckay@iastate.edu	Data Science	Java, C++, MySQL, Project Management
Conan Hill	Software Engineering	chill@iastate.edu	Cybersecurity Engineering	
Laurie Cunningham	Software Engineering	lcunn@iastate.edu		Group project work, HTML/CSS, database creating, testing
Maria Eisenberg	Software Engineering	mariae@iastate.edu	Cybersecurity Engineering	Client communication, backend coding, databases



# Design Complexity

## Web Platform

- Fully functional website
- Rehaul frontend from Phase 1 and redo based on past criticism
- Connecting backend to frontend to database



## Algorithm

- Classical assignment problem
- Vickrey's auctions algorithm + heuristics
- Previously little to no knowledge, extensive research needed
- Main component for project matchmaking
- Several preferences to account for

# Algorithm

## Classic Assignment Problem

- Hungarian Algorithm
- Auctions Algorithm



**CHOSEN**

**Auctions Algorithm**

## Types of Auctions

- English Auction
- Dutch Auction
- Vickrey's Auction
- Double Auction



**CHOSEN**

**Vickrey's Auction**

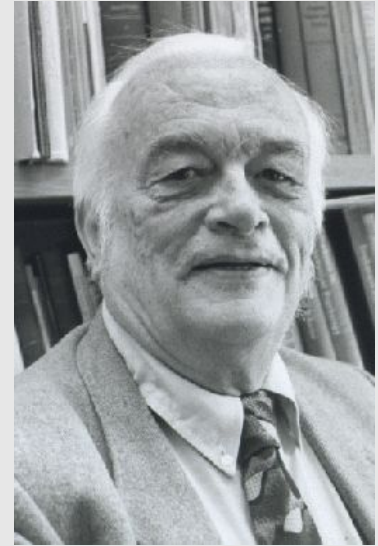
# Algorithm

## Vickrey's Algorithm

- Keeps bidders honest

## General Idea

- Students will be allocated points
- They will simultaneously put bids on 5 projects and 5 people based on their preference
- The algorithm will take into account heuristics and the auctions algorithm



# Test Plan

- Simple and transparent tests
- Creating user test cases with the end product and client in mind
- Avoiding repetitive test cases
- Test cases will include a description of what is being tested, an explanation of how it will be tested, and the expected results.



# Conclusions



**Questions?**