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

Team 18 Client & Advisor: Akhilesh Tyagi

### **Team Introductions**



Haylee Lawrence Software Engineering MyTien Kien Software Engineering Sanjana Amatya Software Engineering Alec Elsbernd Software Engineering

UI Designer & Lead Presenter Team Organization & Client Interaction

Individual Component Design & Report Manager 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
  - $\circ$  Sign up for review times
  - View Team(s) information



## NFR's & Constraints



- 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**



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

			0	ctober 20	22		Nov	/ember 2	2022		Decemb	oer 2022		Ja	anuary 2	023			Febuar	y 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																						

			00	tober 20	122		Nov	ember 3	2022		Decem	oer 2022		la	nuary 2	023			Febuar	v 2023			March	2023			Anril	2023	
Reference		Est. time		tober 20			NOV	ember 2			Dead	Finals		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		025			rebuar	¥ 2025			March	2025			Apric	2025	
Number	Task Name	commitment	8-14	15-21	22-28	29-4	5-11	12-18	19-25	26-2	Week	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	25-31	1-7	8-14	15-21	22-28
3	Frontend																												
3.1	Determine frontend language	1 week																											
3.2	Determine the frontend framework	1 week																											
3.3.1	Determine necessary user roles	1 week																											
3.3.2	Determine which users see specific components and pages	1 week																											
3.3.3	Determine which users can see certain databases	1 week																											
3.3.4	Determine which users can change certain databases	1 week																											
3.4.1	Determine color and font themes	1 week																											
3.4.2	Determine and create pages needed	3 weeks																											
3.5	Wireframe site	5 weeks																											
3.6.1	Code Student Pages	2 weeks																											
3.6.2	Code Client Pages	2 weeks																											
3.6.3	Code SD Instructors Pages	3 weeks																											
3.6.4	Code Faculty & Industry Review Board Pages	2 weeks																											
3.6.5	Code ABET Pages	2 weeks																											
3.7	Connect pages with backend	4 weeks																											
3.8	Finalize UI based on Testing and User feedback	2 weeks																											

			00	tober 20	)22		Nov	/ember 2	022		Decemb	er 2022		Ji	anuary 2	023			Febuar	y 2023			March	2023			April	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	25-31	1-7	8-14	15-21
4.1	Evaluate previous project's database design's to see what can be reused/improved upon	1 week																										
4.2	Create tables	2 weeks																										
4.3	Connect database to backend	1 week																										
5	Algorithm																											
5.1	Reseach algorithms	2 weeks																										
5.2.1	Determine how to maximise student and client satisfaction	2 weeks																										
5.2.2	Determine input parameters and weights	2 weeks																										
5.3	Code the algorithm in the backend	2 weeks																										
6	Testing																											
6.1.1	Test the UI to verify rendering	2 weeks																										
6.1.2	Test the UI to verify component functionality	2 weeks																										
6.2.1	Test connectivity between frontend and backend	2 weeks																	_									
6.2.2	Test connectivity between database and backend	4 weeks																										
6.2.3	Test correctness of backend controllers, classes, and methods	2 weeks																	_									
6.3.1	Test its ability to create teams that fit the ABET standards	3 weeks																										
6.3.2	Test its ability to create teams that maximize student and client satisfaction	3 weeks																										
6.4.1	Test Database Security	2 weeks																										
6.4.2	Test SSO security	2 weeks																										

- 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

Project Prefer	ences	Submission Status	Due Date	
Senior Design Student Project Preferences Form		Submitted	September 9th, 2022	
My Senior Design Group		Team Mass Email	Project Website	
riojeccituitie	Group ID	realli mass ciliali		
Senior Design Server/Client Project Matching	Group ID sdmay23-45	sdmay23-45@iastate.edu	https://sdmay23-45.sd.ece.iastate.edu	
Senior Design Server/Client Project Matching Approved Projects List Project Norme	Group ID sdmay23-45 Project ID	realin mass s intellin sdmay23-45@lastate.edu Required Majors	https://sdmay/23-45.sd.ece.lastate.edu Client/Company/Organization	
Approved Project SList Project Name Senior Design Server/Client Project SList Project Name Senior Design Server/Client Project Matching	Group ID sdmay23-45 Project ID sdmay23-proj01	Required Mijors Software Engineering	https://sdmay23-45.sd.ece.lastate.edu Client/Company/Organization Software Corp.	
Approved Project Matching Approved Project Matching Serior Design Server/Client Project Matching Serior Design Server/Client Project Matching Serior Design Server/Client Project Matching	Group ID           sdmay23-45           Project ID           sdmay23-proj01           sdmay23-proj02	Required Mijors Software Engineering Computer Engineering Computer Engineering	http://sdmay23-45.sd.ece.lastate.edu Citient/Company/Organization Software Corp. Smail Cars Company	
Approved Projects List Project Marching Project State Project Marching Project Marching Server/Client Project Marching Serve	Group ID           sidmay23-45           Project ID           sidmay23-proj01           sidmay23-proj02           sidmay23-proj02           sidmay23-proj03	Required Majors  Required Majors  Software Engineering, Detricula Engineering, Detricula Engineering, Software	https://sdmay23-45.st.erce.iastate.edu Celent/Company/Organization Software Corp. Smail Cars Company the Overnment	

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

### **Prototype: Client Figma Walkthrough**

#### **Client Logs In**



#### **Dashboard View**

IOWA STATE UNIVERSITY Senior Design Project Matcher: Client

Home Sign Out

#### My Proposals

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

#### My Senior Design Groups

Project Name	Group ID	Group Mass Email
Butterfly Tracker App	sdmay23-45	sdmay23-45@iastate.edu

### **Prototype: Client Figma Walkthrough**



Project Name		Submission Status	Review Status
ienior Design Server/Client Project Matching [Phase 2]		Not Submitted	Not Submitted
Client/Company/Organization *			
Iowa State University			
Submitter Name *	Email *		
Please Fill Out Form	Please Fill	Out Form	
Project Contact *	Email *		
Please Fill Out Form	Please Fill	Out Form	
Project Title *			
Senior Design Server/Client Project Matching [Phase 2]			
Project Abstract *			
Please Fill Out Form			

Sign Out

Home

IOWA STATE UNIVERSITY | Senior Design Project Matcher: Client

Role	Name	Email
Client	Ole Broberg	obro@company.com
Client	Dorthe Jensen	dorthej@company.com
Faculty Advisor	Judithe 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





- 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?