

Software Engineering Project

TEAM 29



Ajay Thiagarajan (21f1003242)

A J R Vasu (21f3002975)

Anand K Iyer (21f1001185)

Anuj Gupta (21f3001598)

Ghanashyam R (21f1003387)

Jalaj Trivedi (21f2000730)

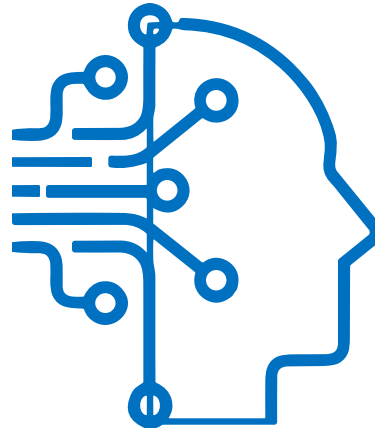
Niraj Kumar (21f1006589)

Presentation

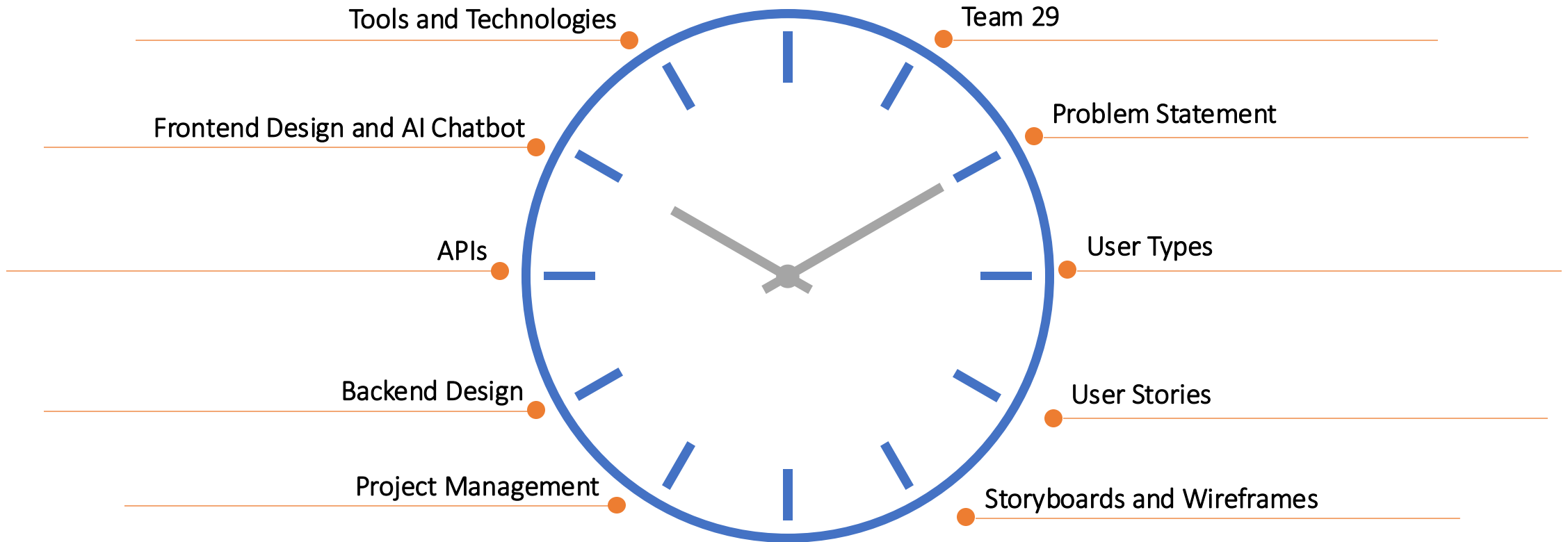
9 April 2025

DeepSEEK

Enhanced Learning with GenAI enabled Chatbot



Presentation Content



Starting with



Meet the Team !

TEAM 29
Software Engineering Project



Meet The Team



A J R Vasu
21F3002975



Anand K Iyer
21F1001185



Ajay Thiagarajan
21F1003242



Niraj Kumar
21F1006589



Anuj Gupta
21F3001598

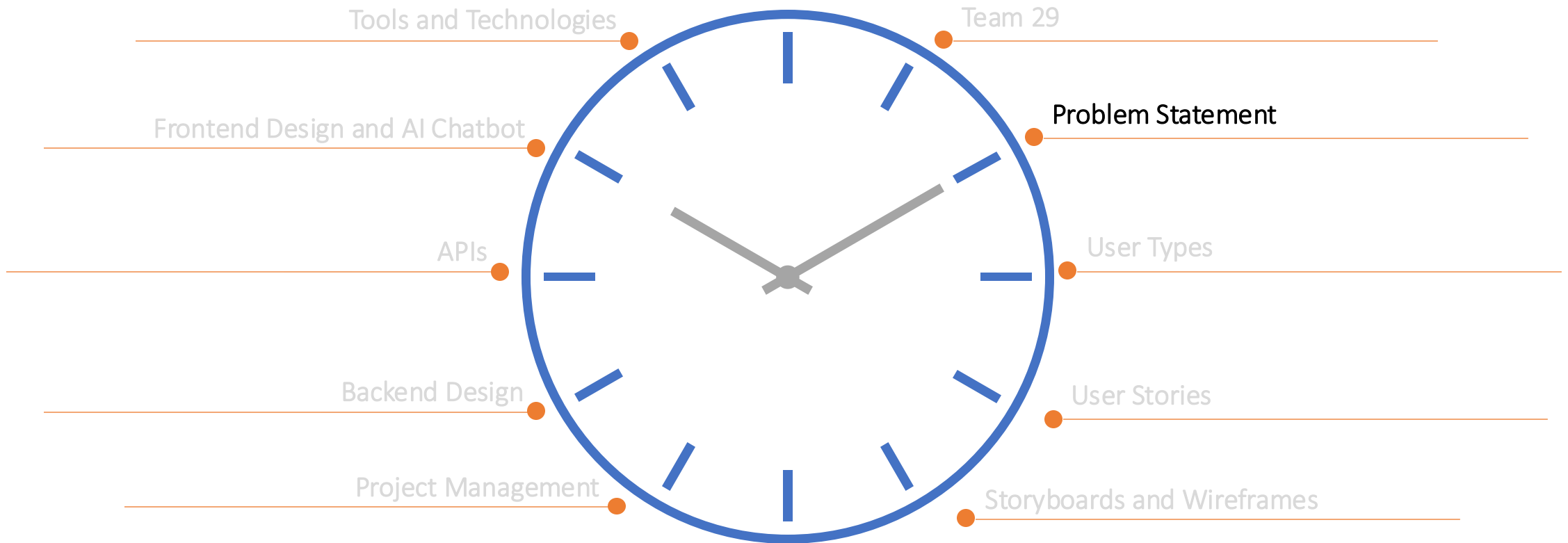


Ghanashyam R
21F1003387

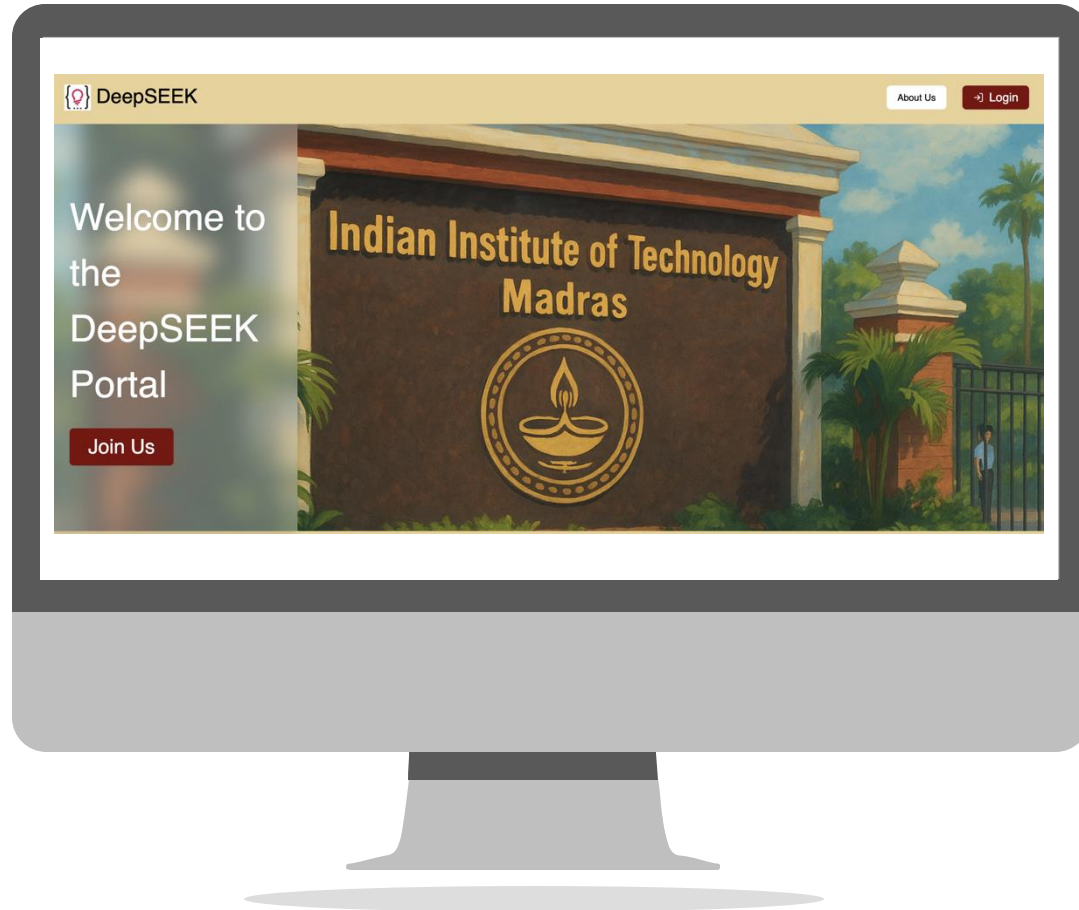


Jalaj Trivedi
21F2000730

Next



Problem Statement



Situation

Learners rely heavily on the learning portals like SEEK for self-paced learning and course navigation.

Challenge

Learners often face difficulties in identifying effective study strategies and understanding coding concepts, hence there is a need for enhancing the learning experience.

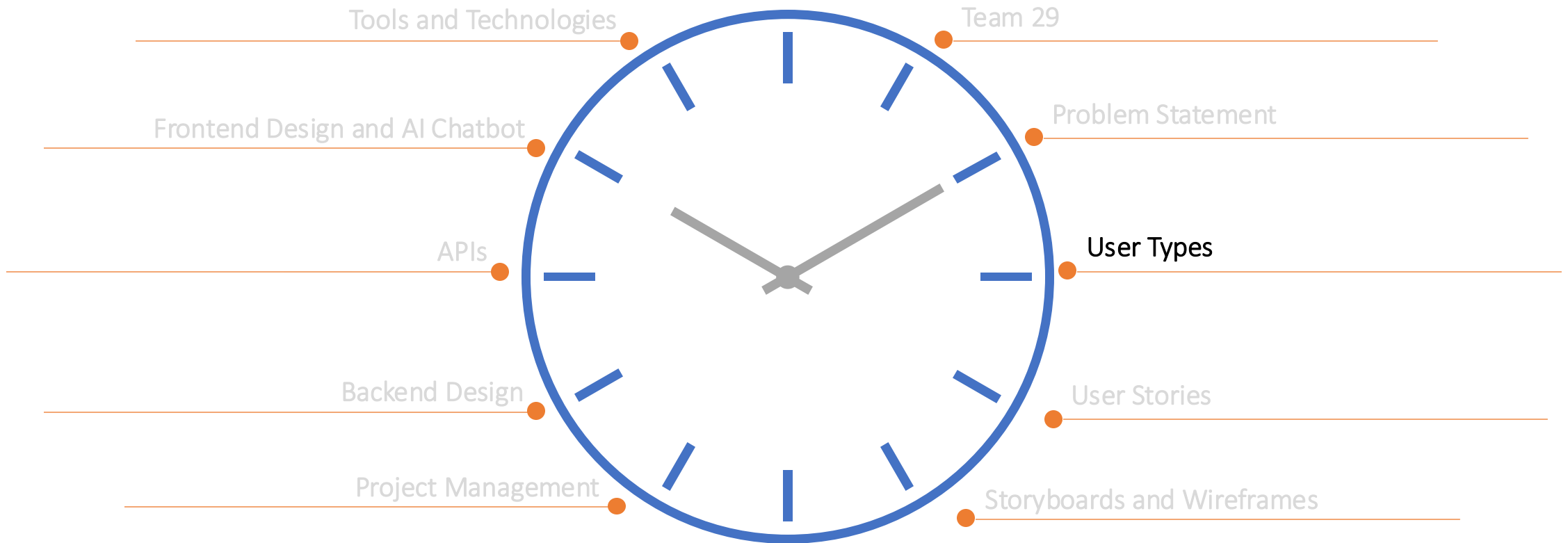
Question

With rapid advancements in GenAI there are many possibilities of leveraging language models to enhance learning environments.

Answer

Integrate AI chatbot (supported by GenAI) with the learning to give learners support in better understanding of the subjects.

Next



Users of the enhanced portal

01



Students : Primary Users

02



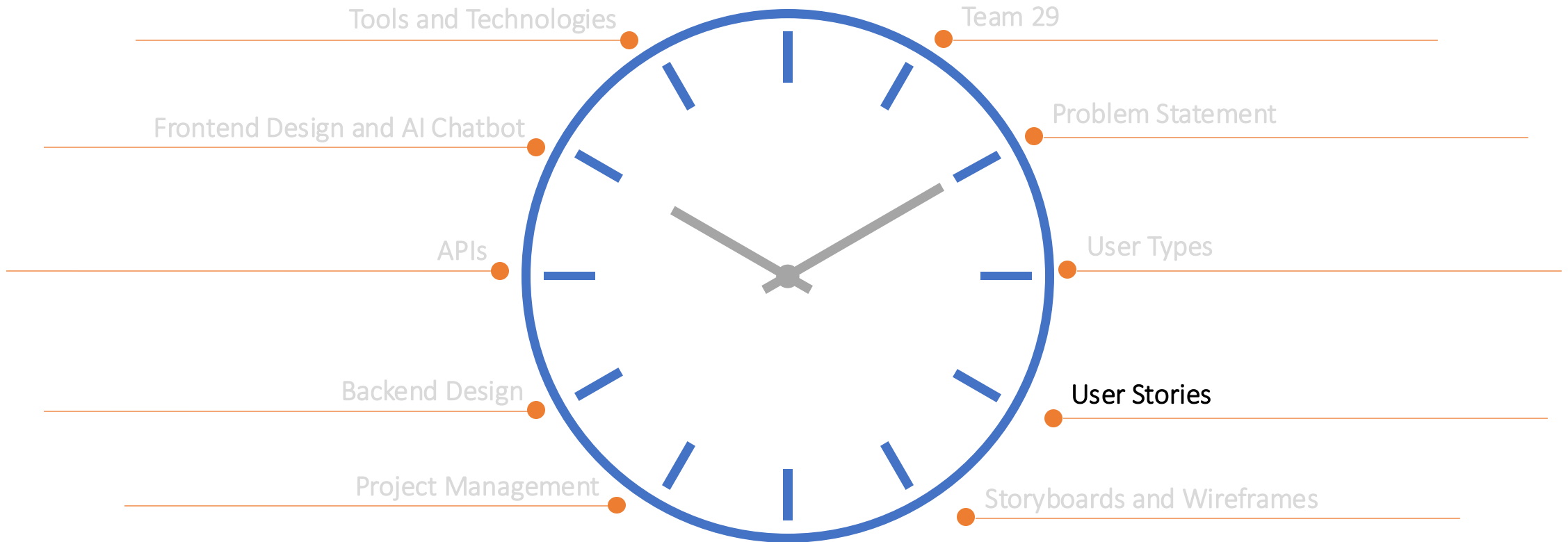
Faculty : Secondary Users

03



Admin : Tertiary Users

Moving forward,



User Stories

Students



Simplified sign in process integrated with institute id for easy accessibility.



Query response by chatbot retrieves pertinent information from course material and directs to relevant resources on the internet for further learning.



Summarize and save responses for future usage and reference.



Provide suggestions while coding and answering practice and graded assignments and to improve my programming skills.



I want the list of all questions asked in the term for revision and quiz preparation.



I want reminders of my upcoming submissions and deadline.

User Stories

Faculty



Assimilate the most queried topics to help prepare for live sessions and learner support.



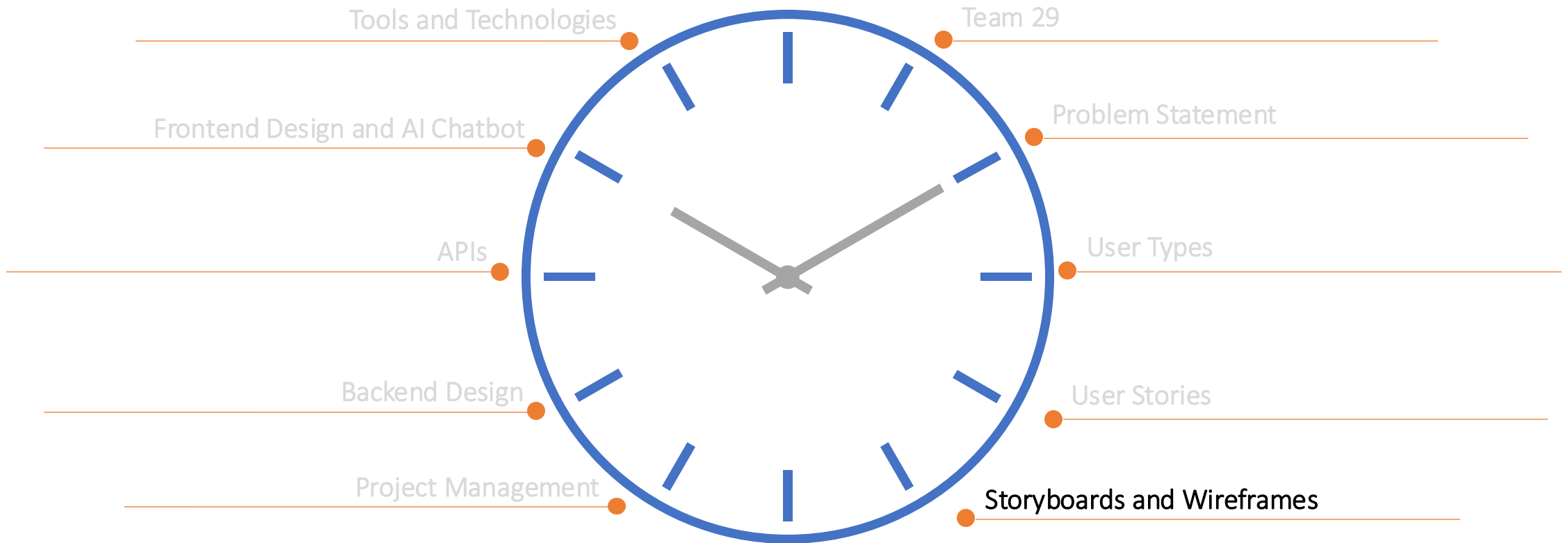
Identify the difficult and error inducing programming concepts for learning support.

Admin



Track students progress and performance, track performance to nudge learners.

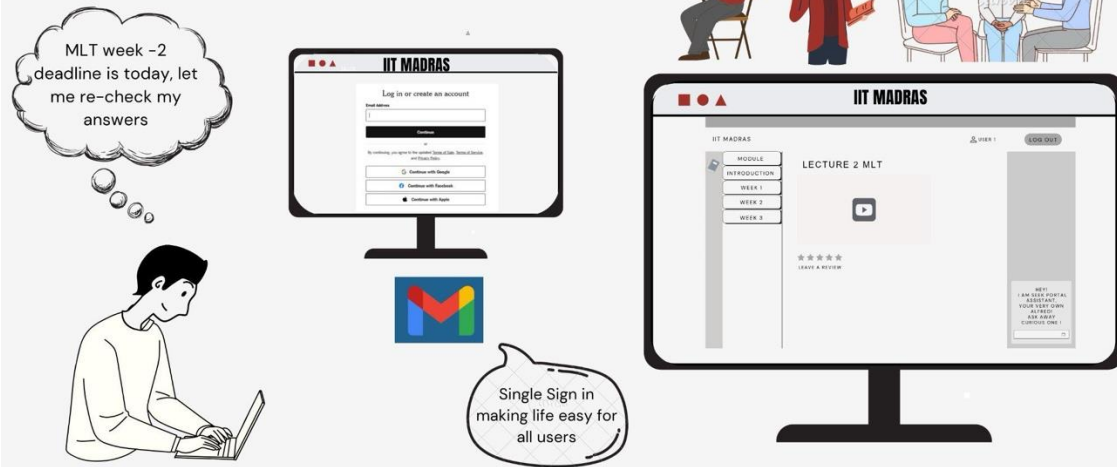
Next



Key Storyboards : Students, Faculty

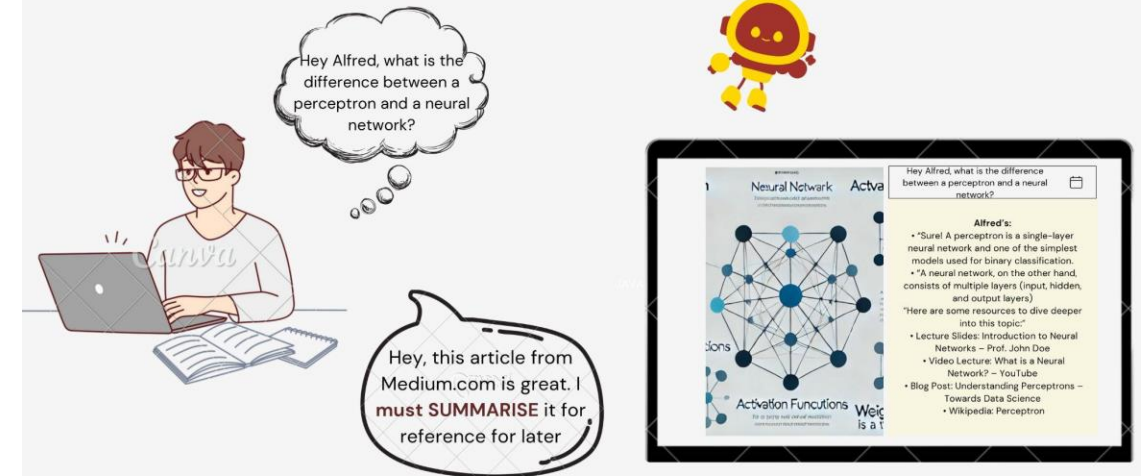
Easy, Secure Access

Student, Faculty and Admin



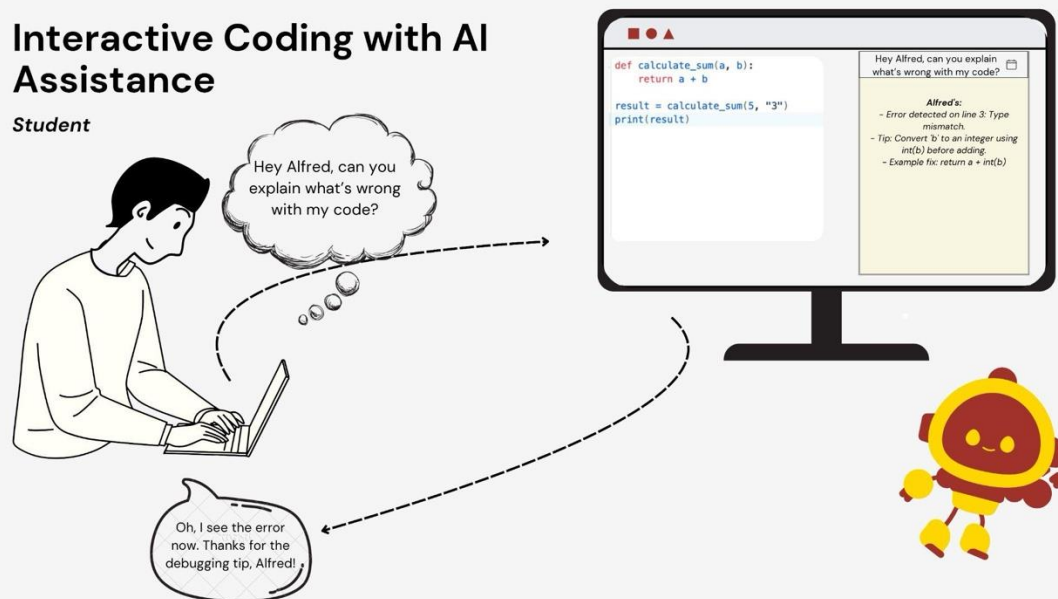
Knowledge Graph for a consolidate view

Student



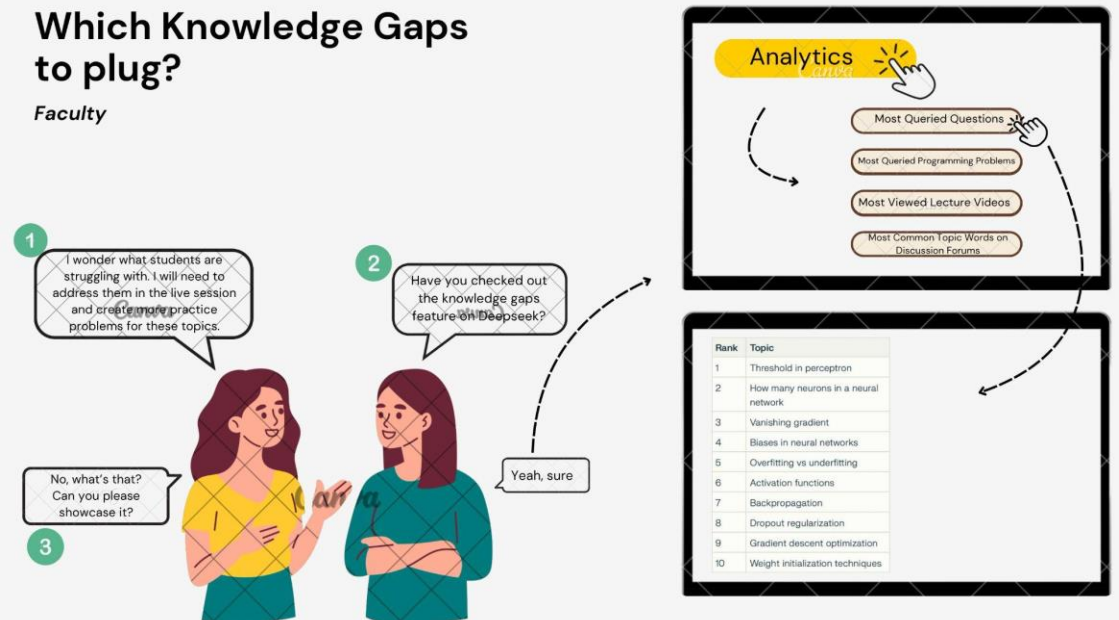
Interactive Coding with AI Assistance

Student



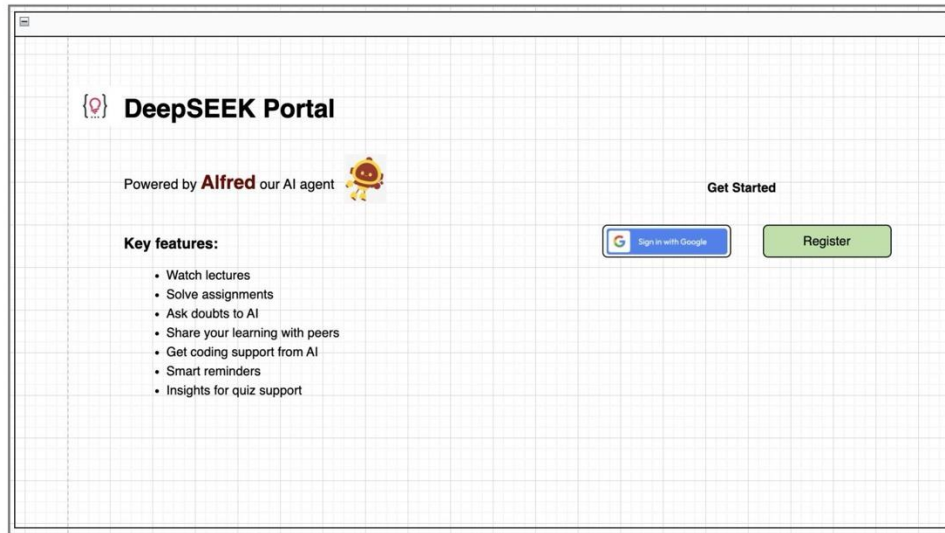
Which Knowledge Gaps to plug?

Faculty

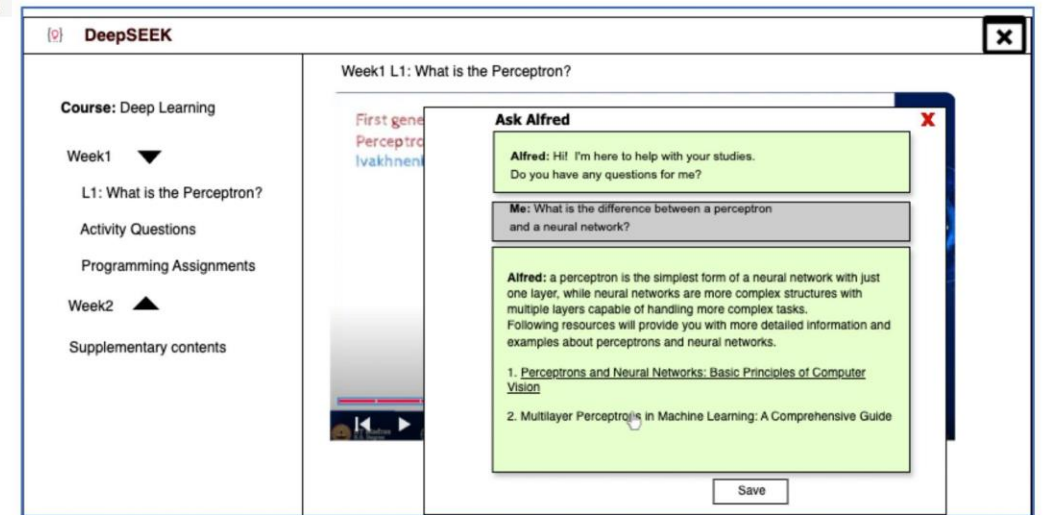


Wireframes

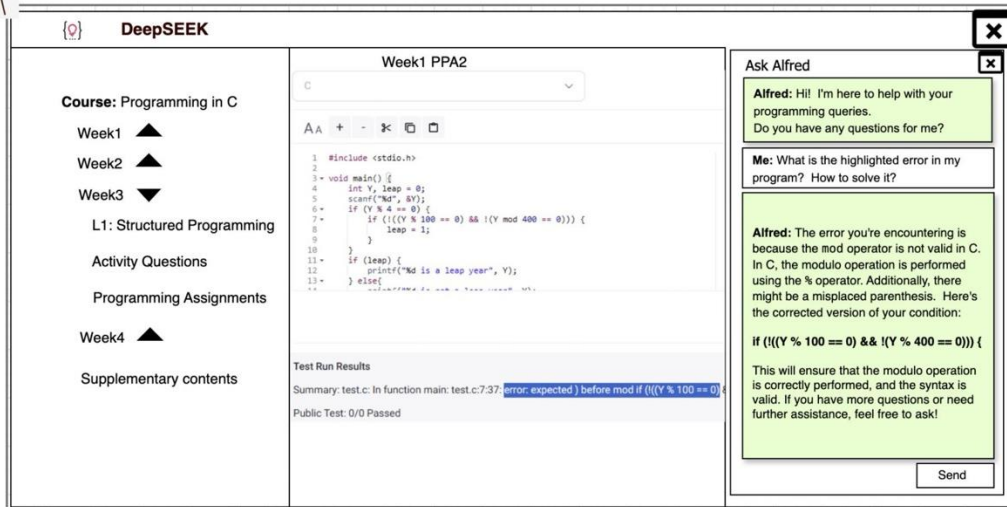
Single sign-on enabled registration and access



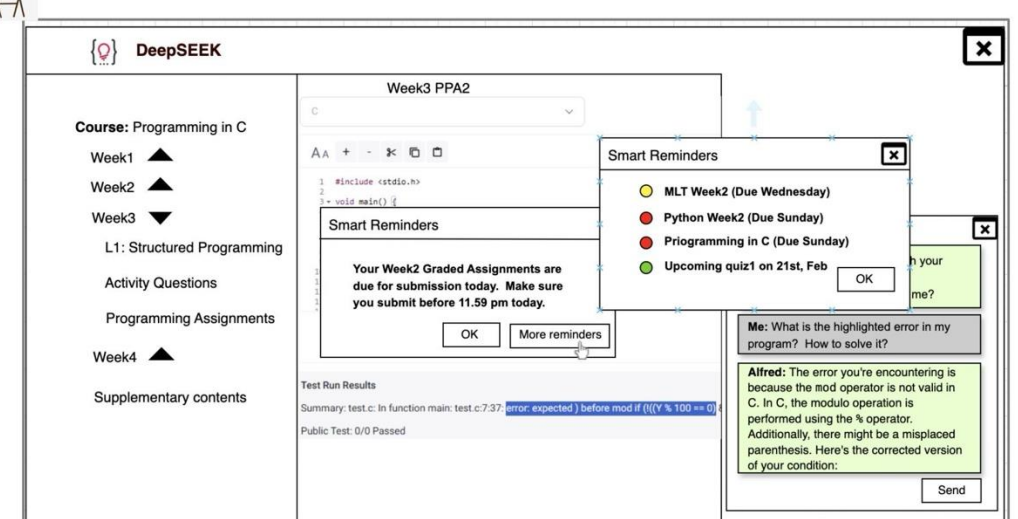
Question and answer, knowledge graph from AI chatbot - Alfred



Interactive coding and support from AI chatbot - Alfred



Smart reminders and notifications for students



Wireframes

Support for Quiz leveraging RAG content

 DeepSEEK Log Out

Quiz Master

Most Queried Topics

GA Mistakes

PYQ Topics

1. Perceptron

2. Sigmoid

3. Momentum

4. AdaGrade

5. Convergence

1. Week2 Q3

2. Week2 Q4

3. Week3 Q8

4. Week4 Q2


5. Week4 Q10

1. Update Rule


2. Momentum

3. Neurons In NN

Profile and complete access of resources

 DeepSEEK Log Out

Student Profile



John Doe

Program: BS Degree in Data Science and Application

Level: Diploma

DOB: dd/mm/yyyy

Course Registered: dd/mm/yyyy

Address: IIT Madras

Student Details

Course done


Grade Card

Documents

Payments

Quiz


Accessing and managing content for the Faculty

 DeepSEEK Log Out

Current Week : Week
23- 10 Feb 2025

Resources for Deep Learning T1 2025

No of students enrolled : 252



Faculty DL

Program: Lead Faculty for Deep Learning

Level: Degree

Email: faculty@email.com

Weekly content

Practice Assignments

Graded Assignments

Coding Assignments

Notes

Trending queries for Week 02

1. Perceptron threshold

2. AdaGrad


3. Sigmoid

4. Momentum

5. Convergence

Wireframes

Support for Quiz leveraging RAG content

 DeepSEEK Log Out

Quiz Master

Most Queried Topics

GA Mistakes

PYQ Topics

1. Perceptron

2. Sigmoid

3. Momentum

4. AdaGrade

5. Convergence

1. Week2 Q3

2. Week2 Q4

3. Week3 Q8

4. Week4 Q2


5. Week4 Q10

1. Update Rule


2. Momentum

3. Neurons In NN

Profile and complete access of resources

 DeepSEEK Log Out

Student Profile



John Doe

Program: BS Degree in Data Science and Application

Level: Diploma

DOB: dd/mm/yyyy

Course Registered: dd/mm/yyyy

Address: IIT Madras

Student Details

Course done


Grade Card

Documents

Payments

Quiz


Accessing and managing content for the Faculty

 DeepSEEK Log Out

Current Week : Week
23- 10 Feb 2025

Resources for Deep Learning T1 2025

No of students enrolled : 252



Faculty DL

Program: Lead Faculty for Deep Learning

Level: Degree

Email: faculty@email.com

Weekly content

Practice Assignments

Graded Assignments

Coding Assignments

Notes

Trending queries for Week 02

1. Perceptron threshold

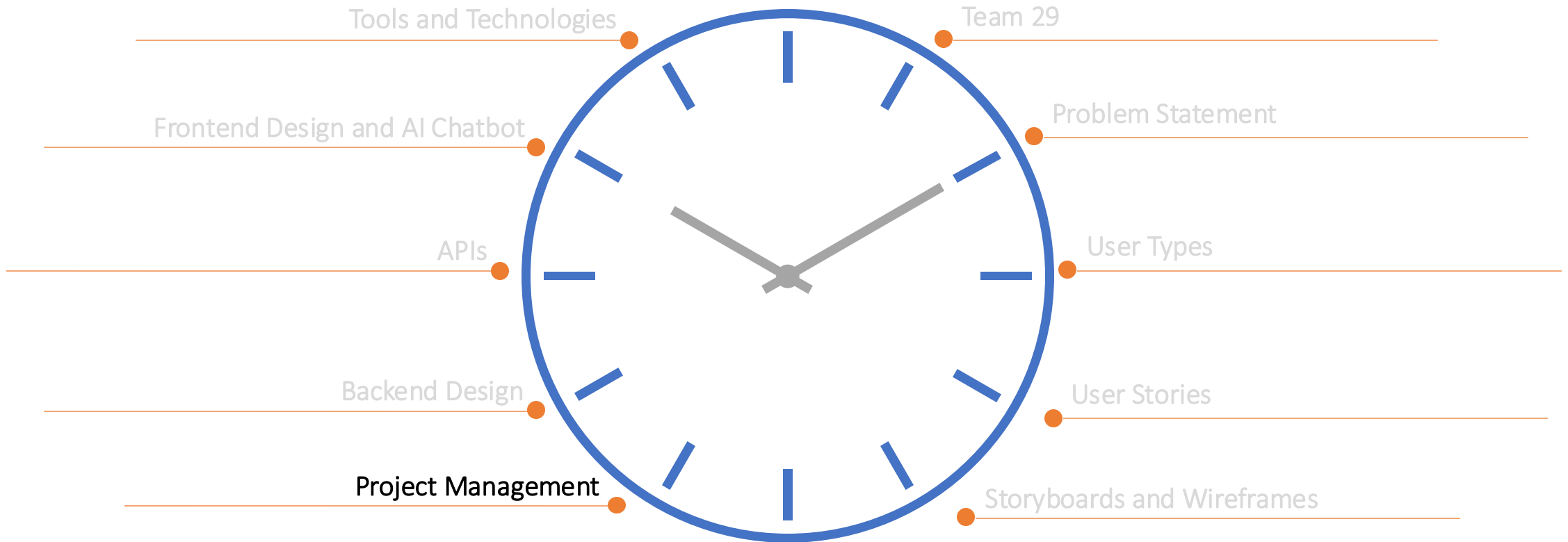
2. AdaGrad

3. Sigmoid

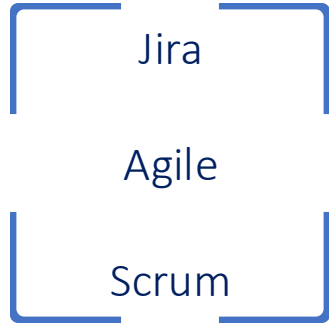
4. Momentum

5. Convergence

Moving forward,



Project Management



Jira was used for project management, planning and scheduling sprints.

Agile framework was leveraged.

Projects / DeepSEEK-Team-29

All sprints

A screenshot of a Jira project board for the project "DeepSEEK-Team-29". The board is titled "All sprints" and features a search bar and filters for "Epic" and "Sprint". The board is organized into three columns: "TO DO 10", "IN PROGRESS 5", and "DONE 8". Each column contains a list of tasks, each with a status label, a task ID, and an assignee icon. The tasks are grouped by sprint. The "TO DO" column lists tasks like "Q & A", "Summarization", "Hints/solutions for quiz", "Hints/solutions for coding", "Documentation", "Complete Milestone 04", "API Integration across the entire App", "API app end points testing", "API RAG end points testing", and "Milestone 05 report". The "IN PROGRESS" column lists tasks like "Quizzes", "Coding Assignments", "Github for software development", "Complete Milestone 03", and "API end points". The "DONE" column lists tasks like "Storyboarding", "Wireframes", "Complete Milestone 02 report", "User registration and login", "RBAC", "Course Enrolment", "Video player", and "Jira for Scum and Sprints".

Column	Task	Status	ID	Assignee
TO DO 10	Q & A	AI LEARNING ASSISTANT	DS-74	JT
	Summarization	AI LEARNING ASSISTANT	DS-75	JT
	Hints/solutions for quiz	AI POWERED QUIZ SUPPORT	DS-87	NK
	Hints/solutions for coding	AI POWERED CODING SUPPORT	DS-97	NK
	Documentation	API DEV (NON RAG)	DS-122	A
	Complete Milestone 04	API DEV (NON RAG)	DS-130	AI
	API Integration across the entire App	API INTEGRATION	DS-133	A
	API app end points testing	INTEGRATED TESTING	DS-137	AI
	API RAG end points testing	INTEGRATED TESTING	DS-138	AI
	Milestone 05 report	INTEGRATED TESTING	DS-139	AI
IN PROGRESS 5	Quizzes	LEARNING MANAGEMENT	DS-60	A
	Coding Assignments	LEARNING MANAGEMENT	DS-61	A
	Github for software development	PROJECT MANAGEMENT	DS-107	AV
	Complete Milestone 03	PROJECT MANAGEMENT	DS-117	AV
	API end points	API DEV (NON RAG)	DS-121	A
DONE 8	Storyboarding	USER INTERFACES AND WIREFRAMES	DS-20	G
	Wireframes	USER INTERFACES AND WIREFRAMES	DS-22	NK
	Complete Milestone 02 report	USER INTERFACES AND WIREFRAMES	DS-23	AV
	User registration and login	USER MANAGEMENT	DS-25	A
	RBAC	USER MANAGEMENT	DS-35	A
	Course Enrolment	COURSE MANAGEMENT	DS-54	A
	Video player	LEARNING MANAGEMENT	DS-59	A
	Jira for Scum and Sprints	PROJECT MANAGEMENT	DS-106	AV

Scrum and Sprints' Scheduling

Sprint 1 Scrum meetings minutes/details

Dates: 15 January, 2025 - 25 January, 2025

Team roles, User requirements and stories

Sprint 2 Scrum meetings minutes/details

Dates: 26 January, 2025 - 2 February, 2025

Story boards and Wireframes

Sprint 3 Scrum meetings minutes/details:

Dates: 3 February, 2025 - 9 February, 2025

Jira set up and milestone 3

Sprint 4 Scrum meetings minutes/details:

Dates: 10 February, 2025 - 18 February, 2025

UI components and Frontend development

Sprint 5 Scrum meetings minutes/details:

Dates: 19 February, 2025 - 28 February, 2025

Backend APIs

Sprint 6 Scrum meetings minutes/details:

Dates: 3 March, 2025 - 12 March, 2025

AI chatbot and RAG

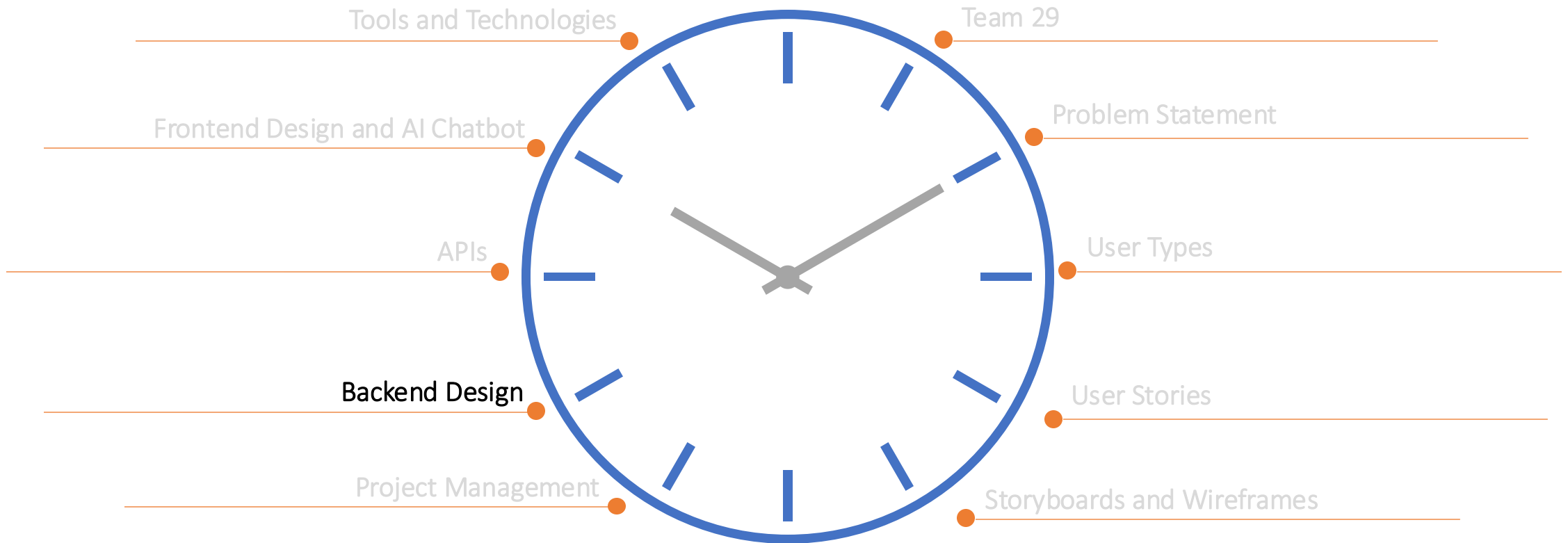
Sprint 7 Scrum meetings minutes/details:

Dates: 17 March, 2025 - 28 March, 2025

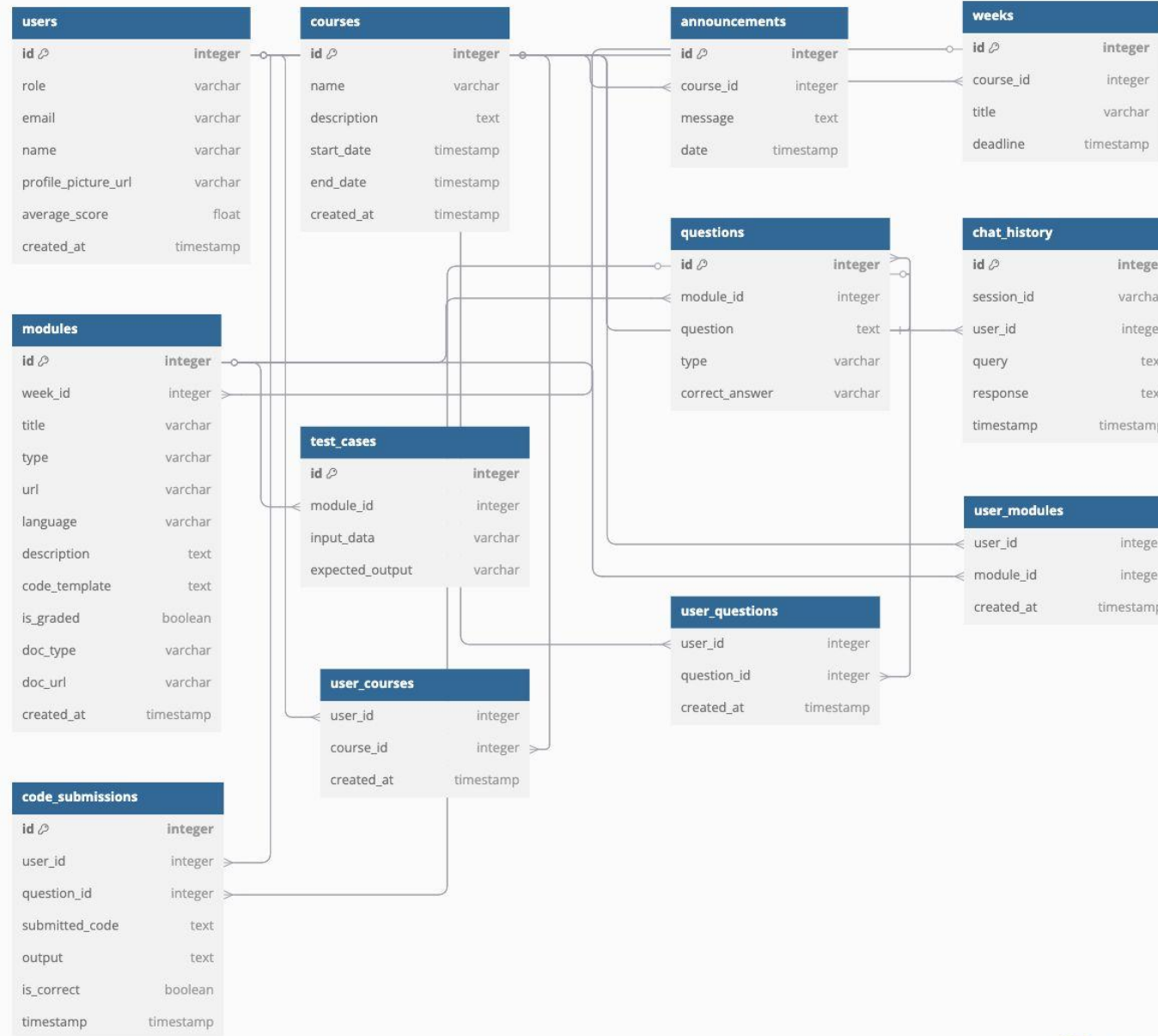
Integration and Testing



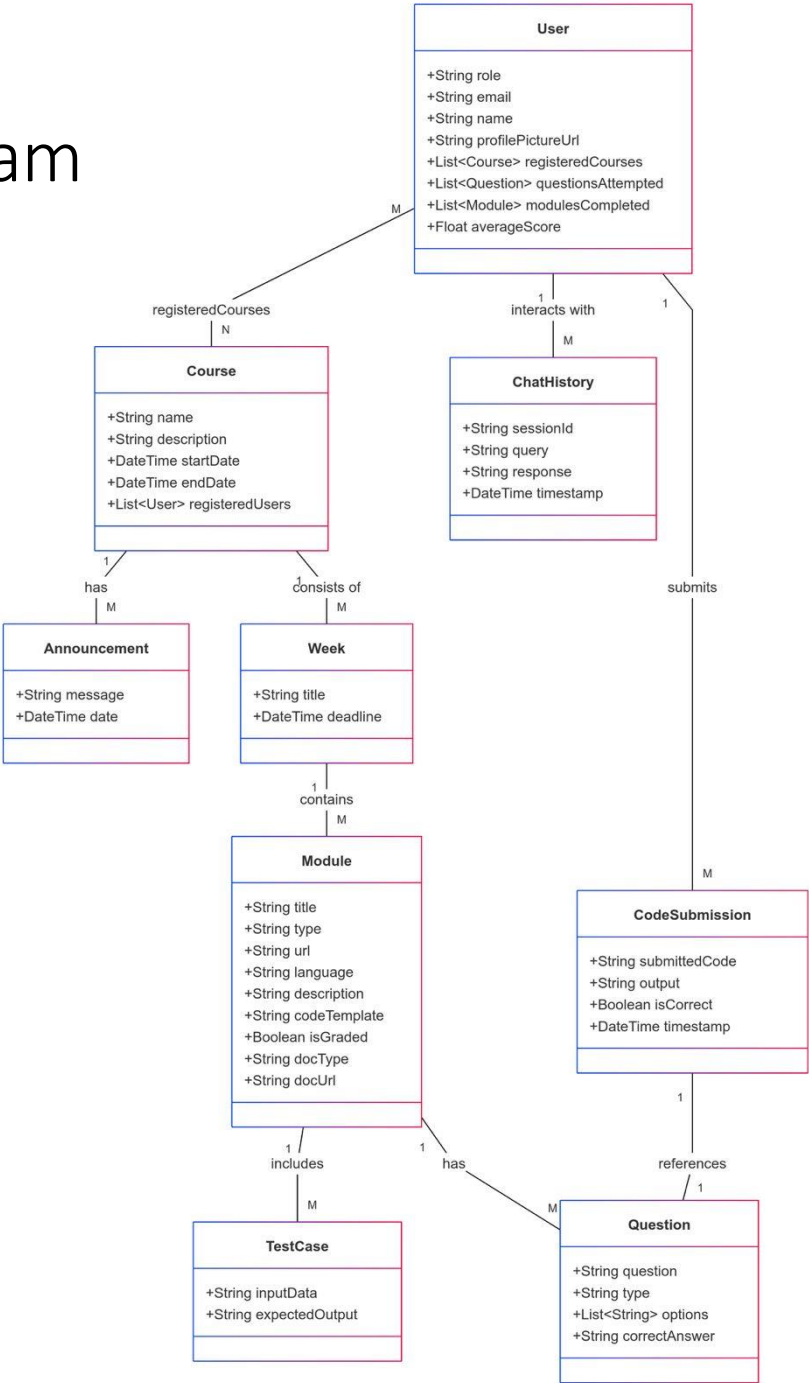
Next



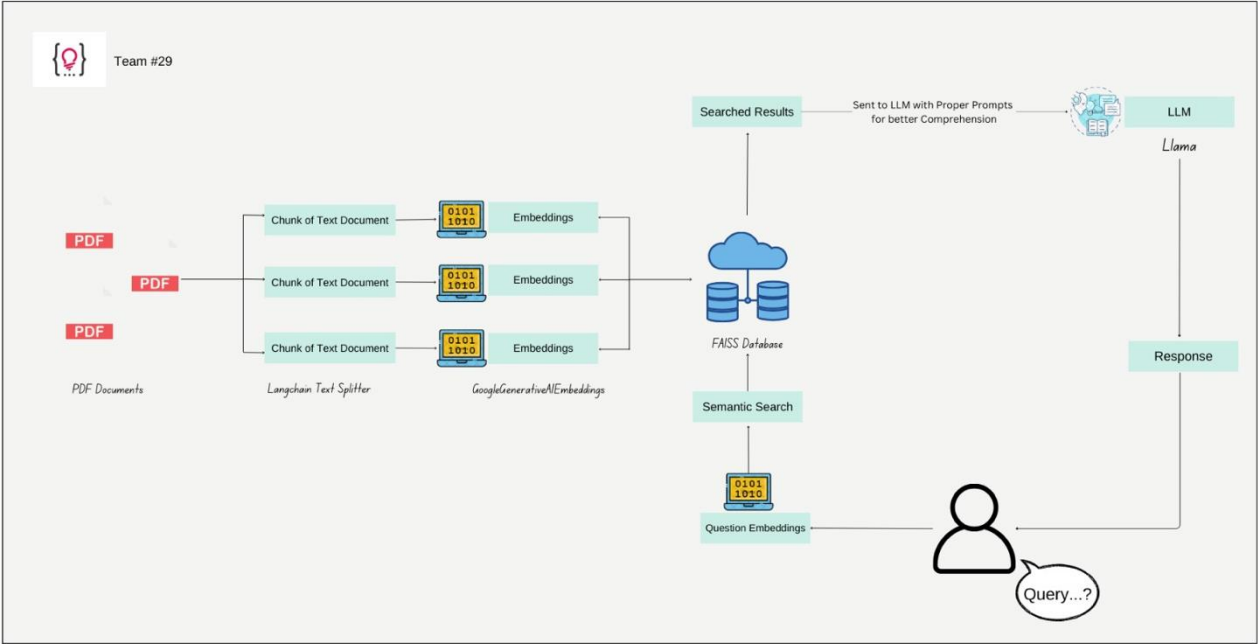
ER Diagram



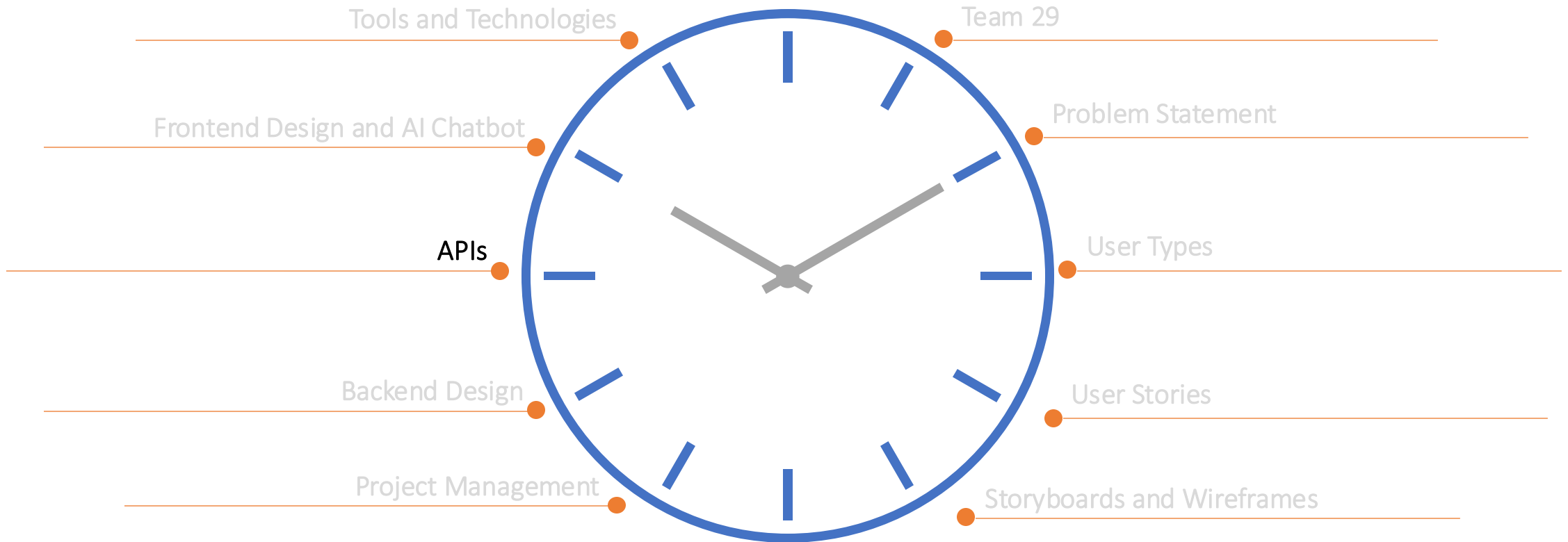
Class Diagram



RAG Architecture



Moving forward,



APIs

Authentication User login and session management

POST `/login` User login

Users Manage user data and statistics

GET `/users` Get all users

GET `/user/{userId}` Get user details

DELETE `/user/{userId}` Remove User Account

GET `/user-statistics/{userId}` Get user statistics

GET `/dashboard/user/questions` Get user's course-wise questions

Code Execution Execute code and test against test cases

POST `/run-code` Run code

POST `/admin-statistics` Submit and test code

POST `/debug/code` Debug code with AI assistance

Admin Admin-specific statistics and operations

GET `/admin-statistics` Get admin statistics

POST `/top-questions` Get top questions by topic

Courses Manage courses, modules, and announcements

GET `/courses` Get all courses

GET `/course/{courseId}` Get course details

GET `/registered-courses` Get registered courses

POST `/registered-courses` Register courses

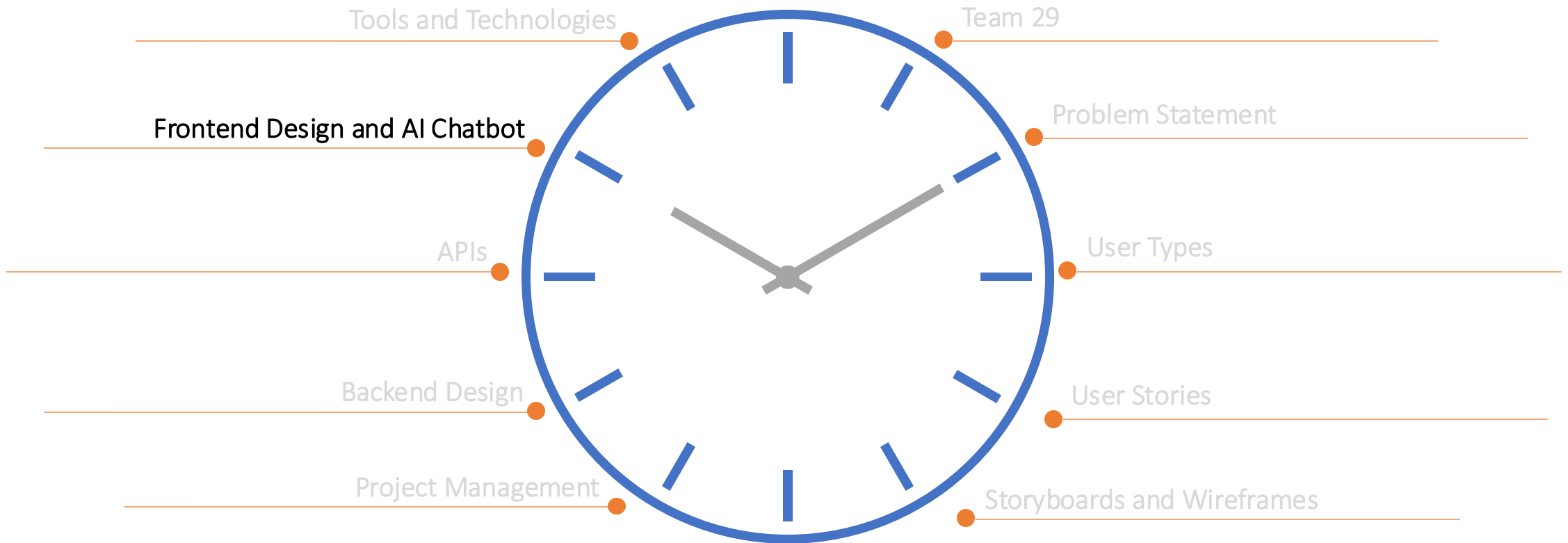
Transcripts Fetch and manage YouTube video transcripts

GET `/video-transcript` Fetch video transcript

Chatbot Interact with the chatbot and manage chat history

POST `/chatbot` Chatbot interaction

Next



Frontend and AI Chatbot

DeepSEEK

Problem Solving and Data Structures Algorithms (PDSA)

Week 1: Python Recap and Sorting Algorithms

Week 2: Searching and Sorting Algorithms

Week 3: Trees and Graphs

Week 4: Dynamic Programming

Week 5: Greedy Algorithms

Week 6: Advanced Topics

Announcements

Welcome to Problem Solving and Data Structures Algorithms (PDSA)! Let's build strong coding fundamentals together.

Week -1 Course Orientation materials are now available. Please review the syllabus and setup your development environment.

1.2 – Python Recap-2 - Video

W1L4_Python Recap - II

IIT MADRAS

ONLINE

DEGREE

PROGRAMME

0:01 / 10:02

Intro

Hide Transcript

So, let us continue with our recap of python by looking at another example, first we looked at gcd, now let us look at the problem of dealing with prime numbers. So, we would like to check primality, so remember that a prime number is 1 that is divisible only by 1 and itself, it has no proper divisors other than 1 and itself, so prime number has exactly 2 prime factors, a prime 2 factors 1 and n and it has $(1)(n/2)$ or 2, so it is not enough to have only 1 factor so if you look at 1, the number 1, it has only 1 factor namely 1 because it is itself 1. So, we need two different factors 1 and n so technically speaking 1 is not a prime the smallest prime as you should know is 2. So, one way to check whether a number is prime is to compute the list of factors of that number and then check whether that list of factors contains exactly 1 and n. So, the list of factors of a number is very similar to the 100 that we wrote in.

About Us

Course

Dashboard

Logout

Alfred: AI Assistant

Clear Chat

Hi! How can I assist you today?

What is Classification?

What is Classification?

Response

Classification is a type of supervised learning algorithm in machine learning that involves predicting a categorical label or class that an instance belongs to, based on its features. It is a fundamental problem in machine learning, where the goal is to assign a label or class to an input instance from a fixed set of categories. The algorithm learns from a training dataset, which consists of input instances and their corresponding labels, to develop a model that can predict the label of new, unseen instances. In classification, the output variable is categorical, meaning it can take on one of a finite number of discrete values. For example, in a spam vs. non-spam email classification problem, the output variable can take on two values: "spam" or "non-spam". The input variables, on the other hand, can be continuous or categorical. The classification algorithm works by learning the relationships between the input features and the output label from the training data. The learned model can then be used to predict the label of new instances. Common classification algorithms include logistic regression, decision trees, random forests, and support vector machines. The loss function used in classification problems is often the 0-1 loss function, which measures the fraction of misclassified instances. The goal of the algorithm is to minimize this loss function, which means maximizing the accuracy of the predictions. Classification has numerous applications in real-world problems, such as image classification, sentiment analysis, and medical diagnosis.

External Resources

Classification in Machine Learning Supervised Learning

Type a message...

PDF

Share

DeepSEEK

Problem Solving and Data Structures Algorithms (PDSA)

Week 1: Python Recap and Sorting Algorithms

Week 2: Searching and Sorting Algorithms

Week 3: Trees and Graphs

Week 4: Dynamic Programming

Week 5: Greedy Algorithms

Week 6: Advanced Topics

Graded Programming: Goldbach's Conjecture

Deadline: No deadline provided

Write a function to find prime pairs that sum to an even number.

1 def prime(n):

2 if n < 2:

3 return False

4 for i in range(2, n//2 + 1):

5 if n % i == 0:

6 return False

7 return True

8

9 def Goldbach(n):

10 Res = []

11 for i in range(n//2 + 1):

12 if prime(i) == True:

13 if prime(n - i) == True:

14 Res.append((i, n - i))

15 return Res

16

17 n = int(input())

18 print(Goldbach(n))

Hint: Try breaking the problem into checking prime numbers and finding pairs.

The provided code has an issue in the Goldbach function where it only checks up to 'n/2' for prime pairs, it should check up to 'n'. The corrected code should iterate over a range that covers all possible pairs of primes that sum to 'n', not just up to 'n/2'.

Test Cases: 2/2 passed

Input	Expected Output	Actual Output
12	[[5, 7]]	[[5, 7]]
26	[[3, 23], (7, 19), (13, 13)]	[[3, 23], (7, 19), (13, 13)]

Alfred: AI Assistant

Clear Chat

Hi! How can I assist you today?

What is Merge Sort?

Merge sort is a popular sorting algorithm that uses a divide-and-conquer approach to sort lists of elements. Here are the key points about merge sort:

It works by dividing the input list into two halves, sorting each half recursively, and then merging the two sorted halves.

The base case for the recursion is when the list has one or zero elements, in which case it is already sorted.

The merge step takes two sorted lists and combines them into a single sorted list.

Merge sort has a time complexity of $O(n \log n)$ and is suitable for large datasets.

You can learn more about merge sort on Google or check out the Merge Sort Wikipedia page for a detailed explanation.

Since the question is closely related to a programming concept, here's a one-line hint for a similar practice question: "Think about how recursive division and merging of sublists can be used to sort a list of elements."

Type

Submission successful

Your code has been submitted successfully.

About Us

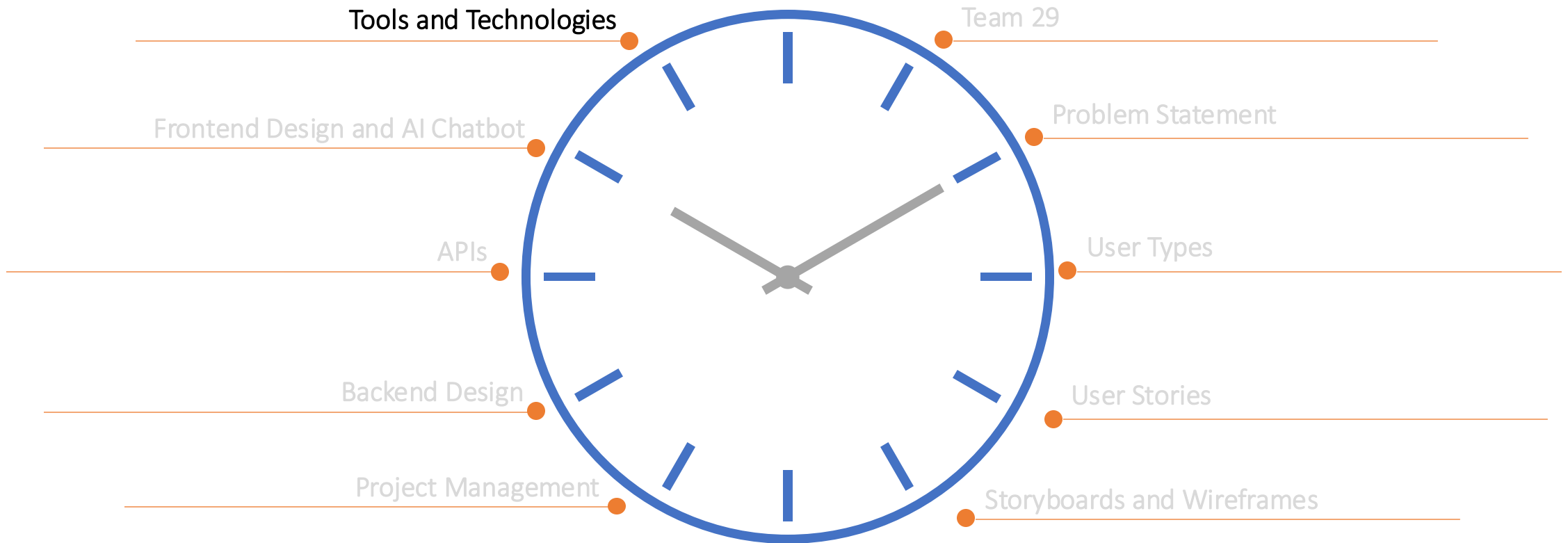
Course

Dashboard

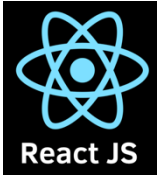
Logout

© 2025 DeepSEEK. All rights reserved.

Finally



Technologies, frameworks, libraries and tools



Library / Framework / Tool/ Model	Application area
Vercel, Render	Hosting, CI
React JS, Router, TypeScript, TailwindCSS, ShadCN, Vite	Application Frontend
Python	Core programming
Flask	Application Backend
MongoDB	Databasing
PyMongo and MongoEngine (ODM)	Database Connectivity
FAISS, FastAPI	RAG database
Flask RESTful	Application Interface
Google SSO (Google OAuth)	Authentication, Security, Access
Swagger API Editor	API Documentation
Langchain	AI Chatbot
Llama (llama-3.3-70b-versatile)	Language Model
Postman	Manual Testing
Pytest	Automated Testing
GitHub Code Review , Issue reporting and Issue tracking	Versioning and Development
Jira	Productivity
Canva, draw.io	UML

For questions and
suggestions :

TEAM 29



21f3002975@ds.study.iitm.ac.in

