



Kudzu

Course Community Website Application

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Outlines

- Introduction
- UX/UI
- Website Architecture
- Frontend Development
- Backend Development
- Artificial Intelligent
- Conclusion & Future Work

Introduction

- ▶ This project aims to develop education and society by preserving the accumulated efforts of students over the years. When a course is taught for several years, we should strive to maintain the students' efforts, discussions, and research, allowing new students to benefit from the work of their predecessors.
- This prevents the need to reinvent the wheel and start from scratch.



By voting on questions and suggestions, we can harness the power of the community to focus on what is mark able, interesting, and important. Data analysis and the average evaluation of questions, made available to students and lecturers, can better highlight areas needing improvement.



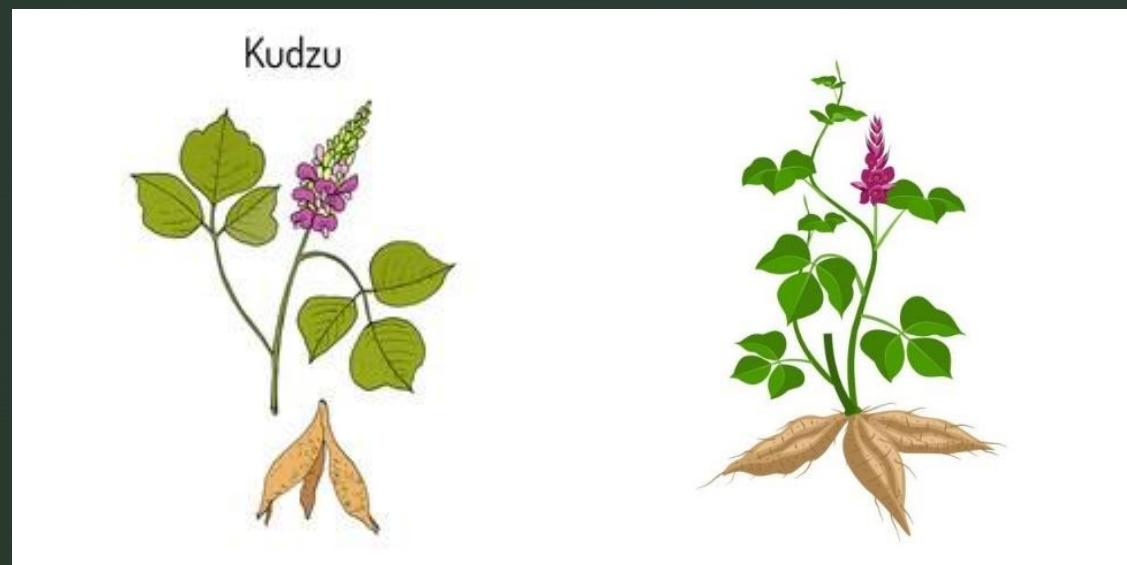


A vibrant illustration of a city skyline at sunset. The sky is filled with fluffy white clouds, a blue and white striped hot air balloon, and several birds in flight. In the foreground, there's a green grassy field with small trees. The city buildings are stylized with vertical stripes in shades of blue, grey, and teal.

UX / UI

■ Why We Named Our Website Kudzu

- From the Plant Called Kudzu we Inspired :
- The Power of Connection
- Rapid Growth and Knowledge Sharing
- Resilience and Adaptability
- A Source of Inspiration



Kudzu Plant



Kudzu Website Logo





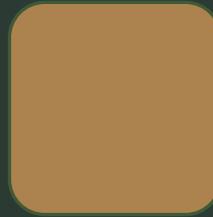
Kudzu Colors We Used



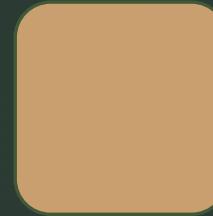
#9f1f6a



#3c8011



#ad8554



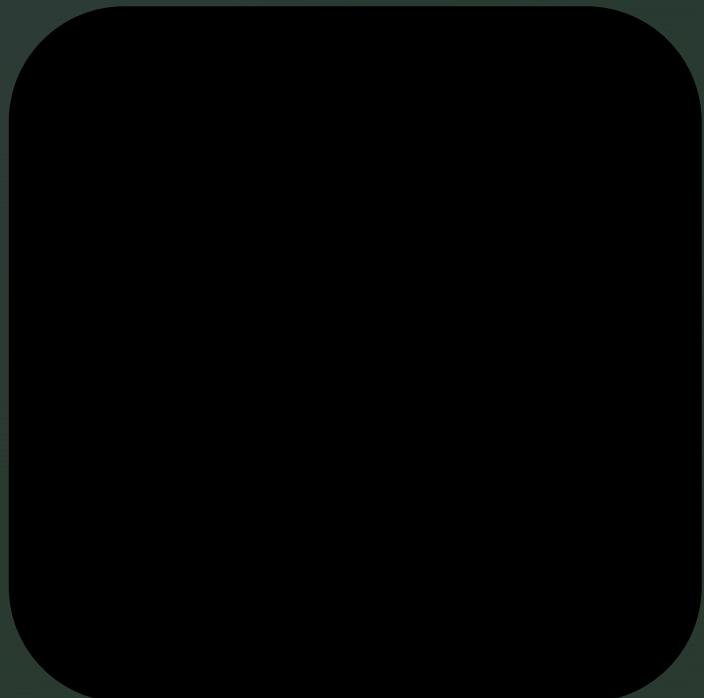
#c8a36e



#e8c291



Kudzu Colors For Typograph



#000000



#3c8011



Kudzu Colors For Website background



#e6e6e6



The Tools We Used

For The Logo



The Tools We Used

For The Website



The Tools We Used

For ColorsMatchin



Website Architecture

- **Three-tier architecture is a well-established software design pattern that divides an application into three distinct layers**

1. Presentation Tier (Client Tier)

- This is the user interface layer where users interact with the application.
- It is responsible for displaying data to the user and sending user inputs to the server.
- Examples include web browsers, mobile apps, and desktop applications.

- **Three-tier architecture is a well-established software design pattern that divides an application into three distinct layers**

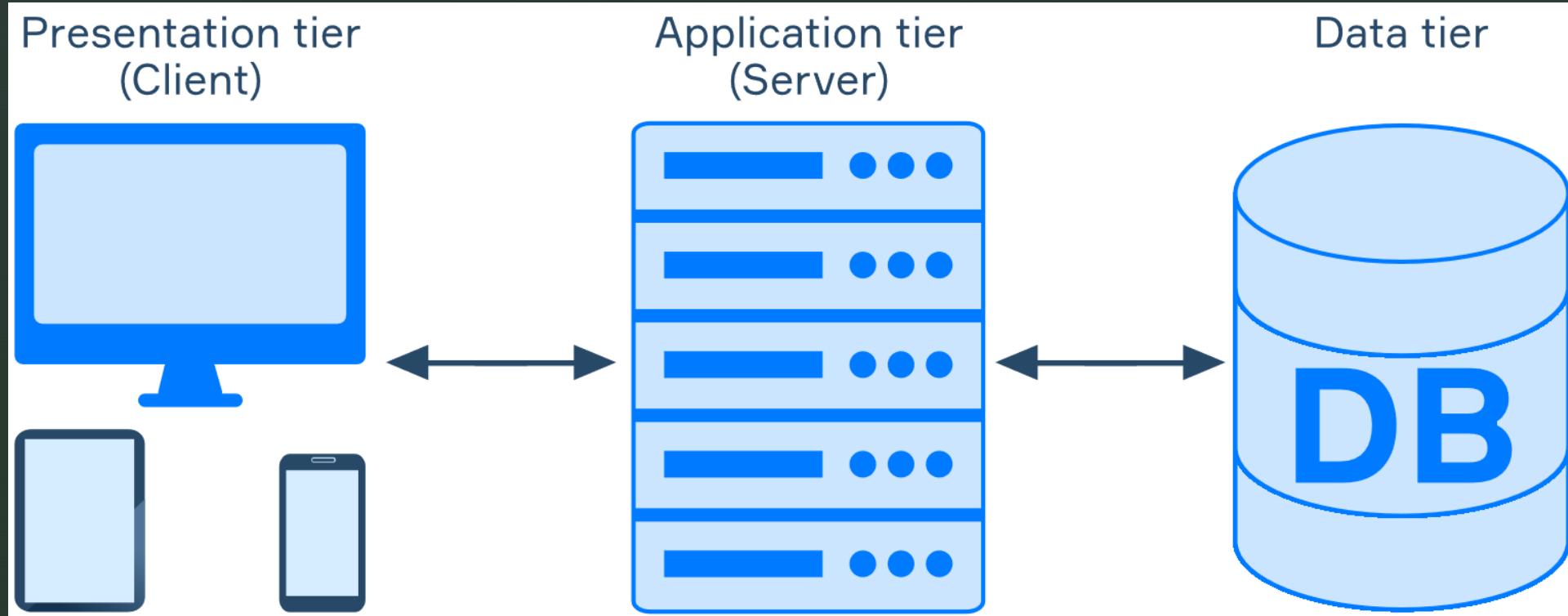
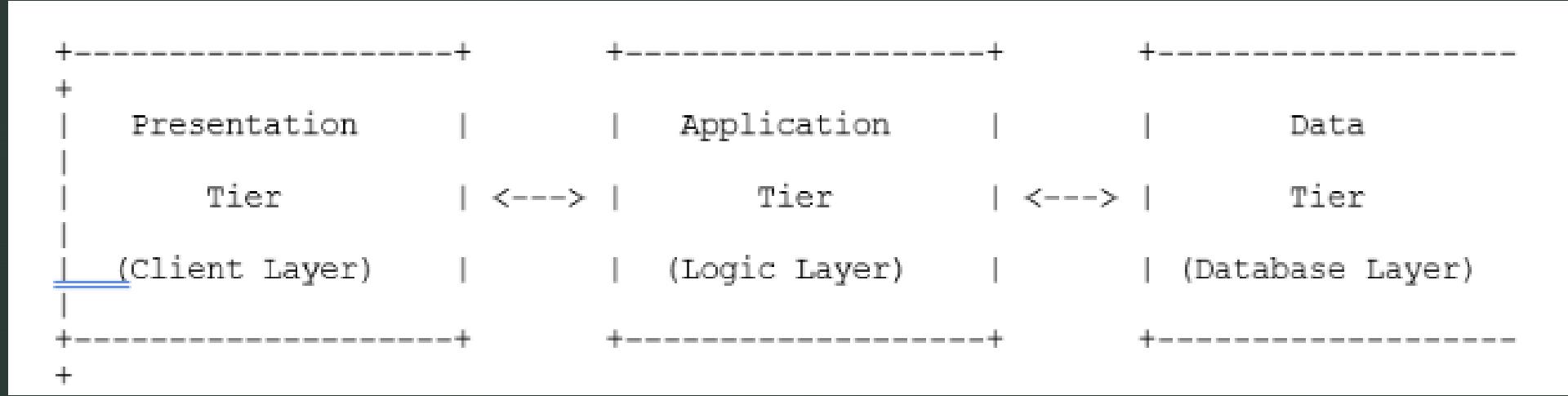
2. Application Tier (Logic Tier, Business Logic Tier, or Middle Tier)

- This layer contains the business logic and rules of the application.
- It processes user requests, performs calculations, and makes logical decisions.
- It acts as an intermediary between the presentation tier and the data tier.
- Examples include web servers, application servers, and API endpoints.

- **Three-tier architecture is a well-established software design pattern that divides an application into three distinct layers**

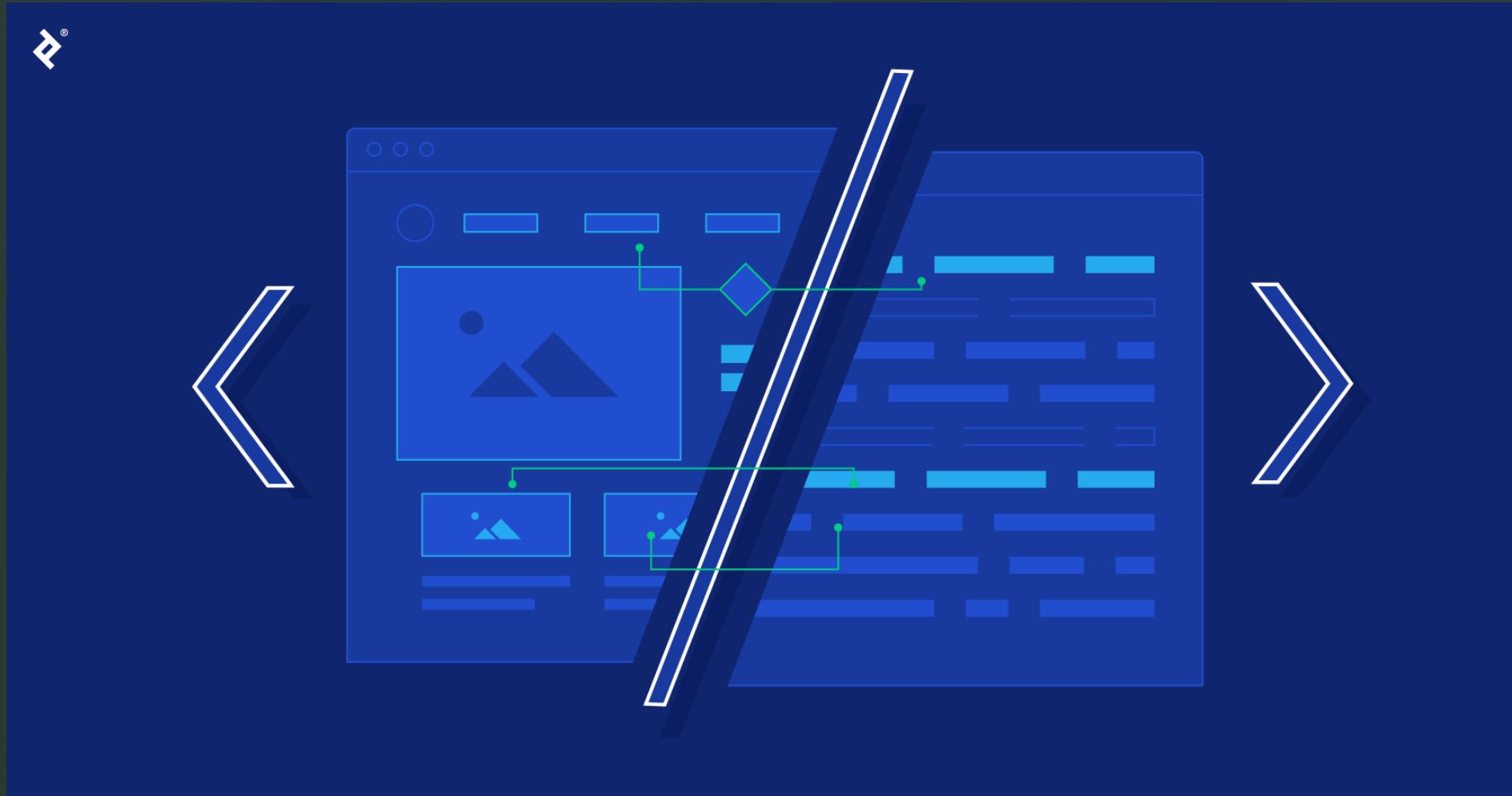
3. Data Tier (Database Tier)

- This layer is responsible for data storage and management.
- It stores data in databases and retrieves or saves data as requested by the application tier.
- Examples include SQL databases, NoSQL databases, and data warehouses.



Frontend Development

Tailwind CSS and React



- **What is Tailwind CSS ?**
- Tailwind CSS is a utility-first CSS framework designed to enable developers to build custom user interfaces quickly and efficiently. Unlike traditional CSS frameworks that provide
- predefined components (like Bootstrap), Tailwind focuses on utility classes that can be composed to create any design directly in the HTML.

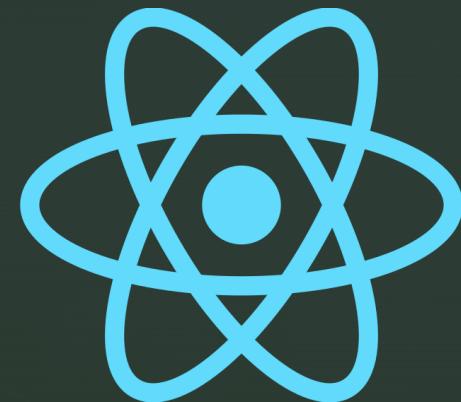


Tailwind CSS

- Why use Tailwind CSS ?
 - Because This makes designing quicker and simpler. Working with Tailwind CSS a more
 - direct approach to styling. Instead of moving between HTML files and separate CSS stylesheets, developers can apply styles right within the HTML. Tailwind CSS isn't tied to a specific JavaScript framework.

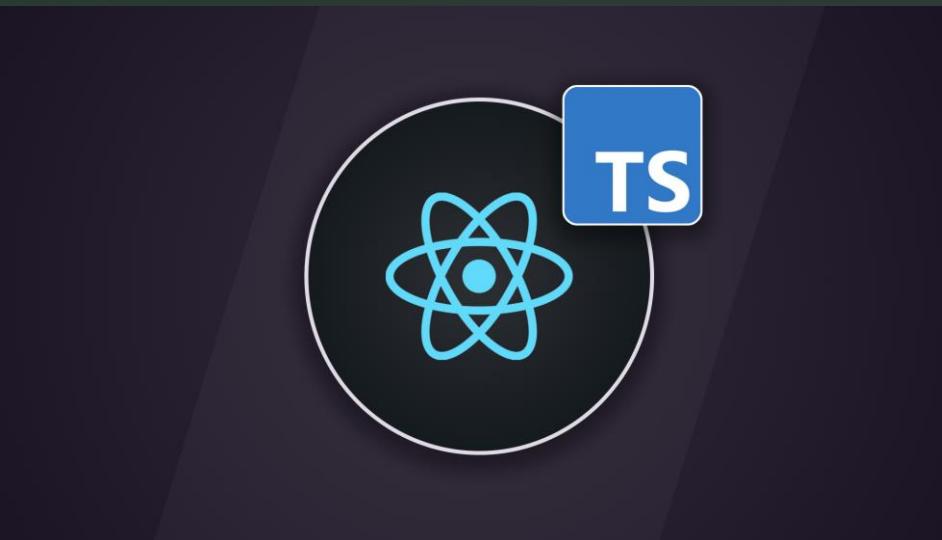


- **What is React ?**
- React: A JavaScript library for building user interfaces, particularly single-page applications, maintained by Facebook



■ Why use React TS ?

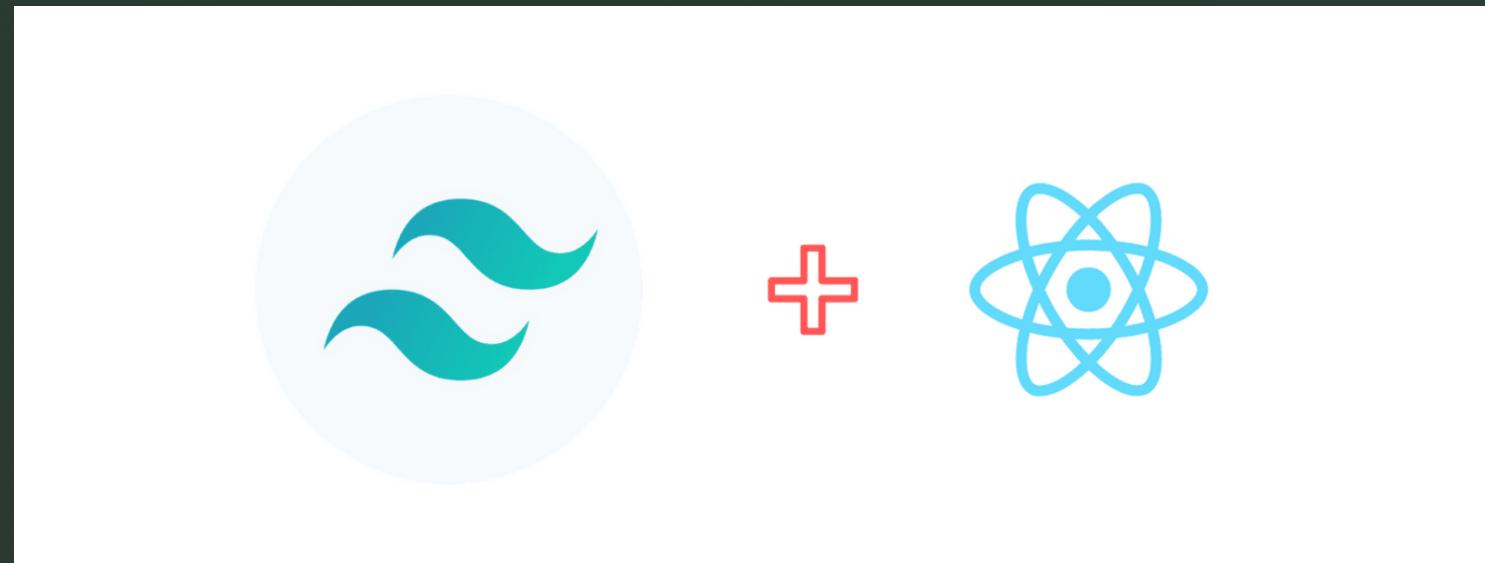
- Statically typed, meaning types are checked at compile time.
- Reduces the likelihood of runtime errors by catching type-related errors during development



Why we use React with Tailwind ?

Tailwind CSS is a utility-first CSS framework that enables developers to quickly build modern and responsive user interfaces.

When combined with React.js, a popular JavaScript library for building user interfaces, **the two technologies synergize to streamline the development process.**



Home Page

KUDZU

Search

Login

The Power of Learning with Community

At any given moment, someone struggles with the same problems you have. And, chances are, someone else has already solved your problem.

Get started

- Computer Science

See more →



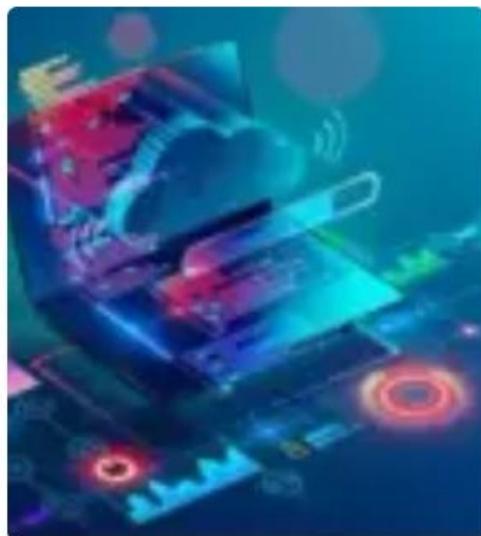
Categories

- **Computer Science**

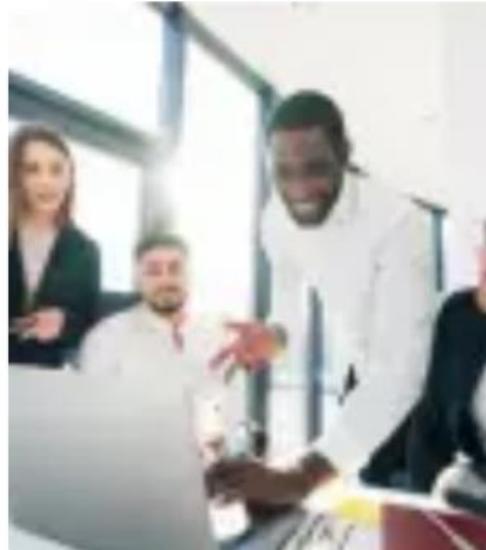
[See more →](#)



CS50's Introduction to Computer Science



Full Stack Application Development



DevOps and Software Engineering



Algorithms and Data Structures

- **Civil Engineering**

[See more →](#)



<https://kudzu.site/courses/1>



Categories



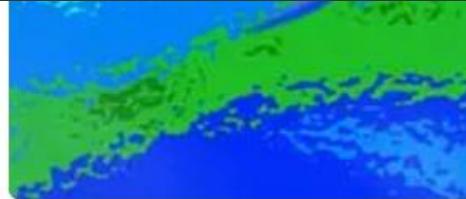
PurdueX: Stability and Design of Structural Frames



UMD, USMx: The Industry and Profession in Construction Management



PennX: Urban Transit for Livable Cities



DelftX: Introduction to Water and Climate

- **Browse Courses by Universities**

[See more →](#)



Tanta University



Cairo University



Alexandria University



MSA University

Login Page

Login

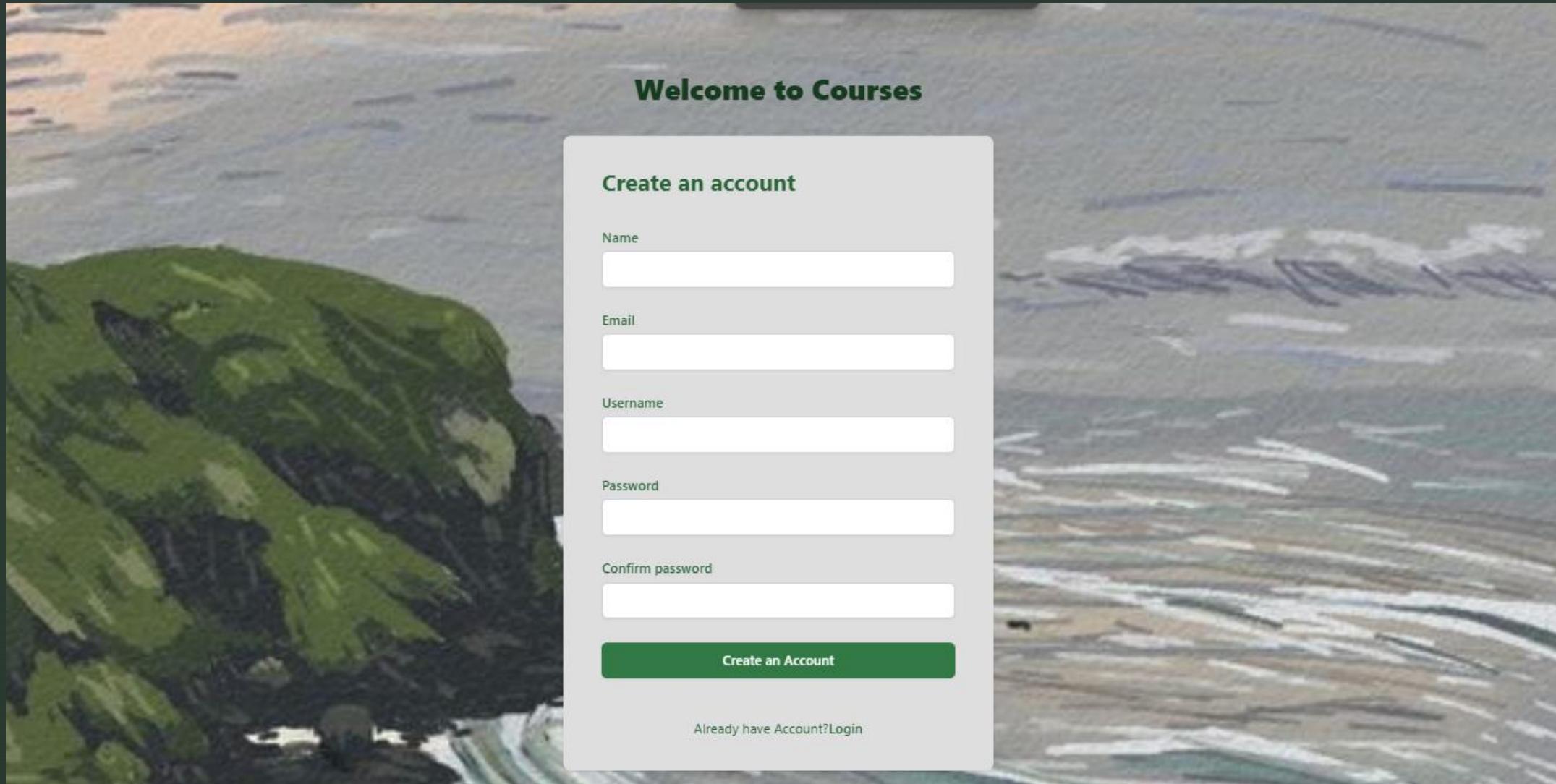
If you already a member, easily log in now.

 Username Password

 OR

[Login with Google](#)[Forgot Password?](#)[Not a member? Create account](#)

Create an Account Page



Community Board

KUDZU

Search

Login

Algorithms

Questions Posts Assignments Resources Members

Existing Modules

-

Create Module

Ask question

POPULAR COMMUNITIES

- 2024
- All
- 2023
- 2022

See more

Create Module

KUDZU

Search

Login

Algorithms

Questions Posts Assignments Resources Members

Existing Modules

Create Module

Create Module

• Algorithms

Module name
Add Name

Description
Add Description

Submit

POPULAR COMMUNITIES

- 2024
- All
- 2023
- 2022

See more

The image shows a screenshot of a web application interface. At the top, there's a dark header with the word "KUDZU" in yellow on the left, a search bar in the center, and a "Login" button on the right. Below the header is a light gray navigation bar with links for "Questions", "Posts", "Assignments", "Resources", and "Members". The main content area has a light gray background. On the left, there's a sidebar with a heading "Existing Modules" and a green "Create Module" button. The central part of the screen displays a "Create Module" form with a blue gradient background. It features a title "Algorithms", a "Module name" field with placeholder "Add Name", a "Description" field with placeholder "Add Description", and a large green "Submit" button at the bottom. To the right of the main content is a sidebar titled "POPULAR COMMUNITIES" with a list of years: 2024, All, 2023, and 2022, each preceded by a small circular icon. At the bottom right of this sidebar is a green "See more" button.

Asking Question

The image shows a screenshot of a KUDZU platform interface. At the top, there is a navigation bar with a search bar containing the text "Search". On the right side of the bar are "Login" and "Logout" buttons. Below the navigation bar, the title "Algorithms" is displayed next to a small icon. The main content area features a navigation menu with tabs: "Questions" (which is underlined, indicating it is the active tab), "Posts", "Assignments", "Resources", and "Members". A central modal window is open, titled "Ask question". It contains a large input field for the question text. Below this field is a green button labeled "Is it a multiple choice question?". At the bottom of the modal is a green "Submit" button. To the left of the main content area, there is a sidebar with a section titled "Existing Modules" and a "Create Module" button. To the right, there is a sidebar titled "POPULAR COMMUNITIES" which lists "2024", "All", "2023", and "2022", each associated with a small circular icon. At the bottom right of the sidebar is a "See more" button.

Assignment Page

KUDZU  Search Login

Algorithms

Questions Posts Assignments Resources Members

Existing Modules

-

Create Module

Create Assignment

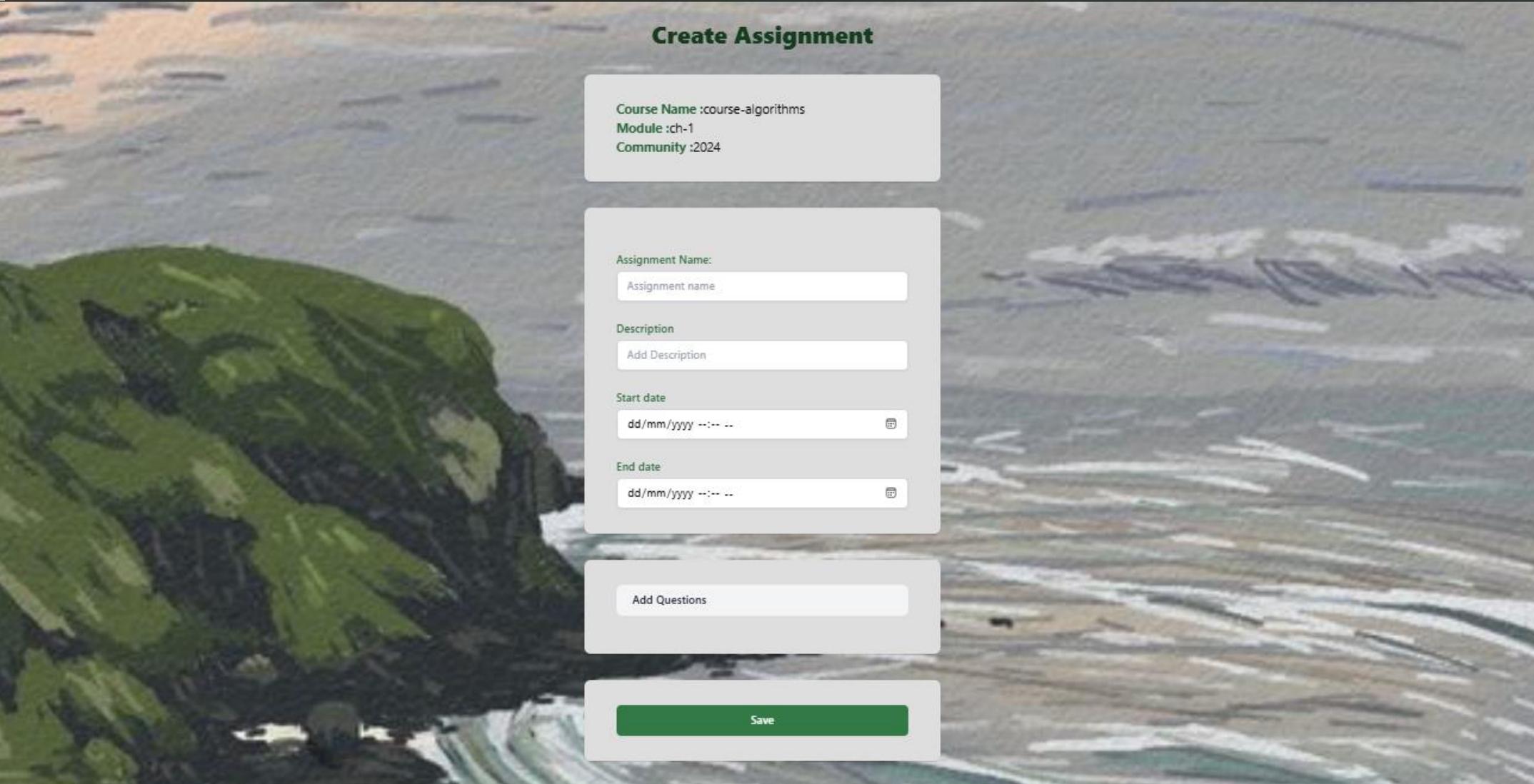
Assignment 1
Assignment 1 description
10 questions
(80 / 100) students turned in
Ended

POPULAR COMMUNITIES

- 2024
- All
- 2023
- 2022

See more

Creating Assignment



Create Assignment

Course Name :course-algorithms
Module :ch-1
Community :2024

Assignment Name:

Description

Start date

End date

Add Questions

Resources Page

KUDZU Login

Algorithms

Questions Posts Assignments Resources Members

Existing Modules

-

Create Module

Lecture 1 description [Download](#)

Lecture 2 description [Download](#)

Lecture 3 description [Download](#)

Lecture 4 description [Download](#)

POPULAR COMMUNITIES

- 2024
- All
- 2023
- 2022

[See more](#)

Members Page

KUDZU

Search

Login

Algorithms

Questions Posts Assignments Resources Members

Existing Modules

-

Create Module

	Calvin Hawkins calvin.hawkins@example.com
	Kristen Ramos kristen.ramos@example.com
	Ted Fox ted.fox@example.com

POPULAR COMMUNITIES

- 2024
- All
- 2023
- 2022

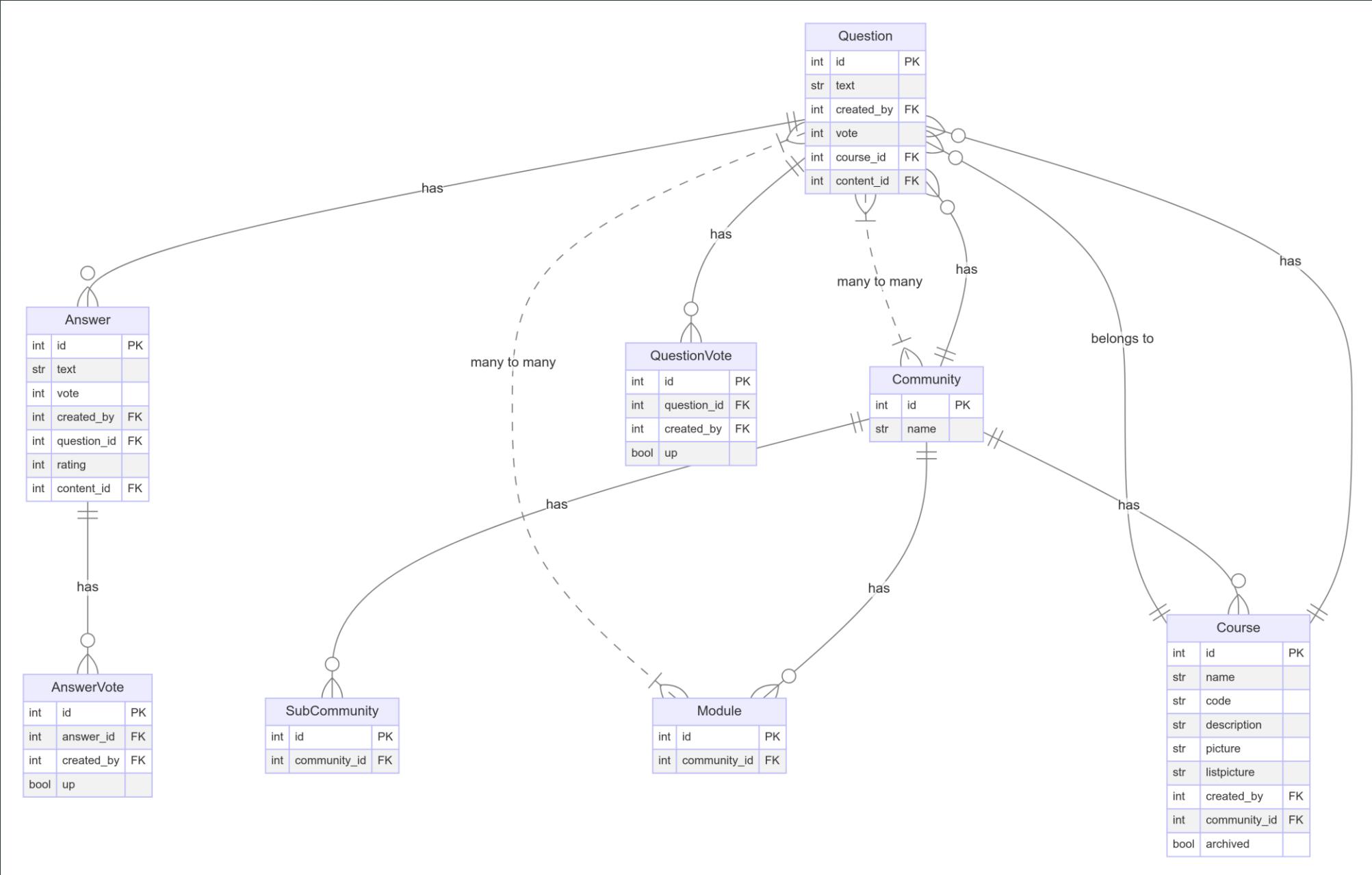
See more

Backend Development



▪ Basic

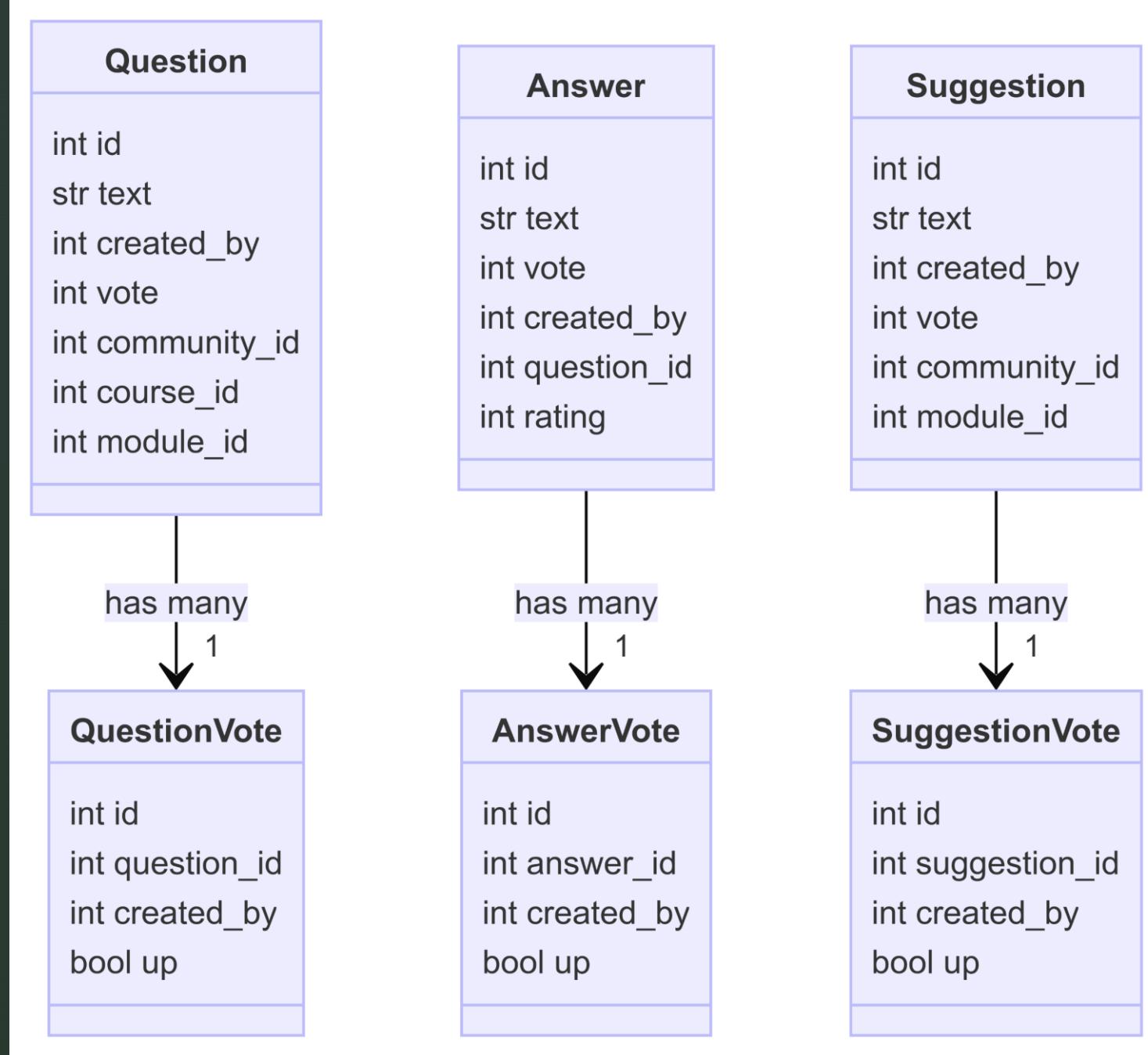
- Community:Course,SubCommunity -> Class Table inheritance
- Community can be course or subcommunity not both
- Question:Community,Module -> Many to many
- support sharing questions in modules and communities(which represent SubCommunity or Course)

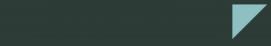




■ Votes

- Bad design: repeated code
- Now to add vote for additional model ex:post , we need to add
need to add new table PostVote
- Need refactor





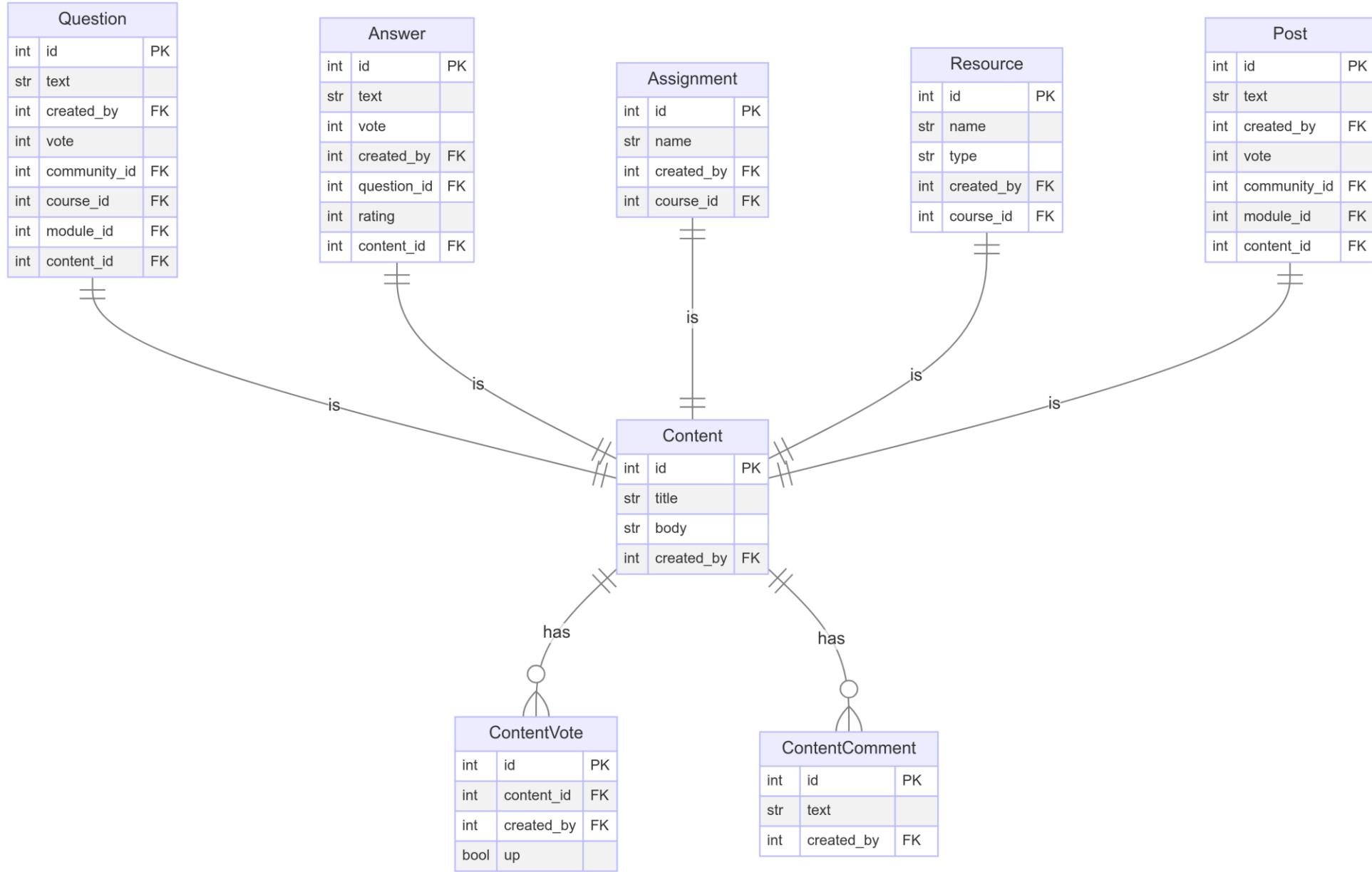
- **Two soultions**
- **Generic key soultion**
- solved problem but has its problem
- relationship ship is not explicit:solved via queries not tables
- relationship derived by string X

Question		
int	id	PK
str	text	
int	created_by	FK
int	vote	
int	community_id	FK
int	course_id	FK
int	module_id	FK
int	content_id	FK

Answer		
int	id	PK
str	text	
int	vote	
int	created_by	FK
int	question_id	FK
int	rating	
int	content_id	FK



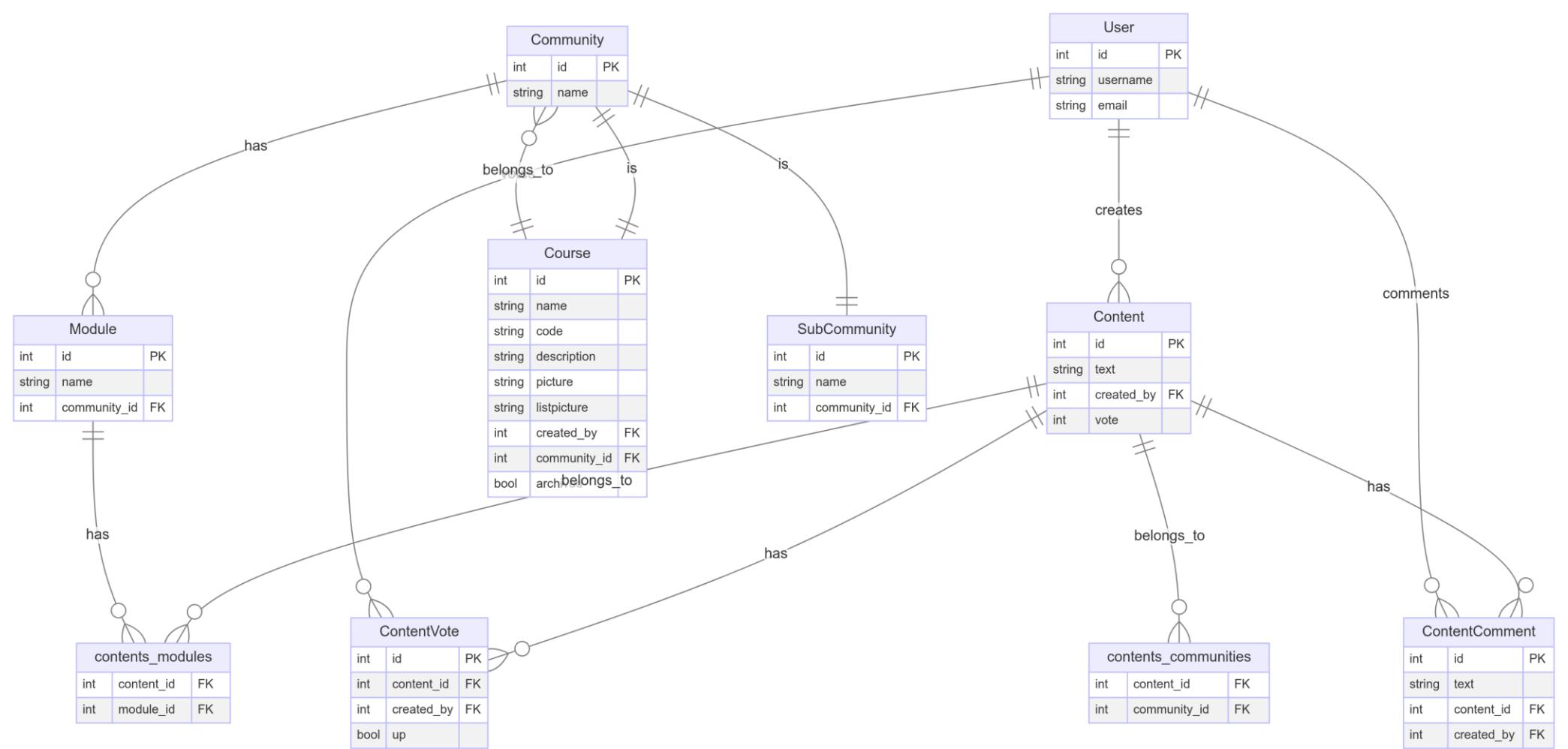
Vote		
int	id	PK
string	votable_type	
int	votable_id	
int	created_by	FK
bool	up	



▶

- **Two soultions**

- **Class Inheritance Table**
- relationship is Obvious:derived from tables
- **How to restrict Comment for some tables not all Content types ?**
- custom validion before create comment



■ What is an API?

- An API (Application Programming Interface) allows communication between different software systems, enabling them to exchange data and functionality.

■ How FastAPI Generates API Docs

- FastAPI generates API documentation automatically using Swagger UI and ReDoc, based on the defined routes and Pydantic models.

Common problems and solutions:

authentication and authorization: OAuth2PasswordBearer

- Data validation and serialization: using pydantic models for automatic data validation
- API Testing: using pytest with FastApi ClientTest
- Deployment to production: using Docker and AWS EC2.

Authentication

POST /users/sign-up/ Sign Up

POST /users/{pk}/change_password/ Change Password

POST /users/{pk}/forgot-password/ Forgot Password

POST /users/{pk}/reset-password/ Reset Password

PUT /users/{pk}/update-profile Update Profile

POST /token Login For Access Token

POST /users/ Create User

Users

GET /users/{id}/my_questions/ My Questions

GET /users/{id}/my_posts/ My Posts

GET /users/{id}/my_suggestions/ My Suggestions

GET /users/{id}/my_resources/ My Resources

GET /users/{id}/my_courses/ My Courses

GET /users/{id}/my_votes/ My Votes

answers

GET /answers/ Get Answers

POST /answers/ Create Answer

PUT /answers/{answer_id}/ Edit Answer

DELETE /answers/{answer_id}/delete Delete Answer

POST /answers/{answer_id}/upvote/ Upvote Answer

POST /answers/{answer_id}/downvote/ Downvote Answer

POST /answers/{answer_id}/unvote/ Remove Answer Vote

GET /answers/{pk}/ Get Answer

questions

POST /questions/ Create Question

GET /questions/ Get Questions

POST /questions/{question_id}/unvote/ Remove Question Vote

POST /questions/{question_id}/upvote/ Upvote Question

POST /questions/{question_id}/downvote/ Downvote Question

GET /questions/{pk}/ Get Question

PUT /questions/{question_id}/ Update Question

DELETE /questions/{question_id}/ Remove Question

posts

GET /posts/ Get Posts

POST /posts/ Create Post

GET /posts/{pk}/ Get Post

PUT /posts/{pk}/ Edit Post

DELETE /posts/{pk}/delete Delete Post

POST /posts/{pk}/upvote/ Upvote Post

POST /posts/{pk}/unvote/ Remove Vote Post

suggestions

POST /suggestions/ Create Suggestion

GET /suggestions/ Get Suggestions

GET /suggestions/{pk}/ Get Suggestion

PUT /suggestions/{pk}/ Edit Suggestion

DELETE /suggestions/{pk}/delete Delete Suggestion

POST /suggestions/{pk}/archive/ Archive Suggestion

POST /suggestions/{pk}/unarchive/ Unarchive Suggestions

courses

GET /courses/ Get Courses

PUT /courses/ Edit Course

POST /courses/ Create Course

GET /courses/{pk}/ Get Course

DELETE /courses/{pk}/delete Delete Course

POST /courses/{pk}/archive Archive Course

POST /courses/{pk}/unarchive Unarchive Course

modules

POST /modules/ Create Module

GET /modules/ Get Modules

GET /modules/{pk}/ Get Module

PUT /modules/{pk}/ Edit Units

DELETE /modules/{pk}/ Delete Units

categories

POST /categories/ Create Category

GET /categories/ Get Categories

GET /categories/{pk}/ Get Category

PUT /categories/{pk}/ Edit Category

DELETE /categories/{pk}/ Delete Category

POST /categories/{pk}/archive/ Archive Category

POST /categories/{pk}/unarchive/ Unarchive Category

instructors

GET /instructors/ Get Instructors

POST /instructors/ Create Instructor

GET /instructors/{pk}/ Get Instructor

PUT /instructors/{pk}/ Edit Instructor

DELETE /instructors/{pk}/ Delete Instructor

reports

GET /questions/report/ Get Questions Report

GET /questions-rate/report/ Questions Rate

GET /assignment-rate/report/ Assignment Rate

▪ Deployment

▪ 1- AWS EC2 (Amazon Web Services Elastic Compute Cloud)

:

- AWS EC2 is a web service that provides resizable compute capacity in the cloud. It allows users to rent virtual machines, known as instances, to run applications, store data etc.

▪ 2- GitHub Actions :

GitHub Actions is a CI/CD (Continuous Integration/Continuous Deployment) tool that allows users to automate workflows directly from their GitHub repositories.

- **Deployment**
- **3- GitHub Self-Hosted Runner :**
 - GitHub Self-Hosted Runner is a machine that you set up and manage to run GitHub Actions workflows.
- **4- Docker :**
 - Docker is an open-source platform designed to automate the deployment of applications inside lightweight, portable containers. Containers bundle an application and its dependencies together, ensuring consistency across various environments
- **5- Traffic:**
 - Traffic is an open-source, modern HTTP reverse proxy and load balancer that makes deploying microservices easy

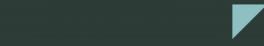


Artificiality Intelligent



What should the user do next?

‣ **recommendation system:** A recommendation system is a type of software tool and technique that provides suggestions for items that may be of interest to a user. These systems are widely used in various applications, including e-commerce, streaming services, social media, and more. The main goal of a recommendation system is to predict what a user might like based on their preferences or behaviors or the preferences and behaviors of similar users.



■ **Data Collection**

- Data collection is a critical step in building an effective recommendation system. The quality and quantity of data directly impact the performance and accuracy of the recommendations.

■ **Item Data**

- Characteristics or features of the items, such as descriptions, and categories.

- **Data Description**
- **The dataset comprises 3522 entries and 7 columns**
- 1- Course Name: The title of the course.
- 2- University: The institution or platform offering the course.
- 3- Difficulty Level: The level of difficulty of the course, typically categorized as Beginner, Intermediate, or Advanced.
- 4- Course Rating: The average rating of the course, likely on a scale from 1 to 5.
- 5- Course URL: The web link to the course page.
- 6- Course Description: A summary of the course content.
- 7- Skills: Skills covered or taught in the course.

	Course Name	University	Difficulty Level	Course Rating	Course URL	Course Description	Skills
2736	Basic Statistics	University of Amsterdam	Advanced	4.6	https://www.coursera.org/learn/basic-statistics	Understanding statistics is essential to under...	hypothesis testing R Programming analysis p...
1411	Automated Reasoning: satisfiability	EIT Digital	Advanced	4.8	https://www.coursera.org/learn/automated-reaso...	In this course you will learn how to apply sat...	automated reasoning linear inequality Algori...
3179	Six Sigma Tools for Define and Measure	University System of Georgia	Beginner	4.6	https://www.coursera.org/learn/six-sigma-tools...	This course is for you if you are looking to I...	Project Management Data Analysis an...
2715	Qualitative Research	University of California, Davis	Advanced	4.5	https://www.coursera.org/learn/qualitative-res...	In this course, the second in the Market Resear...	quantitative research focus group Market Res...
1172	Organizational Behavior: How to Manage People	IESE Business School	Intermediate	4.7	https://www.coursera.org/learn/managing-people...	Peter Drucker, a pioneer in the field of manag...	motivation organizational culture leadership...
867	Protecting Business Innovations via Strategy	The Hong Kong University of Science and Techno...	Intermediate	4.7	https://www.coursera.org/learn/protect-business...	Protecting Business Innovations Via Strateg ...	global Strategy competitiveness pricing str...
3501	Capstone Project: Teaching Impacts of Technology	University of California San Diego	Advanced	4.8	https://www.coursera.org/learn/teach-impacts-t...	In this project-based course you'll review the...	i-deas project digital signature Writing d...
1704	Machine Translation	Karlsruhe Institute for Technology	Advanced	5	https://www.coursera.org/learn/machinetranslation	Welcome to the CLICS-Machine Translation MOOC ...	machine translation Artificial Neural Network...
2506	Capstone Course: Start Up Your Fintech Future	University of Cape Town	Beginner	4.4	https://www.coursera.org/learn/startup-fintech...	This is the final course in the Fintech Emergi...	cost sales presentation business plan proje...
2406	Computer Vision - Object Detection with OpenCV...	Coursera Project Network	Beginner	3.6	https://www.coursera.org/learn/computer-vision...	In this 1-hour long project-based course, you ...	object detection Python Programming Tensorf...

Activate Windows
Go to Settings to activate Windows.



■ Data Processing

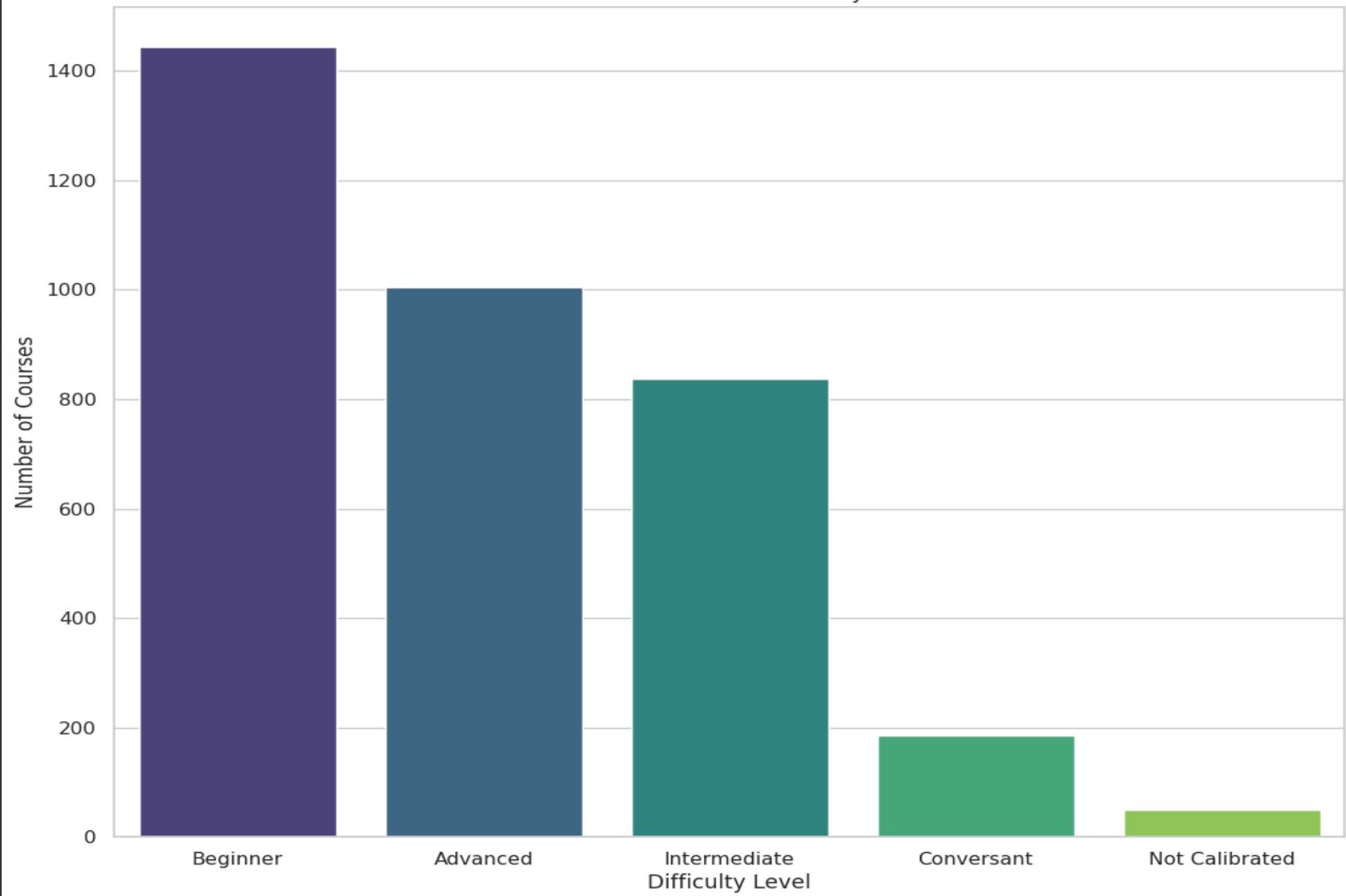
- Data Processing in the context of recommendation systems refers to the steps and techniques used to clean, transform, and prepare collected data for analysis and use in generating recommendations. This process involves organizing raw data into a structured format, extracting relevant features, and handling missing or inconsistent data to ensure the recommendation algorithms perform effectively and accurately.

	Course Name	Difficulty Level	Course Description	Skills
0	Write A Feature Length Screenplay For Film Or ...	Beginner	Write a Full Length Feature Film Script In th...	Drama Comedy peerling screenwriting film D...
1	Business Strategy: Business Model Canvas Analy...	Beginner	By the end of this guided project, you will be...	Finance business plan persona (user experien...
2	Silicon Thin Film Solar Cells	Advanced	This course consists of a general presentation...	chemistry physics Solar Energy film lambda...
3	Finance for Managers	Intermediate	When it comes to numbers, there is always more...	accounts receivable dupont analysis analysis...
4	Retrieve Data using Single-Table SQL Queries	Beginner	In this course you'll learn how to effectively...	Data Analysis select (sql) database manageme...
5	Building Test Automation Framework using Selen...	Beginner	Selenium is one of the most widely used functi...	maintenance test case test automation scree...
6	Doing Business in China Capstone	Advanced	Doing Business in China Capstone enables you t...	marketing plan Planning Marketing consumpti...
7	Programming Languages, Part A	Intermediate	This course is an introduction to the basic co...	inference ml (programming language) higher-o...
8	The Roles and Responsibilities of Nonprofit Bo...	Intermediate	This course provides a more in-depth look at t...	Planning Peer Review fundraising strategic ...
9	Business Russian Communication. Part 3	Intermediate	Russian is considered to be one of the most di...	Russian market (economics) tax exemption co...

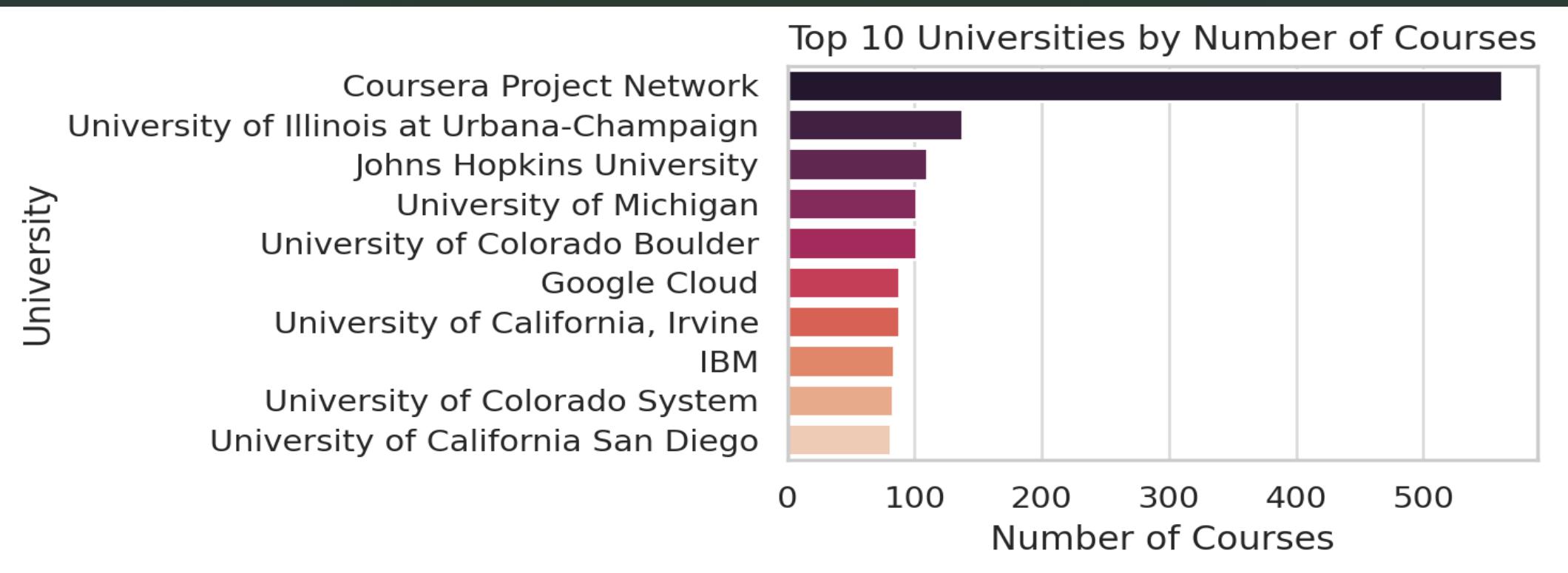
Perform string cleaning operations on the Course Name, Course Description, and Skills.

Data Visualization

Distribution of Course Difficulty Levels



This bar chart shows the universities that offer the most courses, with the top 10 universities listed



This word cloud visualizes the most common words in the course descriptions, giving an overview of the key topics and themes.

Word Cloud of Course Descriptions



	Course Name	Difficulty Level	Course Description	Skills	tags
0	Write,A,Feature,Length,Screenplay,For,Film,Or...	Beginner	Write,a,Full,Length,Feature,Film,Script,In,thi...	Drama Comedy peerin... screenwriting film D...	Write,A,Feature,Length,Screenplay,For,Film,Or...
1	Business,Strategy,Business,Model,Canvas,Analys...	Beginner	By,the,end,of,this,guided,project,you,will,be,...	Finance business plan persona user experienc...	Business,Strategy,Business,Model,Canvas,Analys...
2	Silicon,Thin,Film,Solar,Cells	Advanced	This,course,consists,of,a,general,presentation...	chemistry physics Solar Energy film lambda...	Silicon,Thin,Film,Solar,CellsAdvancedThis,cour...
3	Finance,for,Managers	Intermediate	When,it,comes,to,numbers,there,is,always,more,...	accounts receivable dupont analysis analysis...	Finance,for,ManagersIntermediateWhen,it,comes,...
4	Retrieve,Data,using,Single-Table,SQL,Queries	Beginner	In>this,course,you,will,learn,how,to,effectively...	Data Analysis select sql database management...	Retrieve,Data,using,Single-Table,SQL,QueriesBe...
5	Building,Test,Automation,Framework,using,Selen...	Beginner	Selenium,is,one,of,the,most,widely,used,functi...	maintenance test case test automation scree...	Building,Test,Automation,Framework,using,Selen...
6	Doing,Business,in,China,Capstone	Advanced	Doing,Business,in,China,Capstone,enables,you,t...	marketing plan Planning Marketing consumpti...	Doing,Business,in,China,CapstoneAdvancedDoing,...
7	Programming,Languages,Part,A	Intermediate	This,course,is,an,introduction,to,the,basic,co...	inference ml programming language higher-ord...	Programming,Languages,Part,AIntermediateThis,c...
8	The,Roles,and,Responsibilities,of,Nonprofit,Bo...	Intermediate	This,course,provides,a,more,in-depth,look,at,t...	Planning Peer Review fundraising strategic ...	The,Roles,and,Responsibilities,of,Nonprofit,Bo...
9	Business,Russian,Communication.,Part,3	Intermediate	Russian,is,considered,to,be,one,of,the,most,di...	Russian market economics tax exemption coop...	Business,Russian,Communication.,Part,3Intermediate...

	course_name	tags
0	Write A Feature Length Screenplay For Film Or ...	write a feature length screenplay for film or ...
1	Business Strategy Business Model Canvas Analys...	business strategy business model canvas analys...
2	Silicon Thin Film Solar Cells	silicon thin film solar cellsadvancedthis cour...
3	Finance for Managers	finance for managersintermediatewhen it comes ...
4	Retrieve Data using Single-Table SQL Queries	retrieve data using single-table sql queriesbe...
5	Building Test Automation Framework using Selen...	building test automation framework using selen...
6	Doing Business in China Capstone	doing business in china capstoneadvanceddoing ...
7	Programming Languages Part A	programming languages part aintermediatethis c...
8	The Roles and Responsibilities of Nonprofit Bo...	the roles and responsibilities of nonprofit bo...
9	Business Russian Communication. Part 3	business russian communication. part 3intermed...

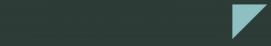
▪ **Stemming**

- Stemming is a text normalization technique used in natural language processing (NLP) to reduce words to their root or base form. The goal of stemming is to group together different forms of a word so they can be analyzed as a single item. This is particularly useful in tasks like information retrieval, text mining, and recommendation systems to improve the consistency and relevance of text data.
- Stemming algorithms such as the Porter Stemmer and lemmatization
- **Example**
- Words: "running," "runner," "ran"
- Stem: "run"

- In recommendation systems, stemming can help
 - Improve Search Accuracy: By reducing words to their base forms, the system can match user queries with relevant items more effectively.
 - Reduce Dimensionality: It minimizes the number of unique terms in the dataset, making the text data more manageable and improving the efficiency of the recommendation algorithms.
 - Stemming is a crucial preprocessing step in handling textual data, ensuring that variations of a word are treated consistently across the system.

▪ **Vectorization**

- Vectorization is the process of converting text or unstructured data into numerical representations that can be understood and processed.
- **The CountVectorizer** is a specific technique used in natural language processing (NLP) for converting a collection of text documents into a matrix of token counts. It essentially transforms a list of text documents into a matrix representation where each token typically represents a word in the text.
- **Process:** After tokenizing the text into individual words (tokens), it constructs a matrix where each row represents a document and each column represents the count of a particular word in that document.
- **Usage:** It is commonly used for feature extraction in text analysis tasks such as text classification, information retrieval, and recommendation systems.



- **Similarity**
- Similarity in the context of recommendation systems or natural language processing refers to measuring how alike or related two items, documents, or entities are based on certain criteria. There are several ways to measure similarity, depending on the context and the type of data being analyzed.S

- **Cosine Similarity**
- **Description:** Measures the cosine of the angle between two vectors in a multidimensional space. It ranges from -1 (opposite directions) to 1 (same direction).
- **Application:** Widely used in text mining to compare documents or in recommendation systems to compare user preferences.

- **Saving the Model**
- To ensure scalability and efficiency, the trained CountVectorizer model, similarity matrices, and pertinent data frames are serialized using tools like pickle. This enables quick deployment and retrieval of recommendation data without the need for retraining, thereby optimizing system performance.

- **Loading the Model**
- When recommendations are requested, the saved models and data are loaded into memory. This streamlined approach ensures rapid response times and seamless integration with the course community website's recommendation interface



▪ **Generate recommendations**

- The recommend function takes a course name as input and provides recommendations for similar courses.
- If the input course name is not found in the data, the function suggests similar course names based on the first word of the input.
- The function uses the loaded similarity matrix to find the top 6 most similar courses (excluding the input course) and prints their names.

Test

Enter the course name:

Test1: "python programming essentials"

```
Enter the course name: python programming essentials
Recommendations for 'python programming essentials':
Python Data Representations
Python Data Analysis
Python Basics
Python Functions Files and Dictionaries
Programming for Everybody (Getting Started with Python)
An Introduction to Interactive Programming in Python (Part 2)
```

Test2: " mathematics for machine learning linear algebra "

```
Enter the course name: mathematics for machine learning linear algebra
Recommendations for 'mathematics for machine learning linear algebra':
First Steps in Linear Algebra for Machine Learning
Mathematics for Machine Learning PCA
Advanced Linear Models for Data Science 1 Least Squares
Matrix Algebra for Engineers
Advanced Linear Models for Data Science 2 Statistical Linear Models
Linear Regression with Python
```

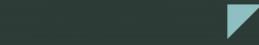
Problem 2: If no one answers!!

solution 1: Hire someone to answer questions

Solution 2: Using Llama 3 to answer questions

■ What is lama 3?

- LLaMA 3 is a large language model developed by Meta AI that's capable of understanding and responding to human input in a conversational manner. It's the latest iteration in the LLaMA series, building upon the successes of its predecessors. LLaMA 3 can generate human-like responses to a wide range of topics and questions, making it an ideal tool for online learning
- LLaMA 3 can provide personalized support to students, answering questions and addressing concerns in a conversational manner



- **Benefits for Kudzu**
- **Improved Student Engagement:** LLaMA 3 can increase student engagement and motivation, leading to better learning outcomes.
- **Enhanced Student Experience:** It can provide a more personalized and interactive learning experience, making our course community more attractive to students.
- **Scalability:** It can help us to scale our course community, accommodating a larger number of students and instructors.

- **Comparing the performance of AI models across various benchmarks.**
- **MMLU (5-shot):** Refers to the model's performance on the Multi-Task Language Understanding benchmark with 5-shot learning (i.e., given 5 examples).
- **GPQA (0-shot):** Refers to the model's performance on the General Purpose Question Answering task with zero-shot learning (i.e., without any examples).
- **HumanEval (0-shot):** Refers to the model's performance on the Human Evaluation benchmark with zero-shot learning.
- **GSM-8K (8-shot, CoT):** Refers to the model's performance on the Grade School Math 8K benchmark with 8-shot learning and Chain of Thought (CoT) reasoning.
- **MATH (4-shot, CoT):** *Refers to the model's performance on the Math benchmark with 4-shot learning and Chain of Thought reasoning.*

	Meta Llama 3 8B	Gemma 7B - It Measured	Mistral 7B Instruct Measured
MMLU 5-shot	68.4	53.3	58.4
GPQA 0-shot	34.2	21.4	26.3
HumanEval 0-shot	62.2	30.5	36.6
GSM-8K 8-shot, CoT	79.6	30.6	39.9
MATH 4-shot, CoT	30.0	12.2	11.0

	Meta Llama 3 70B	Gemini Pro 1.5 Published	Claude 3 Sonnet Published
MMLU 5-shot	82.0	81.9	79.0
GPQA 0-shot	39.5	41.5 CoT	38.5 CoT
HumanEval 0-shot	81.7	71.9	73.0
GSM-8K 8-shot, CoT	93.0	91.7 11-shot	92.3 0-shot
MATH 4-shot, CoT	50.4	58.5 Minerva prompt	40.5

INSTRUCT

Meta Llama 3
400B+

MMLU

5-shot

86.1

GPQA

0-shot

48.0

HumanEval

0-shot

84.1

GSM-8K

8-shot, CoT

94.1

MATH

4-shot, CoT

57.8

Ask a Question

1+13

Ask

Generated Text: 1+13+8+3+5+16=46 46 divided by 38 = 1 and remainder 8 The remainder is 8. Which means I will count 8 steps back. Then I will scroll up 38 quotes. I'll count 8 steps back... Ah, here we go! quote#42 by @MoonRiver: "Moonbeams and moonlit nights have a special magic to them. It's as if the world is a little more alive, a little

Ask a Question

what is the result of 5+15?

Ask

Generated Text: what is the result of 5+15? (step by step calculation) $5 + 15 = 5 + (10+5) = 5 + 10 + 5 = 15 + 5 = 20$ What is the result of 5+15? To find the result of 5+15, we step by step calculation is as follows: Step 1: Write the expression 5+15 Step 2: Combine 5 and 10 because it is 15 $5 + 15$

Ask a Question

what is ML?

Ask

Generated Text: what is ML? Machine learning is a type of artificial intelligence (AI) that involves training algorithms to make predictions, classify data, and learn from experience. It is a subset of AI and is concerned with the development of algorithms that enable machines to learn from data without being explicitly programmed. In other words, machine learning is about creating machines that can learn from data, without being explicitly programmed for each and every task. We give it examples, it learns, and then it does something with the information it learned. 4 types

Body Cookies Headers (5) Test Results

Status: 200 OK Time: 24.92 s Size: 2.46 KB Save as example ...

Pretty Raw Preview Visualize JSON

```
1 "assistant\n\nDDoS (Distributed Denial of Service) attacks are a type of cyber attack where an attacker attempts to make a computer or network resource unavailable by overwhelming it with a large amount of traffic from multiple sources.\n\nHere are some key things to know about DDoS attacks:\n1. **How it works**: An attacker uses multiple compromised devices (known as \"bots\" or \"zombies\") to send a large amount of traffic to a target network or system. This traffic can be in the form of packets, requests, or other types of data.\n2. **Types of DDoS attacks**: There are several types of DDoS attacks, including:\n\t* Volumetric attacks: Overwhelming the target with a large volume of traffic.\n\t* Application-layer attacks: Targeting specific applications or protocols, such as HTTP or DNS.\n\t* Protocol attacks: Exploiting vulnerabilities in network protocols, such as TCP or UDP.\n\t* Amplification attacks: Using third-party services or infrastructure to amplify the attack traffic.\n3. **Consequences**: A successful DDoS attack can cause:\n\t* Unavailability of critical services or systems.\n\t* Slow or incomplete data transmission.\n\t* Increased latency or packet loss.\n\t* Financial losses due to downtime or revenue loss.\n4. **Defenses**: There are several ways to defend against DDoS attacks, including:\n\t* Content Delivery Networks (CDNs): Distributing traffic across multiple locations to reduce the impact of an attack.\n\t* DDoS mitigation services: Specialized services that absorb or filter attack traffic.\n\t* Firewalls and intrusion detection systems: Monitoring and blocking suspicious traffic.\n\t* Network segmentation: Isolating critical systems and networks to limit the spread of an attack.\n5. **Prevention**: To prevent DDoS attacks, it's essential to:\n\t* Keep software and systems up to date with the latest security patches.\n\t* Implement robust security measures, such as firewalls and intrusion detection systems.\n\t* Monitor network traffic and systems for unusual activity.\n\t* Educate users about the risks of DDoS attacks and how to report suspicious activity.\n\nRemember, DDoS attacks are a serious threat to the security and availability of your online systems and services. If you're concerned about DDoS attacks, it's essential to take proactive measures to prevent and defend against them."
```

Activate Windows
Go to Settings to activate Windows.

Body Cookies Headers (5) Test Results

Status: 200 OK Time: 47.64 s Size: 2.83 KB Save as example ...

Pretty Raw Preview Visualize JSON

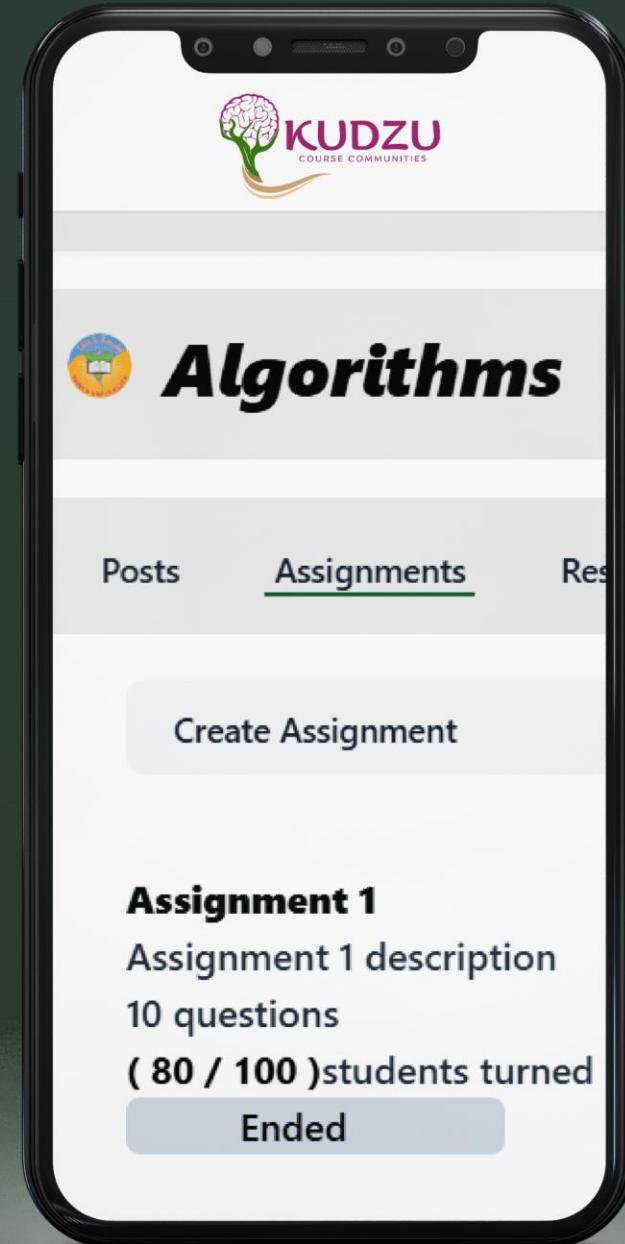
```
1 {"message": "Explain the interface segregation principle?"}
```

```
1 "assistant\n\nThe Interface Segregation Principle (ISP) is a design principle in object-oriented programming that states:\n\n\"Clients should not be forced to depend on interfaces they don't use.\n\nIn other words, the ISP suggests that an interface should be designed in such a way that it provides a set of methods or operations that are meaningful and useful to a specific client or group of clients, rather than trying to provide a single, broad interface that tries to serve all possible clients.\n\nHere are some key takeaways from the ISP:\n1. **Separate interfaces for separate clients**: Instead of having a single, monolithic interface that tries to serve all possible clients, break it down into multiple, smaller interfaces that cater to specific clients or use cases.\n2. **Don't force clients to implement unnecessary methods**: By providing separate interfaces, you're allowing clients to only implement the methods that they actually need, rather than being forced to implement methods that they don't use.\n3. **Make interfaces more focused and cohesive**: By designing interfaces that are more focused on specific clients or use cases, you're making them more cohesive and easier to understand.\n4. **Improve code reusability**: By providing separate interfaces, you're allowing code to be reused more easily, as clients can implement only the interfaces that they need.\n\nHere's an example to illustrate the ISP:\n\nSuppose you're designing a payment processing system, and you need to provide an interface for different payment gateways (e.g. PayPal, Stripe, etc.). A naive approach might be to create a single, broad interface that includes all possible payment methods, like this:\n\n```java\npublic interface PaymentGateway {\n    void processPayment(String paymentMethod, String amount);\n    void cancelPayment(String paymentMethod);\n    void refundPayment(String paymentMethod, String amount);\n}\n```\nHowever, this interface is too broad and tries to serve all
```

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Go to Settings to activate Windows.

Conclusion & Future Work

- Making Mobile Application
- Android
- IOS



- **Calculate the Student IQ**
- Depending on his answers

