

# Stack Overglow

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## Feature overview:

Stack Overglow is a primitive version of Stack Overflow. It is a question and answering platform where signed-in users (we will refer this as users) can:

1. Post questions and answers
2. Upvote/downvote questions and answers
3. See their statistics in their profile page
4. Accumulate *Presence*
5. Select an answer as the best answer (for original poster only)

Both users and non-users, or browsers (a person who browses), can:

1. View questions and answers
2. Search questions to a limited extent.

*Presence* is our tiering system for users. Presence is rewarded for each best answer and upvote. We have 4 tiers in our Presence system: Beginner, Learned, Advanced, Guru. Users will be able to rank up after surpassing the required point threshold.

## Tiering system:

10 points for each best answer, 1 point for every upvote. Parenthesis indicates the equivalent integer representation in our database.

- < 10 points Beginner (0)
- >= 10 points Learned (1)
- >= 50 points Advanced (2)
- >= 90 points Guru (3)

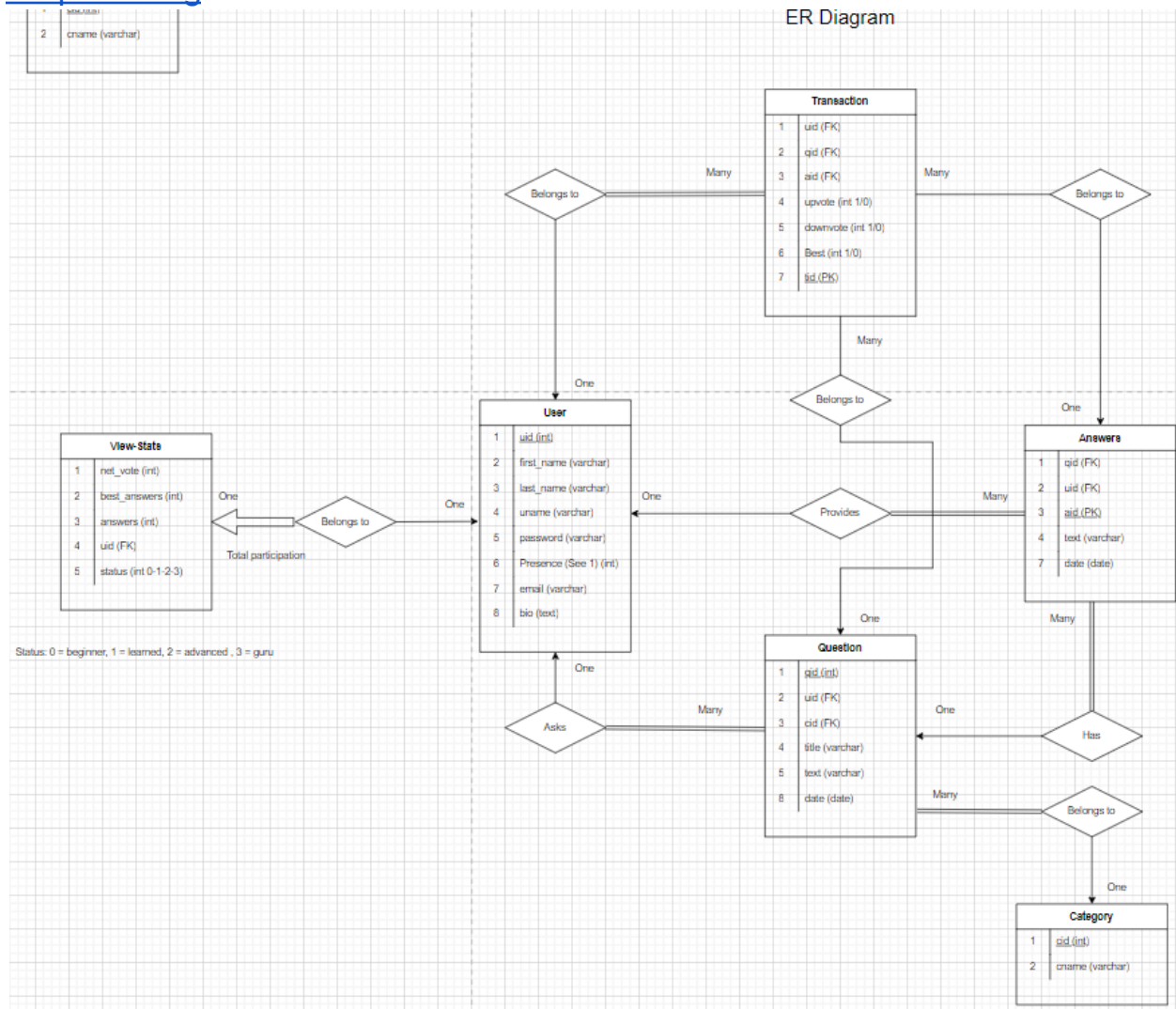
## Limitations/Assumptions:

Due to our limited engineering power and time, we will only be providing 5 topics for which questions are categorized. These 5 topics are: Computer Science, Physics, Arts, Gaming, Religion. Our tiering system will not have the difficulty level resembling that of a real-world Q&A platform like Stack Overflow. In addition, our text search will not rival the level of accuracy and meticulousness of a typical Google search. Hence we classify our project as a primitive version of Stack Overflow. Users will not be able to delete a question/answer, only the admin can. No edits on question/answer once posted.

## Project blueprint:

For a better viewing experience, please use [this](#) link (reproduced below) and open it with diagrams.net.

<https://drive.google.com/file/d/1GxRsmBYcPqHQz6SumtosyLKOzDG6A75g/view?usp=sharing>



## Relational Schema

View-Stats	
1	net_vote (int)
2	best_answers (int)
3	answers (int)
4	uid (FK)
5	status (int 0-1-2-3)
6	rec_id (PK)

User	
1	uid (PK) (int)
2	first_name (varchar)
3	last_name (varchar)
4	uname (varchar)
5	password (varchar)
6	Presence (See 1) (int)
7	email (varchar)
8	bio (text)

Transaction	
1	uid (FK)
2	qid (FK)
3	aid (FK)
4	upvote (int 1/0)
5	downvote (int 1/0)
6	Best (int 1/0)
7	tid (PK)

Answers	
1	qid (FK)
2	uid (FK)
3	aid (PK)
4	text (varchar)
7	date (date)

Category	
1	cid (int)
2	cname (varchar)

Question	
1	qid (int)
2	uid (FK)
3	cid (FK)
4	title (varchar)
5	text (varchar)
8	date (date)

Table/relation explanation/justification:

**Category:** stores all categories and their names with cid as its primary key. Relates to Question because question uses category to verify/track category of questions in database. 1 v many relationship to Question because many questions can belong to the same category, but each question will only have 1 category.

**Question:** stores all posted questions with qid as its primary key. Uses uid as foreign key to track/verify user existence. Uses cid to track/verify category. Relates to Category. Relates to Answers because each answer is specific to a question. Multiple answers belong to the same question, but multiple questions will not have the same answer. Question relates the Transactions because transaction might refer to a question by qid in each one of its entries. One question can have multiple transactions, but each transaction is specific to one question only. Relates to User because every question must be associated with a user. One user can have multiple questions, but one question can only have one user as the owner/poster.

**Answer:** stores all answers associated with a specific question with aid as its primary key. Uses qid to identify the association between itself and a question. Uses uid to identify the user that posted the answer. Relates to Questions.

Relates to User because each answer must be associated with a user. One user can post multiple answers, but one answer will only have one user as its owner/poster. Relates to Transactions because each transaction might be associated with an answer. One transaction can only relate to one answer, but one answer can have multiple transactions.

User: stores all the required information about a user when they sign up with uid as its primary key. Does NOT store any physical address information because they are deemed unnecessary in our Q&A platform. Related to Answers, Questions. Related to Transactions because each transaction must be associated with a user. One user can have multiple transactions, but each transaction is specific to one user.

Transactions: stores user-related, selected activities occurring in our platform with tid as its primary key. The selected activities include upvote/downvote, best answer selection. It does not store information about posting questions/answers because users cannot delete or edit them once posted. It relates to User, Answers, Questions.

View\_Stats: stores statistics of every user, such as each user's net votes, total number of best answers/answers, and tier, represented by an integer of fixed range (see diagram for detail). It relates to User because each user will have its own profile showing the aforementioned information. Every user will have one entry in this table and each entry is specific to a single user.

Table showcase:

\* tables below are shown without any insertion from part c queries.

1. Categories:

▲ RESULTS		
	cid	cname
1	1	Computer Science
2	2	Physics
3	3	Arts
4	4	Gaming
5	5	Religion

## 1. Questions:

RESULTS						
	qid	uid	cid	title	body	date
1	1	1	1	What are compliers?	as stated in the title	2022-03-01
2	2	1	1	What are neural networks?	as stated in the title	2022-02-01
3	3	2	1	What is a stack in programmin...	as stated in the title	2022-01-01
4	4	2	2	What is Gravity?	as stated in the title	2022-01-15
5	5	2	2	What are Newton's three laws?	as stated in the title	2022-02-15
6	6	3	3	Which is most famous work of ...	as stated in the title	2022-02-28
7	7	3	3	Which is famous work of Pablo...	as stated in the title	2022-03-01
8	8	3	4	Best Laptops for Gaming?	as stated in the title	2022-01-31
9	9	3	4	Best online multi-player games?	as stated in the title	2022-03-03
10	10	5	5	How many religions are there i...	as stated in the title	2022-01-31
11	11	2	1	How do I show the changes w...	As stated in the tit...	2009-10-19
12	12	4	1	How do I discard unstaged cha...	As stated in the tit...	2008-09-15
13	13	4	1	How to find and restore a dele...	As stated in the tit...	2009-05-04
14	14	5	1	How do I undo the most recen...	As stated in the tit...	2007-03-22
15	15	4	1	How do I delete a Git branch I...	As stated in the tit...	2010-01-05

## 1. Answers:

RESULTS					
	aid	qid	uid	body	date
1	1	1	1	A compiler is a special program that pr...	2022-03-02
2	2	1	4	The language processor that reads the ...	2022-03-03
3	3	2	1	A neural network is a series of algorith...	2022-02-02
4	4	2	4	Neural networks are computing systems...	2022-03-02
5	5	2	5	Neural networks are a set of algorithms,...	2022-02-28
6	6	3	1	A stack is an array or list structure of fu...	2022-01-02
7	7	4	1	Gravity is the force by which a planet or...	2022-01-16
8	8	5	1	The Newton's three laws of motion are ...	2022-02-20
9	9	6	1	Mona Lisa, oil on wood panel by Leonar...	2022-03-01
10	10	6	5	Leonardo da Vinci's Mona Lisa and The ...	2022-03-10
11	11	7	1	Guernica is not only Picasso's best-kno...	2022-03-04
12	12	7	4	Pablo Picasso was one of the greatest a...	2022-03-05
13	13	8	1	When buying a gaming notebook, get o...	2022-02-05
14	14	9	1	Minecraft has the largest land-based op...	2022-03-05
15	15	10	3	It may surprise you to know that there a...	2022-02-27
16	16	11	2	Use git checkout -- .	2009-10-19
17	17	12	2	It should just be: git diff --cached	2008-09-15
18	18	13	2	Find the last commit that affected the g...	2009-05-04
19	19	14	2	\$ git commit -m "Something terribly mi...	2007-03-22
20	20	15	2	\$ git push -d <remote_name> <branch...	2010-01-05

1. Transactions:

## RESULTS

	tid	uid	qid	aid	upvote	downvote	best
1	1	1	1	1	0	0	1
2	2	1	2	3	0	0	1
3	3	2	3	6	0	0	1
4	4	2	4	7	0	0	1
5	5	2	5	8	0	0	1
6	6	3	6	9	0	0	1
7	7	3	7	11	0	0	1
8	8	3	8	13	0	0	1
9	9	3	9	14	0	0	1
10	10	4	10	15	0	0	1
11	11	5	11	16	0	0	1
12	12	2	12	17	0	0	1
13	13	4	13	18	0	0	1
14	14	4	14	19	0	0	1
15	15	5	15	20	0	0	1
16	16	2	1	1	1	0	0
17	17	3	1	1	1	0	0
18	18	4	1	1	1	0	0
19	19	1	11	16	1	0	0
20	20	3	12	17	1	0	0
21	21	1	10	15	1	0	0
22	22	1	2	5	1	0	0

## 1. Users:

RESULTS									CTRL
	uid	first_name	last_name	uname	password	Presence	email	bio	
1	1	Greg	Cooper	SuperCooper	SC500600700&	155	SC@outlook.co...	Hey this is Gre...	
2	2	Shanesh	Janpaul	Giggity	Giggitygiggity2...	84	Gig@outlook.c...	Hey this is Sha...	
3	3	Shan	Zhuge	FiveBooks	qwertyuiop1000	33	Zhuge@outloo...	This is Shan, fr...	
4	4	Recep	Ergodan	RCPep	hjjklll2000\$	2	Ergo@gmail.com	Hey this is Ergo...	
5	5	Melvus	Worthington	IgniteFlames	UKbritainengla...	1	Mel@gmail.com	Hey this is Mel ...	

## 1. View\_Stats:

Query 1 x SQL File 3\*

Limit to 1000 rows

```
166
167 • SELECT * FROM VIEW_STATS;
168
169 • ALTER VIEW VIEW_STATS as
170     SELECT A.UID,IFNULL(net_vote,0) as net_vote,
```

Result Grid | Filter Rows: | Export: | Wrap

	UID	net_vote	best_answers	answers	Presence	STATUS
▶	1	3	9	9	93	3
	2	2	5	5	52	2
	3	1	1	1	11	1
	4	0	0	3	0	0
	5	1	0	2	1	0

## Query testing:

### 1. User insertion:

```
1 -- (1) Create a new user account, together with username, email, password, city, state, country, and profile.
2 -- FN LN uname password P email bio
3 INSERT INTO [User] VALUES ('Bob', 'Crasnick', 'Bsnick', 'Bobsnick2022',0, 'bsnick@gmail.com', 'Hey this is Bob from New Jersey!');
```



RESULTS								
	uid	first_name	last_name	uname	password	Presence	email	bio
1	1	Greg	Cooper	SuperCooper	SC500600700&	155	SC@outlook.co...	Hey this is Gre...
2	2	Shanesh	Janpaul	Giggity	Giggitygiggity2...	84	Gig@outlook.c...	Hey this is Sha...
3	3	Shan	Zhuge	FiveBooks	qwertyuiop1000	33	Zhuge@outloo...	This is Shan, fr...
4	4	Recep	Ergodan	RCPep	hjjkl112000\$	2	Ergo@gmail.com	Hey this is Ergo...
5	5	Melvus	Worthington	IgniteFlames	UKbritainengla...	1	Mel@gmail.com	Hey this is Mel ...
6	6	Bob	Crasnick	Bsnick	Bobsnick2022	0	bsnick@gmail.c...	Hey this is Bob ...

## 1. Question insertion:

```

5 -- (2) Insert a new question into the system, by a particular user and assigned it to a particular topic in the
6 -- hierarchy.
7
8 INSERT INTO Questions VALUES (1,5,'What was the first religion in the world?','As stated in the title', '2022-01-15');
```

RESULTS						
	qid	uid	cid	title	body	date
1	1	1	1	What are compliers?	as stated in the...	2022-03-01
2	2	1	1	What are neural networks?	as stated in the...	2022-02-01
3	3	2	1	What is a stack in programming?	as stated in the...	2022-01-01
4	4	2	2	What is Gravity?	as stated in the...	2022-01-15
5	5	2	2	What are Newton's three laws?	as stated in the...	2022-02-15
6	6	3	3	Which is most famous work of Leornado ...	as stated in the...	2022-02-28
7	7	3	3	Which is famous work of Pablo Picasso?	as stated in the...	2022-03-01
8	8	3	4	Best Laptops for Gaming?	as stated in the...	2022-01-31
9	9	3	4	Best online multi-player games?	as stated in the...	2022-03-03
10	10	5	5	How many religions are there in the world?	as stated in the...	2022-01-31
11	11	2	1	How do I show the changes which have b...	As stated in th...	2009-10-19
12	12	4	1	How do I discard unstaged changes in Git?	As stated in th...	2008-09-15
13	13	4	1	How to find and restore a deleted file in a...	As stated in th...	2009-05-04
14	14	5	1	How do I undo the most recent local com...	As stated in th...	2007-03-22
15	15	4	1	How do I delete a Git branch locally and r...	As stated in th...	2010-01-05
16	16	1	5	What was the first religion in the world?	As stated in th...	2022-01-15

## 1. View status in View\_Stats:

Query 1 SQL File 3\*

1 • SELECT uid, status FROM VIEW\_STATS;

Result Grid Filter Rows: Export:

	UID	STATUS
▶	1	3
	2	2
	3	1
	4	0
	5	0

## 1. Output answers in chronological order

```

13 -- (4) For a given question (say identified by an ID), output all answers to the question in chronological
14 -- order from first to last. Output the answer text and the time and date when it was posted, and whether
15 -- an answer was selected as best answer.
16 SELECT Answers.[body], Answers.[date],
17 CASE
18 WHEN T.best = 1 THEN 'Yes'
19 ELSE 'No'
20 END AS 'Status'
21 FROM Questions
22 JOIN Answers ON Questions.qid = Answers.qid
23 JOIN Transactions AS T ON T.qid = Answers.qid AND T.aid = Answers.aid
24 WHERE Questions.qid = 2
25 ORDER BY Answers.[date] ASC

```

RESULTS

	body	date	Status
1	A neural network is a series of al...	2022-02-02	Yes
2	Neural networks are a set of algo...	2022-02-28	No

## 1. Output questions posted by topics

```

27 -- (5) For each topic in the topic hierarchy, output the number of questions posted and total number of
28 -- answers posted within that topic.
29 SELECT COUNT(distinct Questions.qid) AS questions, COUNT(distinct Answers.aid) AS answers, Category.cname AS Category
30 FROM Questions
31 JOIN Answers ON Questions.qid = Answers.qid
32 JOIN Category ON Category.cid = Questions.cid
33 GROUP BY Category.cname

```

RESULTS			
	questions	answers	Category
1	2	4	Arts
2	8	11	Computer Science
3	2	2	Gaming
4	2	2	Physics
5	1	1	Religion

1. Keyword query  
Using match() in MYSQL.

Query 1 x Administration - Startup / Shutdo...

Limit to 1000 rows

```

219
220 -- with Boolean search
221 Select * from (
222 SELECT MATCH(title) AGAINST('+most*' IN BOOLEAN MODE) AS Relevance,
223        qid,
224        title
225 FROM questions
226 WHERE MATCH(title) AGAINST('+most*' IN BOOLEAN MODE)) A
227 ORDER BY RELEVANCE desc;
228
229

```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: |

	Relevance	qid	title
▶	0.7657322287559509	6	Which is most famous work of Leornado Da Vinci?
	0.7657322287559509	14	How do I undo the most recent local commits in ...

Web based User Interface

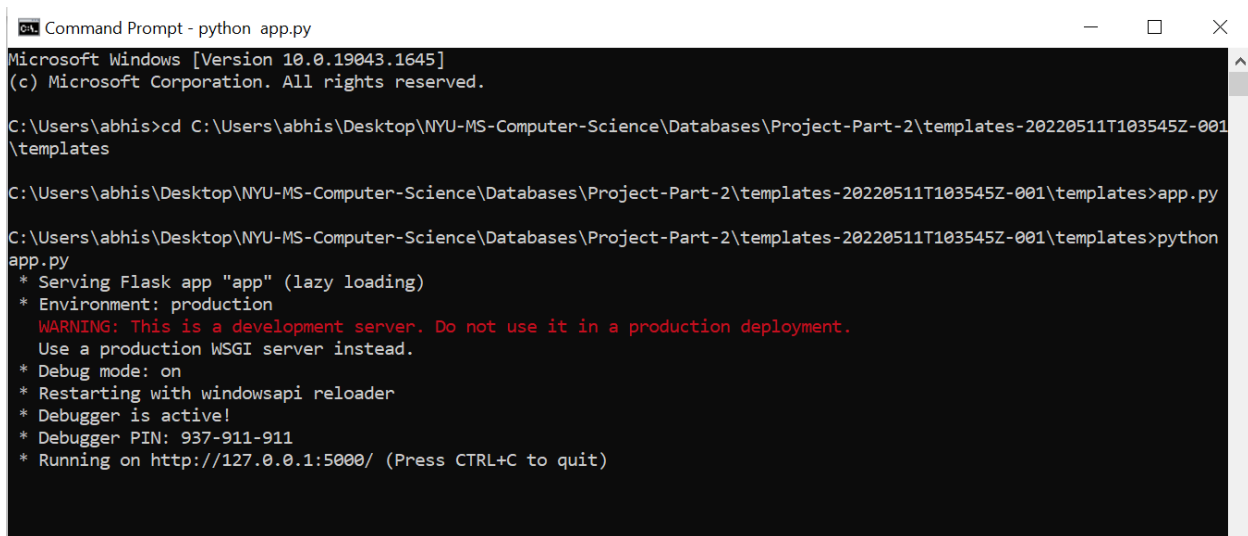
## a) Project Deployment

Following Section provides an overview of the architectural details for the Stack overglow application.

We build the project using the following components:

- 1) MySQL (DB),
- 2) MySQL.Connector/SQLAlchemy (DB connection),
- 3) Flask (Web Servlet Framework)
- 4) Python
- 5) Javascript
- 6) BootStrap (front-end library)
- 7) Cookie (**user authentication**)
- 8) Spyder/Visual Studio Code (IDE).

Setup Details: To deploy and test our project, import the whole project folder, use `flask run` command to start the project. The application is served via the local host port 5000 and can be accessed via any commonly available web browser.



```
Command Prompt - python app.py
Microsoft Windows [Version 10.0.19043.1645]
(c) Microsoft Corporation. All rights reserved.

C:\Users\abhis>cd C:\Users\abhis\Desktop\NYU-MS-Computer-Science\Databases\Project-Part-2\templates-20220511T103545Z-001\templates

C:\Users\abhis\Desktop\NYU-MS-Computer-Science\Databases\Project-Part-2\templates-20220511T103545Z-001\templates>app.py

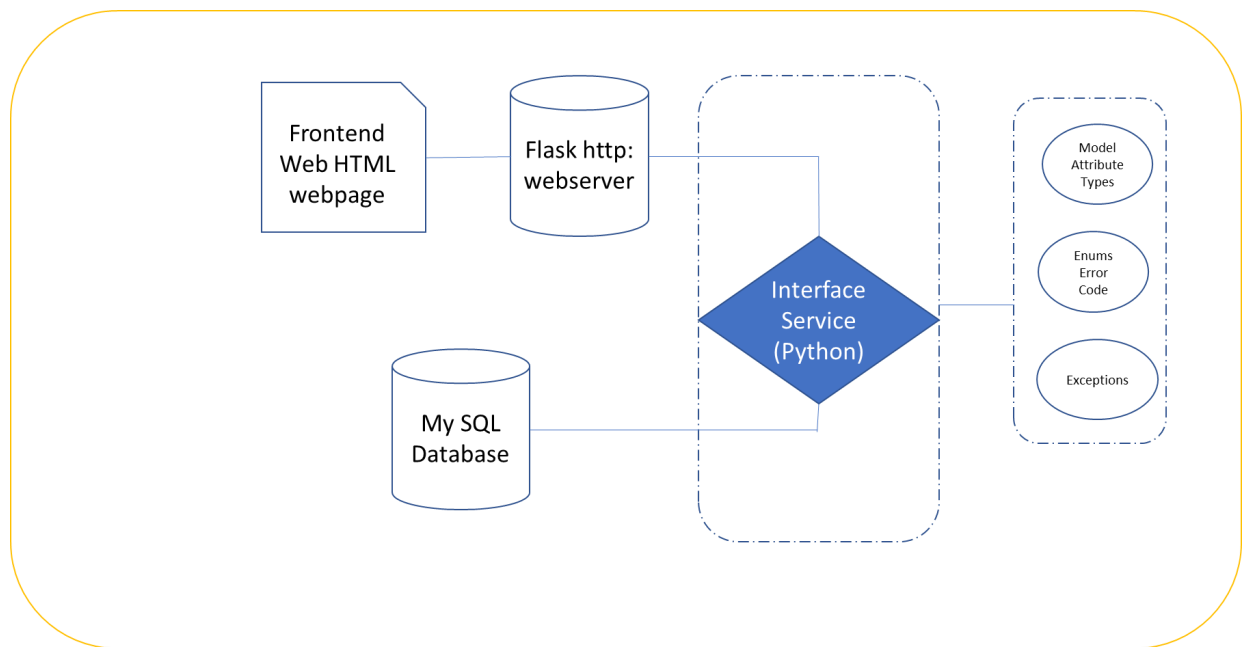
C:\Users\abhis\Desktop\NYU-MS-Computer-Science\Databases\Project-Part-2\templates-20220511T103545Z-001\templates>python app.py
* Serving Flask app "app" (lazy loading)
* Environment: production
  WARNING: This is a development server. Do not use it in a production deployment.
  Use a production WSGI server instead.
* Debug mode: on
* Restarting with windowsapi reloader
* Debugger is active!
* Debugger PIN: 937-911-911
* Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
```

Folder-File-Structure:

Name	Date modified	Type	Size
__pycache__	5/11/2022 6:41 AM	File folder	
static	5/11/2022 6:40 AM	File folder	
templates	5/11/2022 6:39 AM	File folder	
app	5/11/2022 6:49 AM	PY File	13 KB
helper	5/11/2022 6:39 AM	PY File	3 KB
tables	5/11/2022 6:39 AM	Chrome HTML Docu...	1 KB
tempCodeRunnerFile	5/11/2022 6:39 AM	PY File	1 KB

## b) Application Architecture

This part mainly describes the architecture of the application. We use Flask/Jinja to provide functionality in the frontend. Python and MYSQL database for any GET/POST requests.



### c) Core System Functionalities

A user is able to perform the following functions using the stack overglow's web based interface.

#### **Sign up User Account:**

- Create a new user with the following information stored in database:
  - o First/last name
  - o Username
  - o Password
  - o Presence
  - o Email
  - o Bio
- User is then redirected to the logged in page.

#### **User Login & authentication:**

- Check if uname and password matches to the records stored in the database
- Save user cookie (session) to session map
- remove user cookie if log out

#### **User Personal and Activity Information:**

- Display user information (profile attributes) and activity stats (questions asked, answers provided, net\_votes received, Presence score and the status tier. Activity Stats are updated with the change in user's activities.

#### **Searching Questions and Answers:**

- Search function allows both logged in and not logged in users to query for existing Questions and answers in the database using keywords. However, only logged in users can access other system functions.
- ***Search function uses MySQL's inbuilt relevance function to return results ordered by relevance scores.***

#### **Post a Question:**

- Post a question function allows users the ability to ask a question in the forum to other users.
- Logged in User's have the ability to keep a track of the answers provided.
- Posting Questions credits point towards user's Presence score and influences the user's tier.

#### **Post an Answer:**

- Logged in Users can post an answer to an existing question.

- Posting Answers credits point towards user's Presence score and influences the user's tier.

### **Like/Dislike an Answer:**

- Logged in Users can like/dislike an answer to an existing question.
- Liking-disliking Answers credits point towards user's Presence score and influences the user's tier.

### **d) Front-end UI Design**

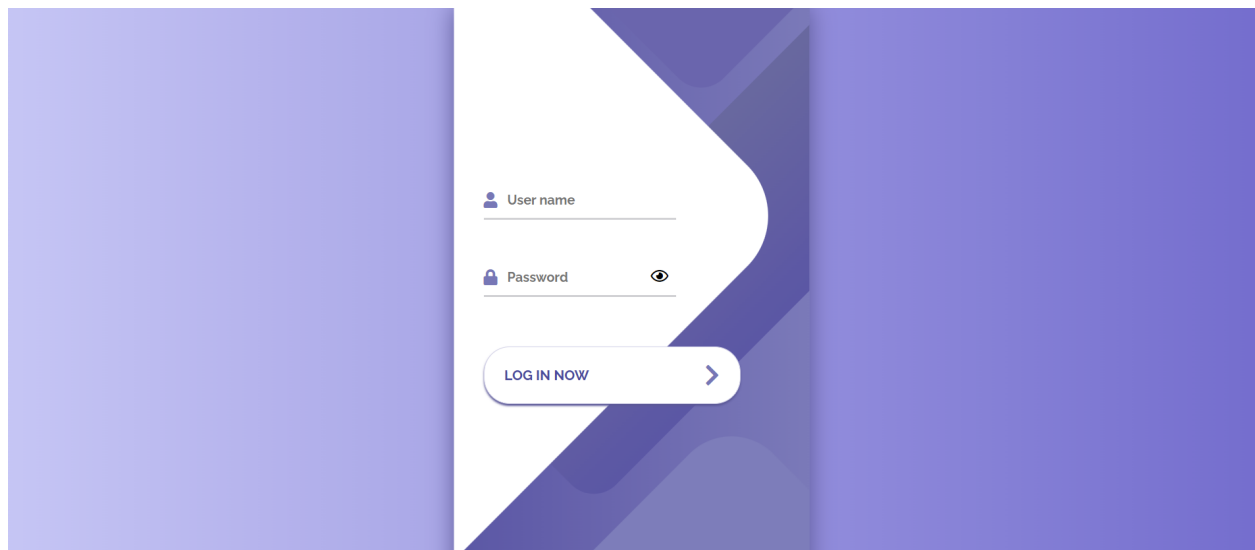
*This part mainly describes the structure of our front-end*

### **New\_splash.html**

- Landing page for the web based stack overflow application. Allows users the ability to login or signup.

### **Login.html**

- Users log in the website with their username and password.



### **Signup.html**

Allows new users the ability to register on the website and input profile information.

# Sign up

First Name	<input type="text" value="First Name"/>
Last Name	<input type="text" value="Last Name"/>
Phone Number	<input type="text" value="username"/>
Email	<input type="text" value="Email"/>
Password	<input type="text" value="Password"/>
Short bio	<input type="text" value="bio"/>

[Sign Up](#)

## Activity.html

Displays users personalized home page upon logging in and displays the following information:

- View activity feed consisting of questions asked and answers provided.

It also provides users the ability to access the following function:

- Ability to search for answers/questions existing in the database using search functionality.
- Also provides user the ability to “Post a question”
- Navigate to “View Profile Information”

Dashboard

Profile

Logout

Search

Available categories: Computer Science Physics Arts Gaming Religion

Post a Question

Post a Question

Answers given


A compiler is a special program that processes statements written in a particular programming language and turns them into machine language or code that a computer's processor uses.	2022-03-02
A neural network is a series of algorithms that endeavors to recognize underlying relationships in a set of data through a process that mimics the way the human brain operates.	2022-02-02
A stack is an array or list structure of function calls and parameters used in modern computer programming and CPU architecture. Similar to a stack of plates at a buffet restaurant or cafeteria, elements in a stack are added or removed from the top of the stack, in a 'last in first, first out' or LIFO order.	2022-01-02
Gravity is the force by which a planet or other body draws objects toward its center. The force of gravity keeps all of the planets in orbit around the sun.	2022-01-16
The Newton's three laws of motion are Law of Inertia, Law of Mass and Acceleration, and the Third Law of Motion.	2022-02-20



Questions Asked	
What are compilers?	2022-03-01
What are neural networks?	2022-02-01
Which is the most famous museum in the world?	2022-05-09
What is speed of light?	2022-05-09
What is gravity?	2022-05-09

## Profile.html

- Display personal information (including last\_name, first\_name) and activity statistics (including net votes received (upvotes-downvotes), best answers, answers provided, presence points and status tier) of current logged-in user.


Search


Your Statistics

last_name	first_name	net_vote	best_answers	answers	Presence	status
Cooper	Greg	4.0	9.0	18	96.0	3

## Search.html

- Allows user to ability to search for a keyword and returns the relevant questions and answers

Search


Dashboard
Profile
Logout

Answers

A stack is an array or list structure of function calls and parameters used in modern computer programming and CPU architecture. Similar to a stack of plates at a buffet restaurant or cafeteria, elements in a stack are added or removed from the top of the stack, in a 'last in first, first out' or LIFO order.

2022-01-02

Answers

Stack has LIFO (Last in first out).

2022-05-09

Questions

What is a stack in programming?

2022-01-01

## QA.html

- Displays a question and its corresponding answers given by the users. Logged in users can like/dislike and add an answer on this page.

Dashboard

Profile

Logout

Search

Question

qid	asker	title	body	date	Action
16	test	res	as stated in the title	2022-05-10	<div>Like</div> <div>Dislike</div>

Post an answer

Post an answer

Answers

aid	answerer	Answer	Date	Action
23	test	Answering my own question here!	2022-05-10	<div>Like</div> <div>Dislike</div>
24	test	test	2022-05-10	<div>Like</div> <div>Dislike</div>
29	test	ss	2022-05-10	<div>Like</div> <div>Dislike</div>
31	test	res	2022-05-11	<div>Like</div> <div>Dislike</div>

## e) Project Test & Use

This part details the tests we conducted on our system

### Test Case(s)

S. No	Test Description	Result
1	try to access page without login, return failure	Return failure
2	try to log in with wrong password, return failure	Return failure
3	try to log in with right password, return failure	Return success
4	logout, clean cookie, try to access page, return failure	Return failure
5	register, check whether username is already taken	Check condition
6	register	Return success, jump to main page logged in
7	Load user Question and Answers Activity,	Return activity
8	View User profile information,	Return profile information
9	Search for Q&A's using keywords	Return list of Q & A's
10	Post a Question under a specific category	Question Posted
11	View answers to posted questions	Return list of answers to the question
12	Post an answer to a question	Answer Posted
13	Like/Dislike an answer	Like/Dislike Posted

### Limitations/bugs:

1. You cannot post a question without first typing the category in a textbox. It will return an error if you do it without.
2. Net vote does not update in our profile page upon liking/disliking.
3. No display of like count.
4. Users are able to like/dislike the same item multiple times.
5. We proposed having a feature where the original poster can select 1 best answer among all answers. Did not actually implement this. Although our initial database

entries did take into account best answers and calculated Presence (our tier system) and status accordingly.

6. Cookie feature does not work in incognito mode, but basic functionalities still hold.

Extra features:

1. Cookies: logged in user skips log in if they close the tab, unless they log out, which will delete the cookie.
2. Password eye: you have the option to see what you typed in the password section in plain text in the log in page.
3. Searches are sorted by relevance. We used built-in functionality from MYSQL.