1. What is structured vs unstructured databases?

Structured databases are more traditional way of storing data. They have a rigid structure and mostly accept string/ integer/float/ Boolean etc standard datatypes. They are good for saving transactional data. They are scalable vertically but less scalable horizontally, meaning adding more data tables to the same machine is easier, but running the database across several machines is a little tricky. MySQL or Oracle is a type of structured database.  
As the amount of data being generated and analysed increased, the need for saving a more robust data increased which led to unstructured databases which allow saving data in audio, video or image format. This type of database is most useful for big data analysis or for social media/ multimedia analysis/ storage. They are typically scalable horizontally. NoSQL databases like MongoDB are unstructured databases.

1. PostgreSQL vs MySQL  
   Both are unstructured databases. PostgreSQL is better in terms of optimization, concurrency etc. PostgreSQL also allows some more datatypes like JSON, XML while MySQL does not.
2. What is Parent children relationship in model.py, what if parent is deleted ?

Parent table has multiple associated records in the child table. In models.py for example, the admin is the parent table while flag is the child table. One admin can have multiple flags, and each flag is associated with atmost one admin. Similarly parent child relationship is there between Influencer – AdRequest, Sponsor – Campaign, Sponsor – AdRequest, Campaign – AdRequest.  
Since in my implementation there are no cascading rules to decide what happens when I delete the parent table, an attempt to delete the parent table will not immediately affect the child records, but an attempt to commit the session will result in an integrity error.

After Parent Deletion (if it were to succeed):

* Child records would still exist in the database.
* Foreign key in child records would still point to the (now non-existent) parent ID.
* Accessing the parent through a child record would likely raise an error.

Deleting a parent doesn't immediately affect the child records or set their foreign keys to null. Instead, it leaves the child records pointing to a non-existent parent, which can lead to integrity issues and potential errors when trying to access the parent through the child.

HOWEVER, if you try to commit the changes, or commit the deletion, it will raise integrity error.

1. What is MVC? Which part of your code comes under Model, View, Controller?

MVC is a method of programming used mostly in web applications to organize and structure code. It also helps in separation of concerns.

Model : Manages the applications data and business logic.

View : Frontend, user interacts with the View part of the code.

Controller : enables connection/interaction between Model and View.

How it works is : when user interacts with the View (by mouse click or providing input), the controller receives a request. The controller then interacts with the Model to do the necessary actions. The Model processes the data and gives output to Controller. The controller updates the View which is seen by the user.

In my code, the models.py + database is the MODEL, HTML templates are the View and routes.py is the controller.

1. What is ORM?

ORM is Object Relational Mapping. ORM allows developers to interact with relational databases using object-oriented programming. Instead of writing SQL queries to manage database operations, developers can work with classes and objects in their programming language and ORM translates these operations into SQL queries. Each table in your database is a class in ORM, each column an attribute.

Essentially, make the life of developers easier, they do not have to deal with intricacies of SQL.

1. What is DOM?

Document Object Model – DOM represents the structure of webpage as a tree structure, allowing programs (JavaScript) to manipulate the contents, structure and style of webpages dynamically. DOM also allows event handling.

1. What is Git? What other functions does Git have apart from tracking? What is Git and what are its uses? Is Git distributed or client server? Is Git centralized or distributed?

Git is a version control system used to track changes in files and coordinate work among multiple people on a project.

Branching, Merging, Version Control, Collaboration, History tracking. Git is a distributed version control system. Git is distributed over client.

1. What are the different types of Requests? Can you in a GET Request? Can we use GET to make changes? Can we submit data using GET?
   1. GET

Used to send a query from client to server. Fetches data from server. Data is sent as a part of URL. Idempotent. Does not change to state of the server. It is possible to send data in a GET request.

* 1. POST

Send data to server to create / update a resource. Data is sent in the body of the request. Non-Idempotent. Changes the state of the server. Commonly used for submitting forms or uploading files.

* 1. PUT

Update an existing resource on the server or create one if it doesn’t exist. Idempotent. Sending the same request multiple times produces the same result.

* 1. PATCH: Same as PUT, but only changes specified fields, doesn’t change the whole resource. Idempotent.
  2. DELETE: Deletes resource from server. Idempotent.
  3. HEAD: Similar to GET but only retrieves the HEAD part of response not the body.
  4. OPTIONS: Check available methods for a resource.
  5. CONNECT: Establish a secure tunnel (for HTTPS).
  6. TRACE: Diagnose and debug requests.

1. What database model have you used?

SQLite

1. What is REST API?

Representational State Transfer. REST is a state of rules for building and interacting with web services. All communication done via REST API uses HTTP requests.

REST is stateless, meaning the server does not save any session information about the client. The request from client to server must contain all the information required to process the request.

This allows a clear distinction between the client and the server. They are independent.

REST also enables multiple clients, for e.g. mobile apps, web apps, third party apps can all interact with the same server using REST API

REST is also very scalable, since client and server are separate, one can simply deploy more servers when traffic increases with no change in client-side code.

1. What is template inheritance? Where is it used in your code?

Template inheritance allows developers to create a base template and extend it in child templates. This promotes code reusability, maintainability and organization.

1. What are JS Tags?

<script> tag which is used to embed JavaScript code in HTML templates.

1. What are HTML ids and classes?

In HTML, ids and classes are used to identify and style elements of the webpage.

Id is a unique identifier for each element.

Class is used to group together different elements that share common behaviour or style.

document.getElementById(‘id’)

document.getElementByClassName(‘class’)

1. Differentiate between id and name attributes in html?

Id is used to uniquely identify elements in webpage.

Name is primarily used to identify form elements and associate them with the data they submit. Does not need to be unique. Used in form submission.

1. What are the different types of CSS and what is their precedence? What attribute do we use to start CSS in inline, internal, or external CSS?

Inline > Internal > External

Inline : applied directly to HTML tag using style attribute.

Internal: written within <style> tag in <head> section of HTML

External: written in a different .css file and added to HTML using a <link> tag.

Even within CSS, #id has the highest precedence, .class has mid preference, element selectors (like div,p) has least precedence.

1. How to call and handle JS functions using ids?

Document.getElementById(“mybutton”)

1. HTTP and HTTPS full form, which one is best? Which one is more secure? What security measures does HTTPS use to ensure security?

HTTP – HyperText Transfer Protocol

HTTPS – HyperText Transfer Protocol Secure

HTTPS is more secure. Data sent over HTTPS is encrypted using SSL(Secure Socket Layer) or TLS(Transport Layer Security). HTTPS uses digital certificates to authenticate identity of servers.

1. Client server vs Distributed architecture

In client server architecture, all data is stored on the server. So there is single point of failure. It has limited scalability. Client interacts with only one server.   
In distributed architecture, data is stored on multiple nodes, as a result this architecture is more tolerant towards fault. It is more scalable compared to centralized system, simply add more nodes. Different nodes communicate with each other.  
Eg : Flipkart vs BitTorrent

1. How does network security work between client and server?

Network security involves encryption (e.g., SSL/TLS), secure protocols (e.g., HTTPS), and authentication mechanisms to protect data integrity, confidentiality, and availability during communication between client and server.

1. Show your database
2. What is the meaning of public and private campaigns?
3. How do we get element of particular id or class in CSS? When do you use ID and when do you use class?

Use #id for IDs and .class for classes in your CSS to style the respective elements.

Use Cases: IDs should be used for unique elements; classes should be used when you need to apply the same styles to multiple elements.

1. What technology is used for templating?

Jinja2

1. Is class inheritance same as template inheritance?

No, class inheritance refers to object-oriented programming, template inheritance refers to HTML structure in web development.

1. What are sessions and cookies? Where are they stored?

Cookies are small pieces of data(upto 4 KB) stored on client machine. They are used to remember the user for future visits. Cookies are automatically deleted after sometime when they expire. Mostly used to remember user preferences.

Sessions are server side storage mechanisms, used to store data temporarily while the user interacts with the web app. Sessions are temporary and expire with 15-30 mins of inactivity or when user logs out. They can store more data compared to cookies. Used for authentication/ user state. Maintain user specific data while user navigates the app.

1. What is class and what is object? What are classes in JavaScript?

In the context of OOP, a class is a blueprint or template for creating objects. It has a set of attributes and methods that the created object will have.

An object is an instance of a class. An object has its own state and behaviour. The state is determined by the attributes.

1. What are the benefits of using Bootstrap?
   1. Cross browser compatibility, the website looks same irrespective of the browser used.
   2. You can maintain the consistent formatting and style across the website.
   3. There are predesigned components like navbars, forms, buttons, alerts, etc
2. How is the database connected to your code?

Using SQLAlchemy

1. In many applications we see that if we login then we can perform tasks and have access for a long time without getting logged out by itself, what do you think is behind this functionality? How does this work?

Session management.

1. What is Visual Studio Code and Git?
2. What is the difference between render\_template() and redirect()?

render\_template() is used to render a HTML page.

redirect() is used to send the user to a different URL. Generally, render\_template is used with GET requests, redirect is used for POST requests to avoid resubmission of forms.

1. What is db.Model?

db.Model acts as the bridge between your Python code and SQL databases, enabling you to work with your database in a more intuitive and Pythonic way while maintaining the ability to perform complex database operations behind the scenes.

1. What is @app.route?

The @app.route decorator is applied to a function to specify the URL endpoint and the HTTP methods (like GET, POST) that it should respond to.

1. What is the difference between backref and backpopulates?

backref is considered legacy behaviour, back\_populates is preferred. backref only needs to be configured in one table, either parent or child, not both.

If you use back\_populates, the relationship needs to be defined on both parent or child.

1. What is db.relationship?

db.relationship is used to establish relationship between 2 tables. It provides a convenient way to access records.

1. Can HTML template handle Boolean values? YES
2. Authentication vs authorisation. How have you implemented authorisation?

Authentication – Who is the user?

sponsor\_required, influencer\_required, admin\_required

Authorisation – What can this user do?

Using if else blocks

1. What is load balancing?

When you have a single server architecture, and there is a huge traffic, the server gets overwhelmed by the no of requests and the responses are slower. In such case, load balancing is implemented where we balance the loads amongst multiple servers.

There are various methods of doing this – round robin, weighted round robin, IP Hash etc

You can have a physical load balancer to do this, you can have a software that does it or cloud frameworks that do it for you.

1. What is scaling?

Scaling refers to the ability of the system or the app to efficiently handle increased workloads or demands. They are 2 types – vertical scaling and horizontal scaling. Vertical scaling is when you add more power (CPU, RAM, storage) to the same servers. Horizontal is when you increase the no. of servers

1. Constraints of REST API?
2. Uniform Interface – There should be a uniform way of interacting with server irrespective of device or type of app (mobile/web etc)
3. Statelessness
4. Cacheable – Every response must include whether it is cacheable or not and for how long
5. Client Server – client and server are separate entities
6. Layered system – there can be various layers between client and server and the client might not know about it
7. Code on demand – Servers can provide executable code to client. This is optional
8. What did you learn from project?
9. What is CDN?

A CDN is essentially a system of distributed servers that deliver web content to users. Suppose I wish to retrieve some information from a server that is geographically distant from me, then instead of connecting to the server, I will connect to the nearest CDN and that CDN will deliver the required information to me. CDN is faster because it uses cacheing to store information. In a similar fashion, Bootstrap CDN allows us to use bootstrap’s styling functionality without storing all the css and javascript files on the local system.

1. What is Flask?

Flask is a web framework that enables developers to build quick easy lightweight and efficient applications.

1. Advantages and disadvantages of SQLite

Advantages:

1. Lightweight and self-contained
2. Serverless
3. Easy to setup and use
4. Open source

Disadvantages:

1. Limited Concurrency: database locks up during write actions
2. Size Limits: Doesn’t perform well on large datasets.
3. Limited Scalability

Alternatives:

1. PostgreSQL
2. MySQL
3. MongoDB
4. Alternative to REST API

GraphQL

gRPC

1. Explain normalization

Normalization is the process of building databases with the aim to reduce redundancy, simplify data structure and improve data integrity.

1 NF : All columns have non-divisible values.

2 NF : All non-key attributes must be fully dependent on primary key.

3 NF : Non key attributes must not depend on other non key attributes.

1. What is a decorator?

In Python, a decorator is a function that modifies the behaviour of another function without changing the original function’s code.

In Flask, decorators are executed before the actual function is executed. For eg. The decorator

@app.route() first maps the function to thr URL endpoint and then executes the code  
@login\_required decorator first checks login then executes function.

1. What are SPAs

As the name suggests, it is a single page application. Instead of loading new page every time, the loaded page changes dynamically according to user interaction. They are single HTML pages. They often utilize client side routing. SPAs are faster, more responsive.

SEO is challenging. Initial load time can be longer. Heavily dependent on JavaScript.

1. What is Lazy Loading?

Data is retrieved only when it is requested / needed. This reduces the initial load time significantly. N+1 query problem : Trying to access related data might result in many additional queries effectively slowing down the system.

1. What is Ajax?

Asynchronous JavaScript and XML

AJAX allows webpages to communicate with the server asynchronously, making the webpage more interactive and dynamic.

1. Can flask endpoint return a Boolean value? YES
2. Can you make changes using GET request? YES but not recommended due to security issues.
3. Explain HTTP stateless protocol. (Same as stateless)
4. Where is DOM effective? Client side or server side?
5. ER Diagram
6. What is uselist

class Sponsor(db.Model):

\_\_tablename\_\_ = 'sponsors'

id = db.Column(db.Integer, primary\_key=True)

campaigns = db.relationship('Campaign', back\_populates='sponsor') # This is treated as a list (default uselist=True)

class User(db.Model): \_\_tablename\_\_ = 'users' id = db.Column(db.Integer, primary\_key=True) profile = db.relationship('Profile', back\_populates='user', uselist=False) # One-to-one relationship #Returns a single object

1. How is ChartJS implemented in the admin page?
2. How do secret keys work? Were they used in your project, how?
3. What is aria-current in bootstrap?

Code Modifications

1. Change the backend such that the username of user is added in the uppercase only even if the user provides input in mixed alphabets.

username.upper()

1. Change the frontend such that users can only enter 10 letters as Username.

<input type="text" id="username" name="username" **maxlength="10"**>

1. Change the colour of navbar.

<nav class="navbar navbar-light" style="background-color: #e3f2fd;">

1. He also asked me to perform some basic operations like creating campaigns, editing and deleting them.
2. Restrict the full name to 10 characters. If the character count exceeds this limit, a warning should be shown on the client side.
3. Change position of submit button to the top left corner of the web page.
4. What if hacker hacks your database? Implement password security feature
5. Add delete button to remove a particular search result
6. Change port to 8000

*if \_\_name\_\_ == ‘\_\_main\_\_’:  
   app.run(debug=True,* ***port=port\_number****)*

1. What change do you need to make if you want want to run your app on linux/mac
2. Add constraints so that user makes strong password
3. Can you change the url\_ for ,so it can through error
4. Change the url\_for so it take route name to connect
5. What if I login, then close the tab and reopen it? Will I still be logged in?
6. asked me to shift the signup option to the rightmost corner of the page.
7. Change background colour of login page.