1. Why is API Necessary?

What: APIs (Application Programming Interfaces) allow applications to communicate by exposing functionalities or data through endpoints.

Why: APIs enable seamless interaction between systems, reduce duplication of effort, and promote modular application development. They act as bridges between different software, ensuring flexibility and interoperability.

When to Use: APIs are necessary when systems need to exchange data or functionality, such as integrating a front-end application with back-end services, consuming third-party services, or enabling automation.

How to Use: APIs are accessed using HTTP methods (GET, POST, PUT, DELETE). You must understand the API documentation, authenticate requests (if required), and send data in the specified format (e.g., JSON, XML).

Use Case: An e-commerce mobile app uses APIs to fetch product catalogs, add items to the cart, and process payments by connecting the front end to back-end systems.

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2. Different Types of APIs

What: APIs are classified into different types based on their design and purpose:

- **REST (Representational State Transfer):** Lightweight, scalable, and widely used.
- **SOAP (Simple Object Access Protocol):** Standardized protocol with higher security.
- **GraphQL:** Flexible querying of specific data fields.
- **gRPC:** High-performance, language-agnostic RPC (Remote Procedure Call).
- **Webhooks:** Event-driven callbacks.

Why: Each type is designed for specific use cases, such as simplicity (REST), transactional reliability (SOAP), or customizable queries (GraphQL).

When to Use:

- **REST:** For lightweight web applications requiring standard operations.
- **SOAP:** When security and reliability are critical (e.g., banking).
- **GraphQL:** For apps needing flexibility in data retrieval.

Use Case: A social media app might use REST APIs for posting data, GraphQL for retrieving dynamic user feeds, and Webhooks for real-time notifications.

3. What is a Web Service, and How Does It Differ from an API?

What: A web service is a type of API designed to communicate over the web using standard protocols like HTTP.

Why: Web services provide standardized communication between systems, often using XML (SOAP) or JSON (REST). APIs are broader, supporting additional protocols like WebSocket or TCP.

Difference:

- **API:** A broader concept that includes all software interfaces (e.g., WebSocket-based, library-based).
- **Web Service:** A subset of APIs, limited to web-based communication over HTTP/HTTPS.

Use Case: A weather web service fetches real-time data over HTTP, whereas an API can also work with IoT devices over protocols like MQTT.

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4. What are the Basic Checks or Prerequisites Before Starting API Testing?

What: Essential steps to ensure a smooth testing process include:

- ✓ Verifying the API documentation (request/response structure).
- ✓ Setting up the test environment (staging/QA).
- ✓ Acquiring authentication tokens/credentials.
- ✓ Validating the endpoint availability.

Why: These checks ensure that the API is functional and prevent initial failures due to missing configurations.

How to Use: Tools like Postman, Swagger, or API testing frameworks like RestAssured can validate these prerequisites.

Use Case: Before testing a payment API, verify that the sandbox URL is accessible, the API key is valid, and the request schema matches the documentation.

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5. How Do You Handle Chains of API Testing?

What: API chaining involves executing a sequence of API calls, where one API's response is used as the input for another.

Why: This approach replicates real-world scenarios like user workflows and ensures the system's end-to-end functionality.

When to Use: Use chaining in scenarios where multiple dependent actions occur, such as login, fetching user data, and updating account details.

How to Use: Tools like Postman allow you to store responses as variables (`pm.environment.set()`) and pass them to subsequent requests.

Use Case: In a flight booking app, use the Login API to authenticate, the Search API to find flights, and the Booking API to confirm reservations.

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6. Apart from Headers, Where Can You Provide Username and Password in Postman?

What: Credentials can be passed in multiple ways based on the API's authentication type:

- ✓ **Authorization Tab:** Using Basic Auth, Bearer Token, or OAuth2.
- ✓ **Request Body:** For APIs requiring credentials in the payload.
- ✓ **URL Parameters:** Sometimes used in GET requests (not recommended for sensitive data).

Why: Different APIs use different mechanisms for authentication, and it's important to follow their guidelines.

When to Use: When accessing secured APIs that require user authentication.

Use Case: A banking API may require the username/password in the Authorization tab for Basic Auth, while a login API may need them in the request body.

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7. How Do You Manage Historical Challenges in APIs?

What: Common challenges include backward compatibility, changes in response structures, and performance degradation.

Why: Managing these challenges ensures smooth integration with existing systems and avoids disruptions for end users.

How to Use:

- Version APIs (e.g., `/v1/users`, `/v2/users`).
- Maintain a robust change log for API updates.
- Monitor API performance using tools like JMeter or Postman.

Use Case: When updating an API from v1 to v2, ensure that v1 remains functional for older clients while allowing new features in v2.

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8. What is a Payload?

What: The payload refers to the data sent in the body of an HTTP request. This data is processed by the server to perform the requested operation.

Why: Payloads carry the necessary information, such as user details, form submissions, or file uploads, for the API to process the request.

When to Use: In POST, PUT, or PATCH requests, where data needs to be submitted or updated.

How to Use: The payload is typically structured in JSON, XML, or form-data formats.

Use Case: Submitting user details in JSON format during a registration process.

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9. Difference Between URI and URL

What:

- **URI (Uniform Resource Identifier):** A unique identifier for a resource (e.g., `/users`).
- **URL (Uniform Resource Locator):** A URI that specifies the location of a resource (e.g., `https://api.example.com/users`).

Why: Understanding these concepts is crucial for designing and consuming APIs effectively.

Use Case: Define URIs for resources and expose them as URLs for client access.

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10. JSON and XML Format Differences

What:

- **JSON:** Lightweight, human-readable, supports only UTF-8.
- **XML:** Verbose, supports multiple encodings, allows attributes.

Why: JSON is more efficient for modern APIs, while XML is used when complex document structures are needed.

Use Case: JSON is preferred for REST APIs fetching user details, while XML might be used in SOAP APIs for banking transactions.

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11. How Do You Upload an Excel File in Postman and Use Its Values in API Requests?

What: Uploading Excel files helps in parameterizing data for multiple requests.

Why: This is used for testing APIs with large sets of dynamic inputs.

How to Use: Convert the Excel file to CSV/JSON, upload it in Postman Runner, and map the values dynamically.

Use Case: Use customer data from an Excel sheet to test bulk user registration APIs.

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12. How Do You Store Response Values in Postman and Retrieve Them?

What: Postman allows storing response values as variables to be reused across requests.

Why: This helps in chaining APIs and using dynamic data in subsequent requests.

How to Use:

Extract values using `pm.response.json()`.

Store values using `pm.environment.set()` or `pm.collectionVariables.set()`.

Use variables in requests (`{{variableName}}`).

Use Case: Extract an authentication token from a Login API and pass it in the Authorization header of the next API.
