API (Application Programming Interface) is a set of rules that allows different software applications to communicate with each other. It defines how requests and responses should be structured so that one system can request data or functionality from another system.

### ****Types of APIs****

1. **Web APIs** – Used for web-based communication (e.g., REST, SOAP, GraphQL).
2. **Library APIs** – Functions provided by libraries to be used in programs.
3. **Operating System APIs** – Allows software to interact with an OS (e.g., Windows API, POSIX).
4. **Hardware APIs** – Used to communicate with hardware components (e.g., DirectX for graphics).

### ****How APIs Work****

1. A client sends a request to an API endpoint (e.g., GET https://api.example.com/users).
2. The API processes the request and fetches data or performs an action.
3. The API sends back a structured response, usually in **JSON** or **XML** format.

### ****What is an API Endpoint?****

An **API endpoint** is a specific URL where an API receives requests and sends responses. It represents a function or resource that the API provides.

JSON (JavaScript Object Notation) is a lightweight data format used to store and exchange data. It is easy for humans to read and write and easy for machines to parse and generate. JSON is commonly used in APIs, web applications, and databases.

{ "name": "Maaz", "age": 22, "languages": ["English", "Farsi", "Pashto", "Urdu"], "skills": { "frontend": ["HTML", "CSS", "JavaScript"], "backend": ["ASP.NET Core"], "database": ["Firebase", "PostgreSQL", "MySQL"] } }

### ****Key Features of JSON:****

* Uses **key-value pairs** (like dictionaries in Python).
* Data is enclosed in **curly braces** {}.
* Supports **arrays** [] for lists of data.
* Commonly used for **web APIs** (RESTful APIs return JSON responses).

const jsonData = JSON.stringify(data); /// this is when you want to pack it

const jsonData = JSON.parse(data);  // it will change it back to javascripte code

Axios is a popular JavaScript library used to make HTTP requests from web browsers and Node.js. It is often used for fetching data from APIs and sending data to servers.

### ****Key Features of Axios:****

1. **Promise-based** – Uses Promises, making it easier to handle asynchronous requests.
2. **Supports HTTP Methods** – GET, POST, PUT, DELETE, etc.
3. **Automatic JSON Handling** – Converts JSON responses automatically.
4. **Request & Response Interceptors** – Modify requests or responses before they are handled.
5. **Timeouts & Error Handling** – Handles request timeouts and errors efficiently.
6. **Supports Canceling Requests** – Useful in scenarios like search suggestions.
7. **Cross-browser Support** – Works in both frontend (browser) and backend (Node.js).

**import axios from 'axios';**

**axios.get('https://jsonplaceholder.typicode.com/posts')**

**.then(response => {**

**console.log(response.data);**

**})**

**.catch(error => {**

**console.error('Error fetching data:', error);**

**});**

**axios.post('https://jsonplaceholder.typicode.com/posts', {**

**title: 'My New Post',**

**body: 'This is the content of my post',**

**userId: 1**

**})**

**.then(response => {**

**console.log('Post created:', response.data);**

**})**

**.catch(error => {**

**console.error('Error posting data:', error);**

**});**