

<image/nation>
Future-proof Tech Skills

Specially designed for



HKU
BUSINESS
SCHOOL
港大經管學院

Masters
Programmes

2026/2027

Rapid Prototyping for Digital Entrepreneurs

by

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Sunny NG

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Founder & Master Trainer Image Nation 隨想國度

26-Year IT & New Media Experience

AI, Cloud, Blockchain, Web, Mobile, Database & IoT Applications Development

19-Year University Teaching & Tech Training

HKU / HKUSPACE / EdUHK / CityUHK

Certifications & Professional Qualifications

Microsoft Certified Azure Developer, AI Engineer & Github Copilot

AWS Certified Solution Architect, Developer, Data Engineer, Machine Learning Engineer & AI Practitioner

Alibaba Cloud Certified Professional in Cloud Computing

Accredited Educator for AWS Academy

Accredited Educator for Microsoft Learn for Educator (MSLE)

Accredited Educator for Oracle Academy

Accredited Educator for Cisco Networking Academy



Setup Check List

- Make sure you have a Gmail account. If you don't, create one and make sure you can log in to the following services
 - <https://gmail.com>
 - <https://gemini.google.com>
- Figma (Use Google Single Sign-on to access it)
 - <https://www.figma.com/>
- Canva (Use Google Single Sign-on to access it)
 - <https://www.canva.com/>
- Lovable (Use Google Single Sign-on to access it)
 - <https://lovable.dev/>

In this workshop (3 hours)

- **Understanding Software Stack:** Front-End vs. Back-End
- **Understanding SDLC:** Software Development Life Cycle
- **Design Thinking & UX Mindset:** User Driver Innovation
- **Rapid Prototyping:** Progressively Design, Validate and Adapt
- **Popular AI Tools:** AI Disruptions in Innovation and Prototyping
- **Understanding GenAI:** How LLM & GenAI Works
- **Mastering GenAI:** Effective Prompting, Codes Generation, UX Design Generation
- **AI-Powered Prototyping:** From Concept to Working MVP

To download the slides

tinyurl.com/hkin-dl



Let's Hack

what forms a web application

Open **yahoo.com.hk** in Google Chrome & Use Dev Tools

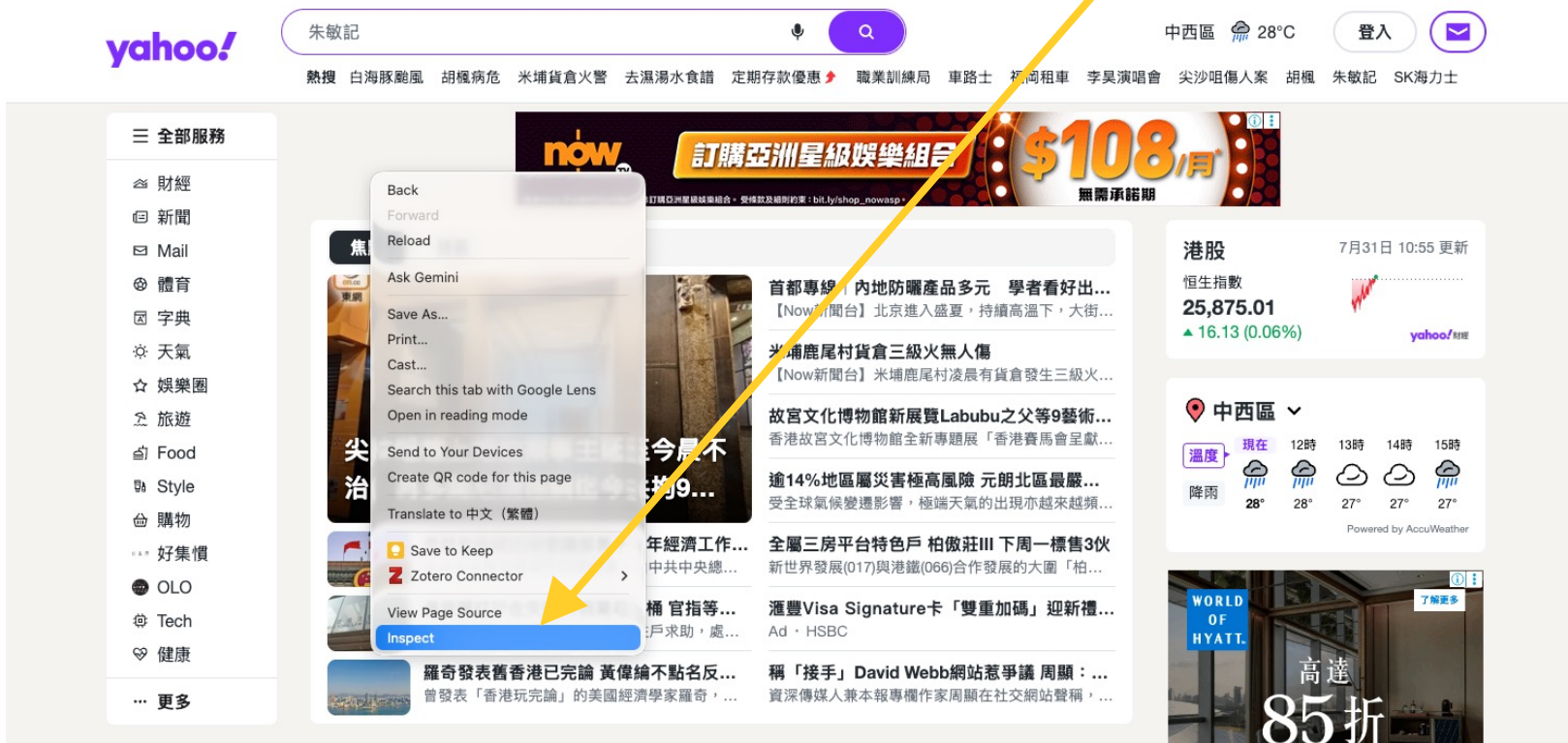
The screenshot displays the Yahoo! Hong Kong homepage. At the top, there's a search bar with the text "朱敏記" and a microphone icon. To the right, it shows the location "中西區" with a weather icon and "28°C", along with a "登入" (Login) button and a mail icon. Below the search bar, a horizontal list of trending topics includes "熱搜 白海豚颱風 胡楓病危 米埔貨倉火警 去濕湯水食譜 定期存款優惠 職業訓練局 車路士 福岡租車 李昊演唱會 尖沙咀傷人案 胡楓 朱敏記 SK海力士".

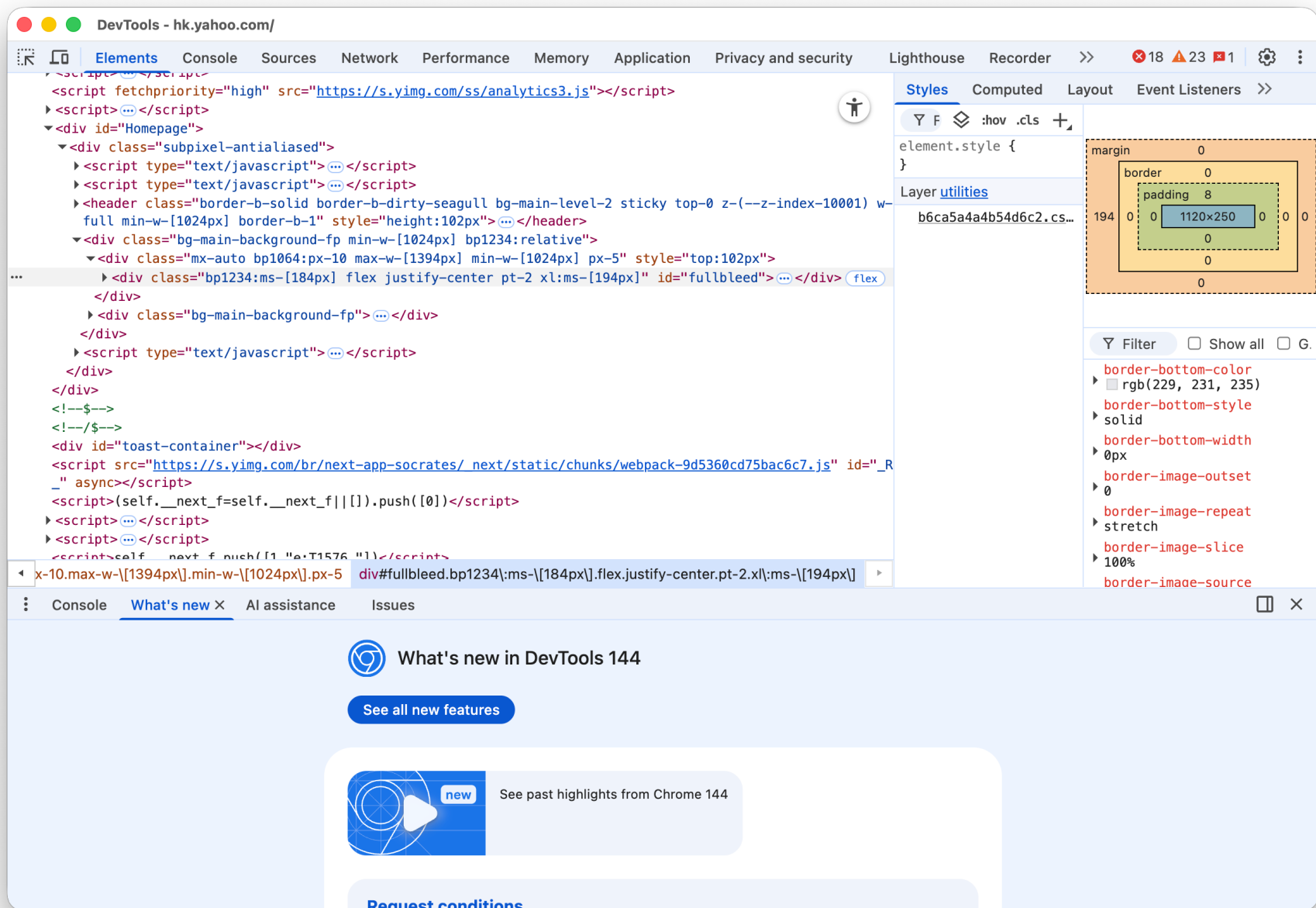
The main content area is divided into several sections. On the left, a sidebar titled "全部服務" (All Services) lists various categories like 財經 (Finance), 新聞 (News), Mail, 體育 (Sports), 字典 (Dictionary), 天氣 (Weather), 娛樂圈 (Entertainment), 旅遊 (Travel), Food, Style, 購物 (Shopping), 好習慣 (Good Habits), OLO, Tech, and 健康 (Health). The main content area features a large banner for "now TV" with the text "訂購亞洲星級娛樂組合 \$108/月 無需承諾期". Below this, there are several news articles. The first article is titled "尖沙咀樓上吧血案主延至今晨不治 再多兩尼漢落網迄今共拘9..." (A blood case on a bar in Tsim Sha Tsui has been delayed until this morning, and two more Nihilists have been arrested, bringing the total to 9...). Other articles include "首都專線 | 內地防曬產品多元 學者看好出..." (Capital Hotline | Diverse domestic sunscreen products, scholars看好 out...), "米埔鹿尾村貨倉三級火無人傷" (Three-level fire in Mui Wo Deer Tail Village warehouse, no one injured), "故宮文化博物館新展覽Labubu之父等9藝術..." (The Summer Palace Cultural Museum's new exhibition 'The Father of Labubu' and 9 other artists...), "逾14%地區屬災害極高風險 元朗北區最嚴..." (Over 14% of the area is at a very high risk of disaster, Yuen Long North is the most severe...), "全屬三房平台特色戶 柏傲莊III 下周一標售3伙新世界發展(017)與港鐵(066)合作發展的大圍「柏..." (All are three-bedroom platform-style units, Pak Oi Ching III, 3 units for sale next Monday, New World Development (017) and MTR (066) joint development in Tai Wai 'Pak...'), "匯豐Visa Signature卡「雙重加碼」迎新禮..." (HSBC Visa Signature Card 'Double加码' New Year gift...), and "羅奇發表舊香港已完論 黃偉綸不點名反..." (Loke Yee-chi publishes 'Old Hong Kong is over' theory, Wong Wai-lun does not name him in response...). On the right side, there's a "港股" (Hong Kong Stock) section showing the Hang Seng Index at 25,875.01, up 16.13 (0.06%). Below that is a weather section for "中西區" showing a temperature of 28°C and a forecast of rain. At the bottom right, there's an advertisement for "WORLD OF HYATT" with the text "會員獲享高達 8折" (Members enjoy up to 80% off).

To Open Chrome Dev Tools

At Google Chrome browser content area

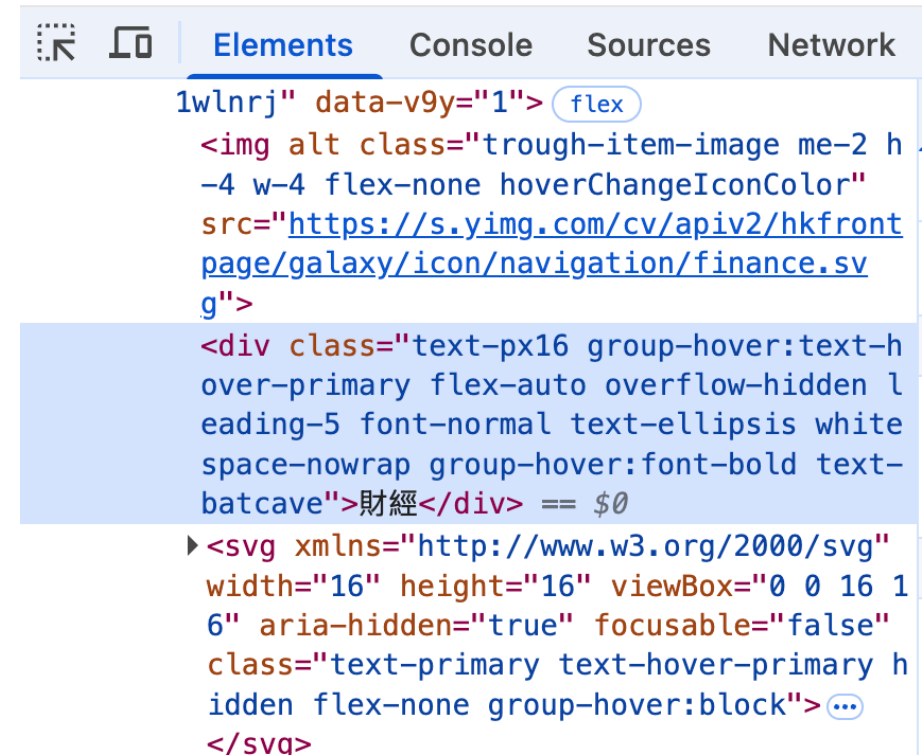
Right-click -> Choose "Inspect"





Hack #1: Modify HTML contents

- Choose **Elements** tab
- Double-click any DOM object and make some changes to DOM:
Document **O**bject **M**odel
- You will see updated web contents in the browser content area

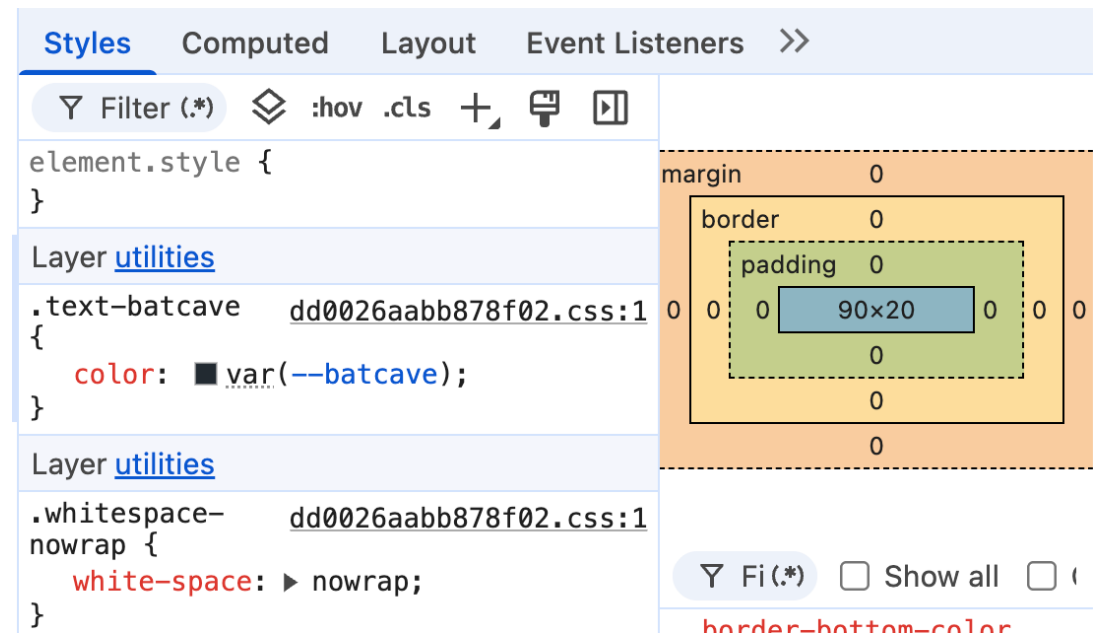


```
1wlnrj" data-v9y="1"> flex

<div class="text-px16 group-hover:text-h
over-primary flex-auto overflow-hidden l
eading-5 font-normal text-ellipsis white
space-nowrap group-hover:font-bold text-
batcave">財經</div> == $0
▶ <svg xmlns="http://www.w3.org/2000/svg"
width="16" height="16" viewBox="0 0 16 1
6" aria-hidden="true" focusable="false"
class="text-primary text-hover-primary h
idden flex-none group-hover:block"> ...
</svg>
```

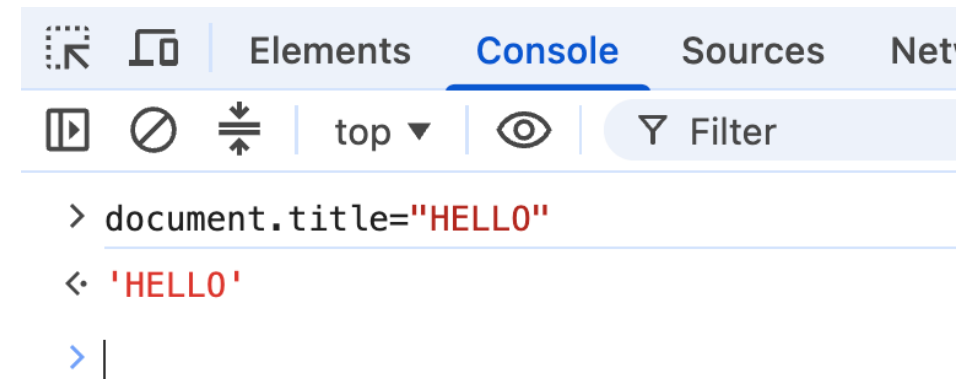
Hack #2: Modify CSS styles

- Right-click at any **news category** on the page and choose **Inspect**
- In the **Styles** tab, scroll all the way till you see `color` property
- Change the color to your favorite one e.g. green



Hack #3: Code some JavaScript

- Choose **Console** tab
- Type the following statement
 - `document.title="HELLO"`
- You will see the title of the browser tab change to "Hello"



Front-end Web Development Triangle

- HTML 
- CSS 
- JavaScript (JS) 

A web page is a combination of codes in HTML, CSS & JavaScript files that are combined and rendered nicely by a browser

Most application software on market are web-based applications.

JavaScript Playground

Good for learning and practicing web development

- JS Fiddle
- Codepen
- RunJS

jsfiddle.net

The screenshot displays the jsfiddle.net web application. The interface is divided into several sections:

- Header:** Includes navigation links like Run, Save, Fork, Set as base, Collaborate, and Embed. A green button labeled "Change" indicates the fiddle listing shows the latest version. There are also links for Settings and a power icon.
- Left Sidebar:**
 - User Profile:** Sunny NG, Image Nation - Hong Kong.
 - Fiddle meta:** Fetch Demo, No description.
 - Private fiddle:** A toggle switch is turned on, with an "EXTRA" label.
 - Groups:** A section with an "EXTRA" label.
 - Resources:** Links for URL and cdnjs.
 - Async requests:** A section for asynchronous requests.
 - Other (links, license):** A section for additional links and license information.
 - Audience Network:** A section with a "Get Started" button and a "Meta" logo.
 - Boost your app monetization:** A section with text about Meta's people-based advertising solutions and a link to "ads via Carbon".
- Main Content Area:**
 - HTML:** Contains three lines of HTML code:

```
1 <div>Weather Forecast</div>
2 <div>
3 <div id="output"></div>
```
 - JavaScript + No-Library (pure JS):** Contains ten lines of JavaScript code using the Fetch API to retrieve weather data from the Hong Kong Open Data API and update the output div:

```
1 Fetch("https://data.weather.gov.hk/weatherAPI/opendata/weather.php?dataType=fnd&lang=tc")
2 .then(response => response.json()) // getting response
3 .then(data => { // processing JSON data
4   console.log(data)
5   document.querySelector("#output").innerHTML = data.generalSituation;
6   console.log(data.seaTemp.place);
7   console.log(data.weatherForecast[0].forecastDate);
8 }
9 );
10
```
 - CSS:** Contains one line of CSS code:

```
1
```
 - Preview:** Displays the rendered output, which is a heading "Weather Forecast" followed by a paragraph of Chinese text about the weather forecast for the upcoming week.
 - Console:** A section at the bottom showing the output of the JavaScript code, including the JSON response from the API and the updated HTML content of the output div.

JSFiddle Example 1

Lucky Draw Mini Game

- <https://jsfiddle.net/sunnyng/trsa271m/25/>

Lucky Draw

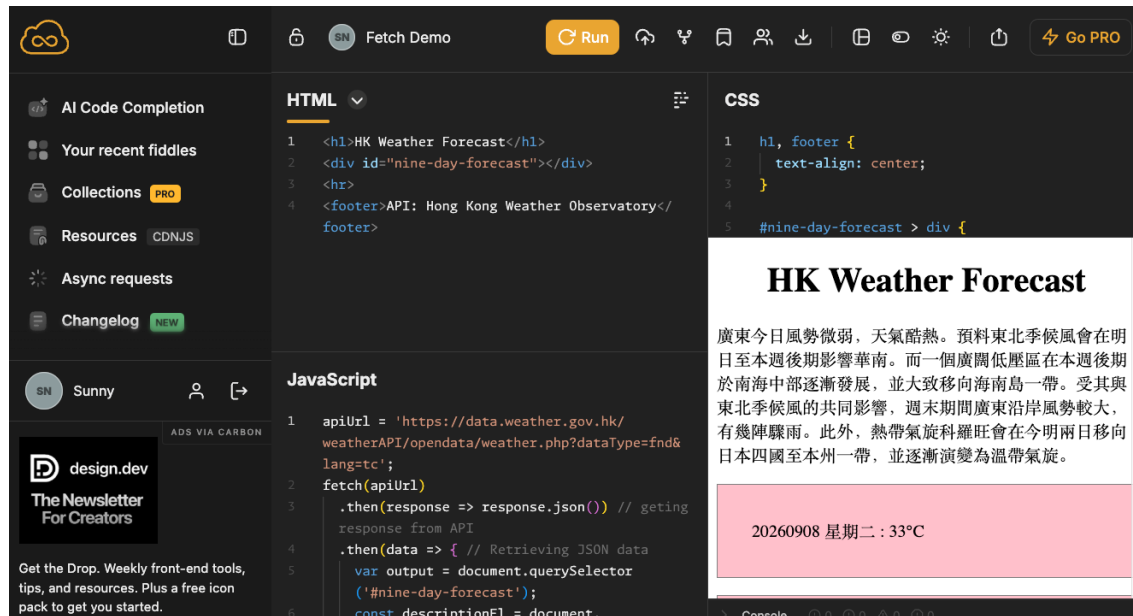
?

PLAY

JSFiddle Example 2

Weather Forecast Mini App

- <https://jsfiddle.net/sunnyng/bf0k2ezm/131/>



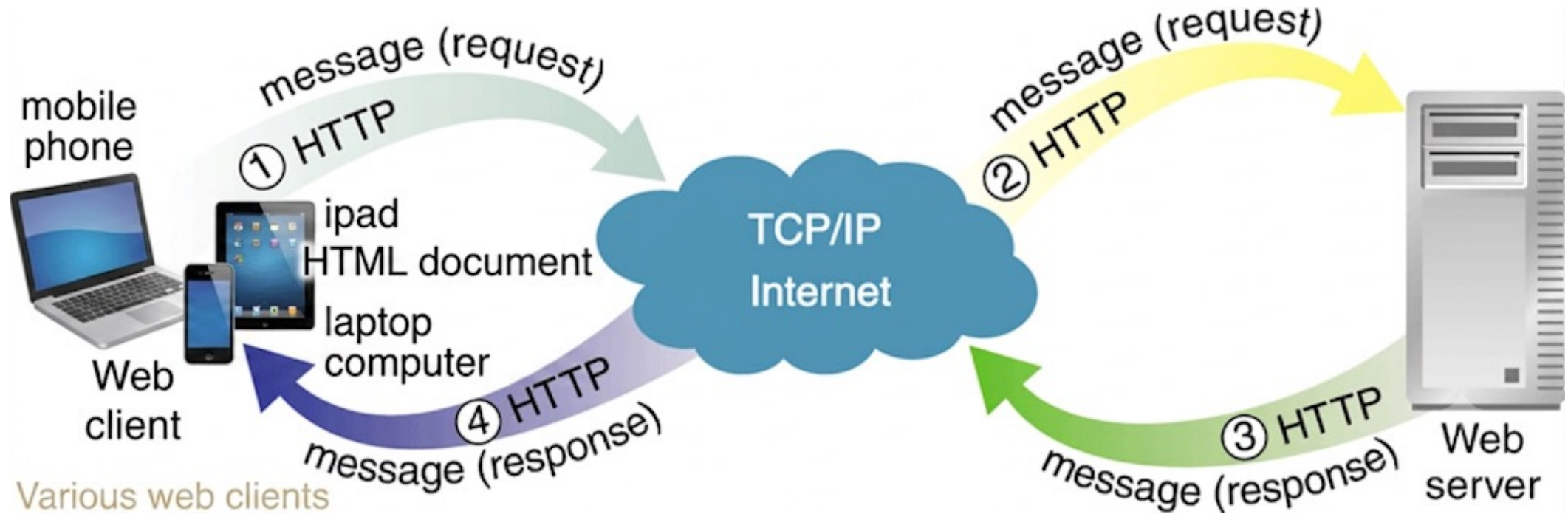
Software Stack

Modern Software Building Blocks

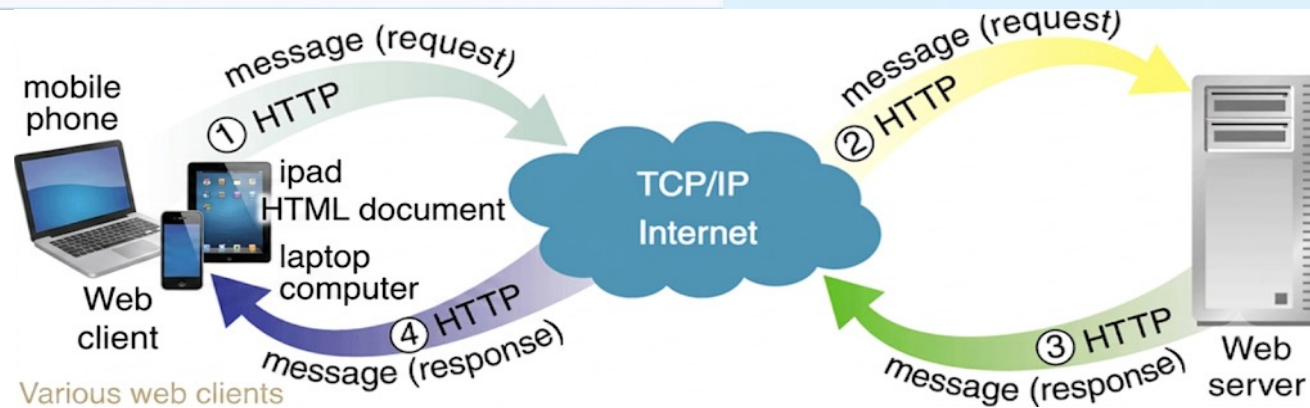
Software Stack

A software stack is a **set of integrated technology components** - ranging from operating systems and databases to programming languages and client-side tools - that work in tandem to support the execution of a web application.

When you run an app, your device talks to a server in **HTTP** protocol



Front-End vs. Back-End





LATEST TOP POPULAR FRONT-END WEB DEVELOPMENT STACK

Modern, fast, scalable and developer-friendly front-end stack used by developers in **2024/2025**.

CORE TECHNOLOGIES



React

A JavaScript library for building user interfaces.

LIBRARY



TypeScript

Typed superset of JavaScript that improves scalability.

LANGUAGE



Next.js

The React framework for production-grade web applications.

FRAMEWORK



Tailwind CSS

Utility-first CSS framework for rapid UI development.

CSS FRAMEWORK



shadcn/ui

Beautifully designed, accessible components built with Radix UI and Tailwind CSS.

UI COMPONENTS



TanStack Query

Powerful data fetching, caching and state synchronization.

DATA FETCHING

DEVELOPER EXPERIENCE & TOOLS



Vite

Next-generation build tool for blazing fast development.



ESLint

Identify and fix problems in JavaScript/TypeScript code.



Prettier

Opinionated code formatter for consistent and clean code.



Git

Version control system for collaborative development.



VS Code

Powerful code editor with amazing extensions ecosystem.



pnpm

Fast, disk space efficient package manager.

★ WHY THIS STACK?

✓ High Performance

✓ Great Developer Experience

✓ Scalable & Maintainable

✓ Strong Community Support

✓ Production Ready

🌐 This stack is widely used in production by companies and developers worldwide.

| Stay curious. Keep building.





LATEST TOP POPULAR BACK-END WEB DEVELOPMENT STACK



Modern, scalable, secure and cloud-ready stack used by developers in **2024/2025**.

CORE BACKEND TECHNOLOGIES



Node.js

Fast, non-blocking JavaScript runtime for scalable network apps.

RUNTIME



TypeScript

Typed JavaScript that improves code quality and maintainability.

LANGUAGE



NestJS

Progressive Node.js framework for building efficient, scalable server-side apps.

FRAMEWORK

express

Express.js

Minimal and flexible Node.js web framework.

WEB FRAMEWORK



Prisma ORM

Modern ORM for Node.js & TypeScript with type safety and auto-completion.

ORM



Zod

TypeScript-first schema validation for robust inputs & outputs.

VALIDATION



Redis

In-memory data structure store for caching, sessions and real-time apps.

CACHING

DATABASES



PostgreSQL

Powerful, open-source relational database.



MongoDB

Flexible NoSQL document database.



MySQL

Reliable, open-source relational database.



SQLite

Lightweight embedded database.



Supabase

Open-source Firebase alternative with Postgres.

DEVELOPER EXPERIENCE & TOOLS



Git

Version control for collaborative development.



Docker

Containerization for consistent environments.



ESLint

Identify and fix problems in JavaScript/TS code.



Prettier

Opinionated code formatter for consistent style.



Jest

Testing framework for unit and integration tests.



VS Code

Powerful IDE with extensions ecosystem.



Swagger / OpenAPI

Design, document and test APIs effortlessly.



WHY THIS STACK?



High Performance



Scalable & Reliable



Type Safety



Developer Friendly



Open Source & Cost Effective



Cloud Ready

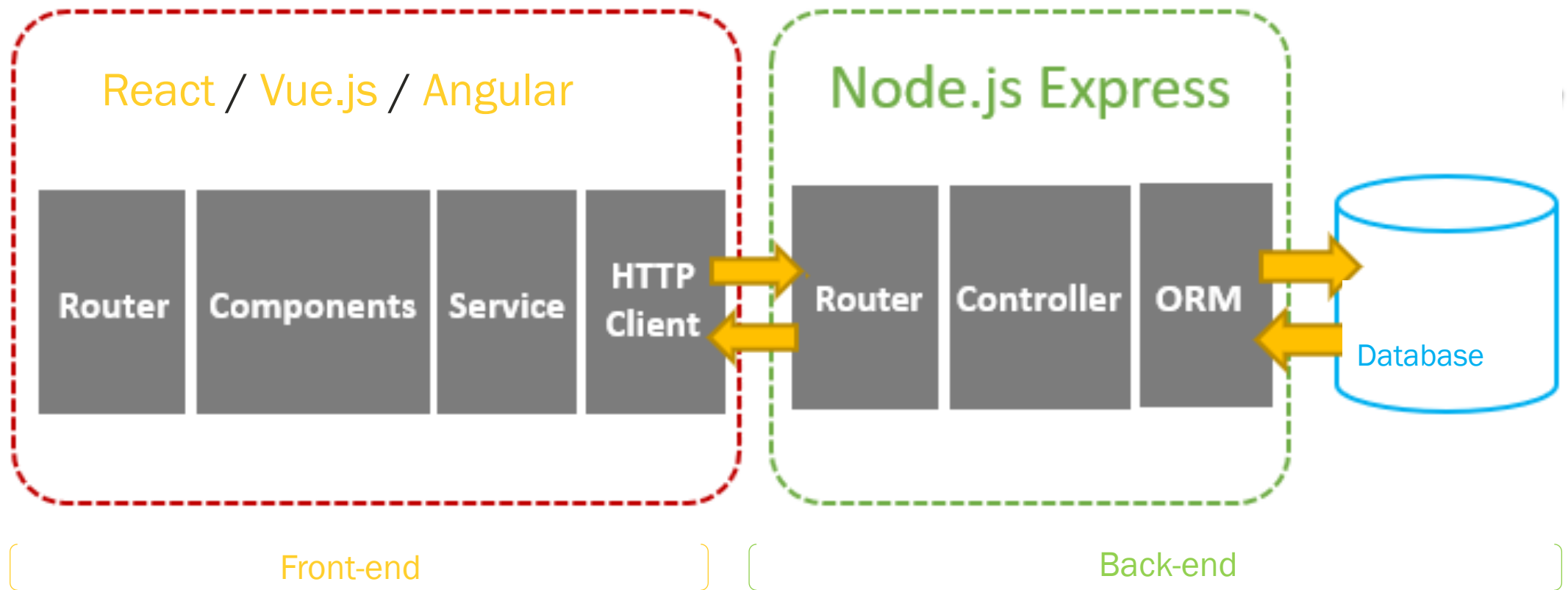


Widely used in startups, SaaS products and enterprise applications worldwide.

Build robust APIs. Ship faster. Scale with confidence.



A sample modern full-stack web app



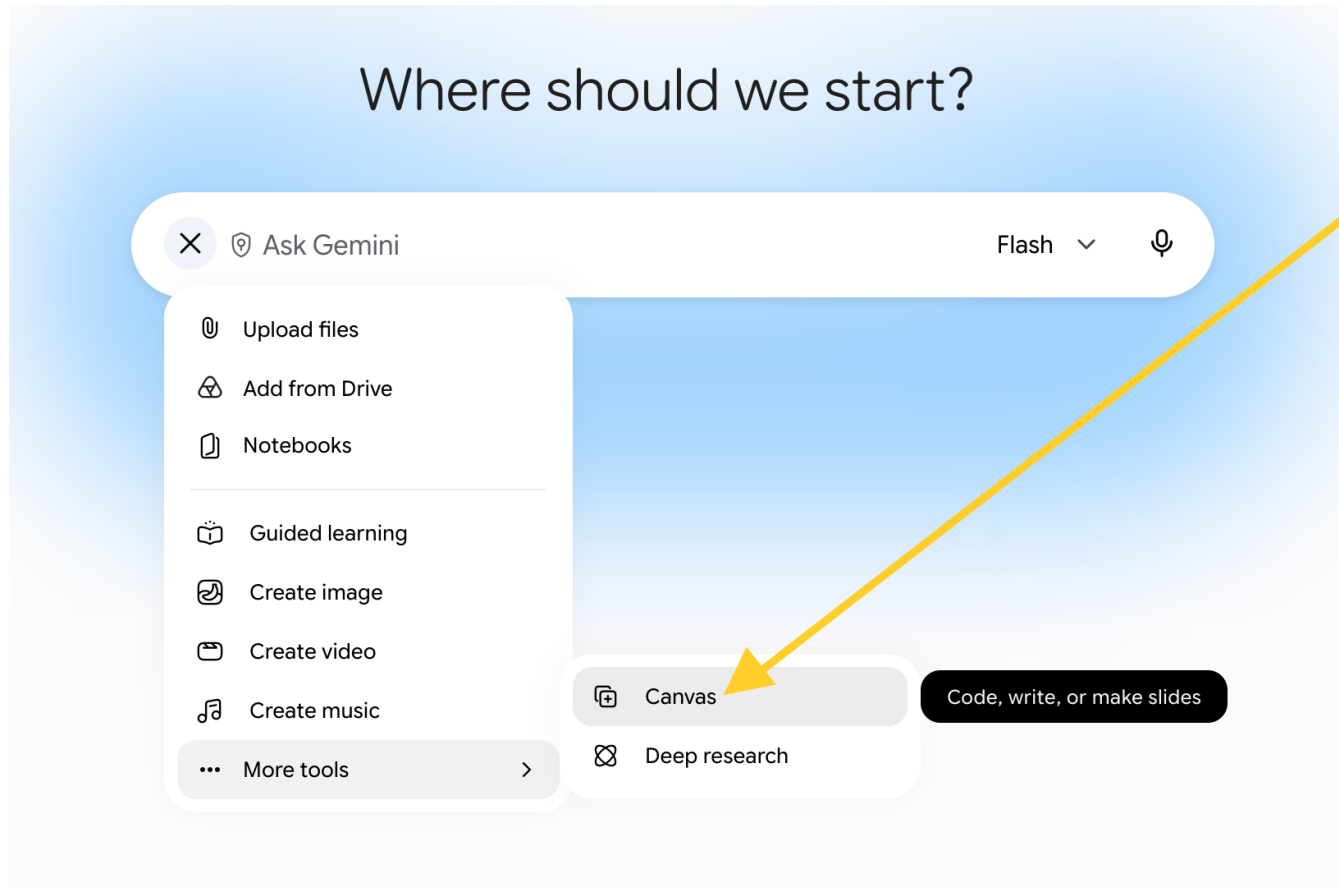
Hand-on Moment

Let's use **Gemini** to generate a few simple apps.

Exercise 1

Use the following prompt in Gemini

Create a lucky draw app that generate a random number between 1000 and 2000



If you choose
“Canvas”
generation
type, you will
be able to run
the app right
there in
Gemini.

Exercise 2

Use the following prompt in Gemini

Create a to do list app that supports multiple categories

Exercise 3

Use the following prompt in Gemini

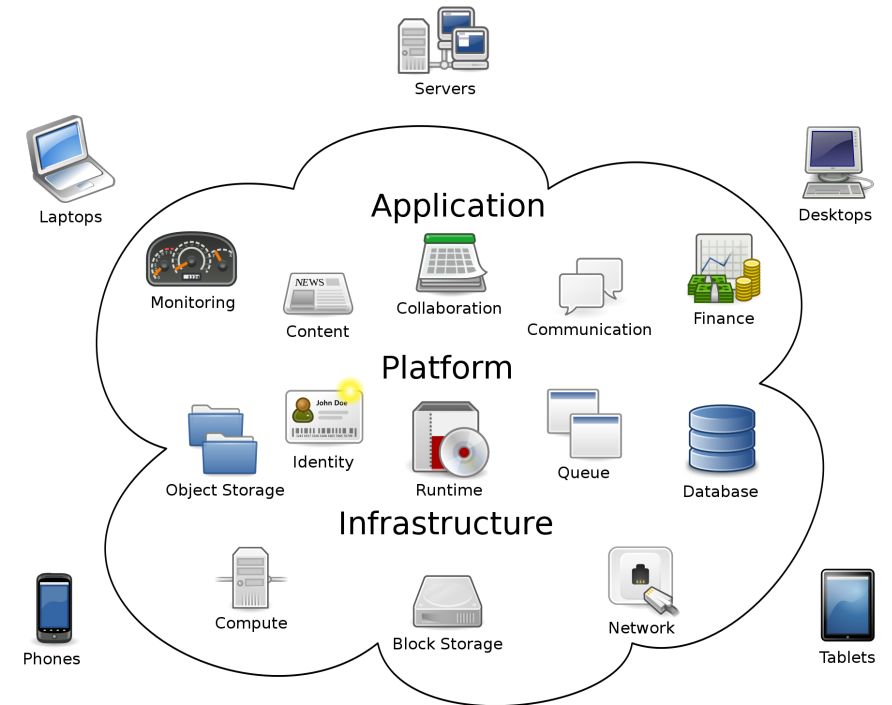
Create a flappy-bird-like game that use a flying goose as game character. When a play lose the game, the goose turn into a Cantonese roast goose. Make it good for child level players.

Understanding Cloud Computing

The modern computation to power back-end applications

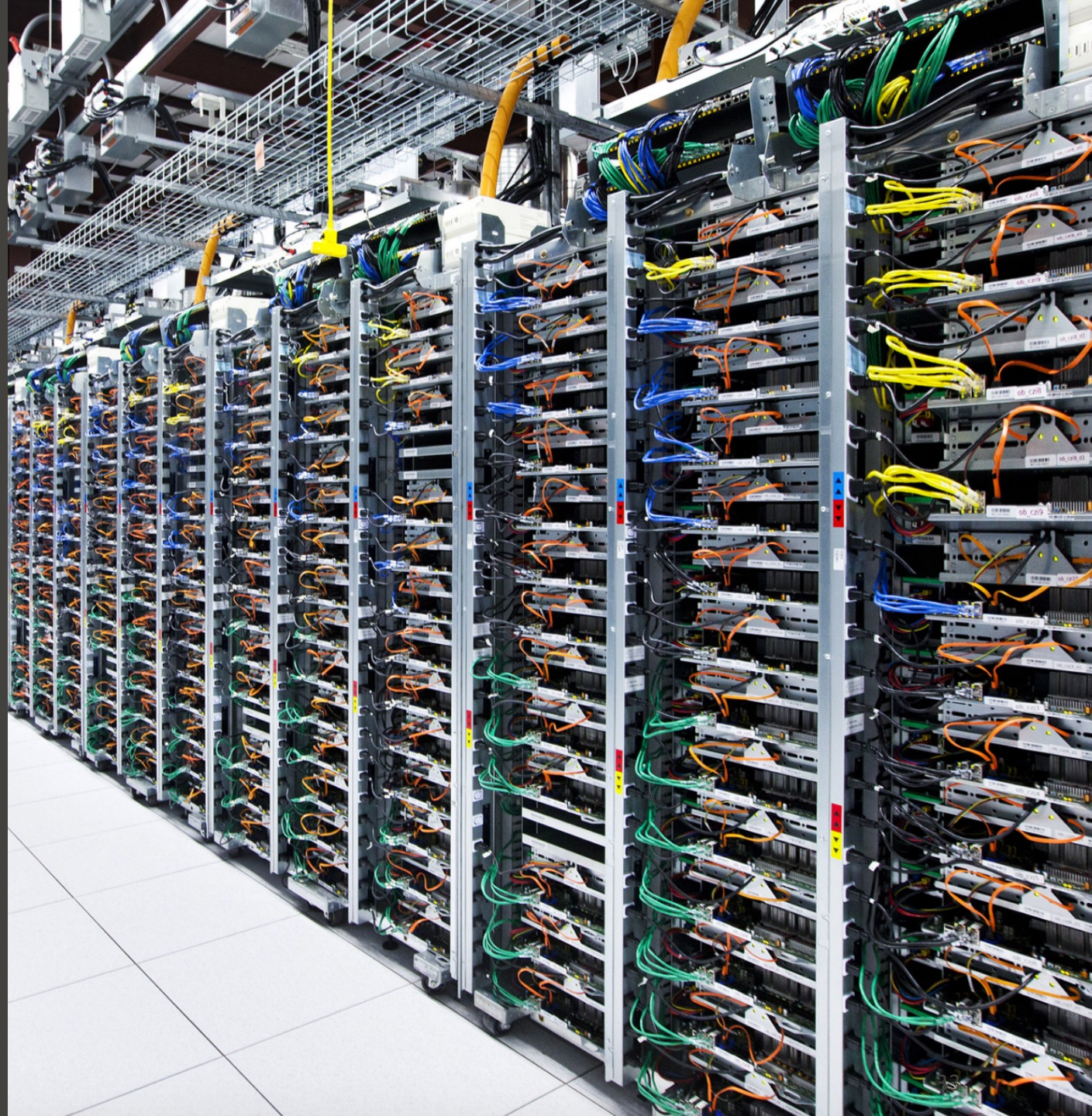
Cloud Computing

- On-demand rental of computing hardware and software
- Can easily scale to fit dynamic needs
- No hardware purchase (CapEx)
- No hardware maintenance is required
- Popular cost-reduction strategy for companies of all sizes
- Cloud service models: IaaS, PaaS, SaaS



Limitless Computation Power

Cloud providers build their data centers to provide “limitless” computation power.



Cloud Service Models

- **IaaS** - Infrastructure as a Service
- **PaaS** - Platform as a Service
- **SaaS** - Software as a Service

IaaS vs. PaaS vs. SaaS

	Service Item	Self Host	IaaS	PaaS	SaaS
	Data center physical plant/building		✓	✓	✓
	Networking firewalls/security		✓	✓	✓
	Servers and storage		✓	✓	✓
	Operating systems			✓	✓
	Development tools, database management, business analytics			✓	✓
	Applications/apps				✓

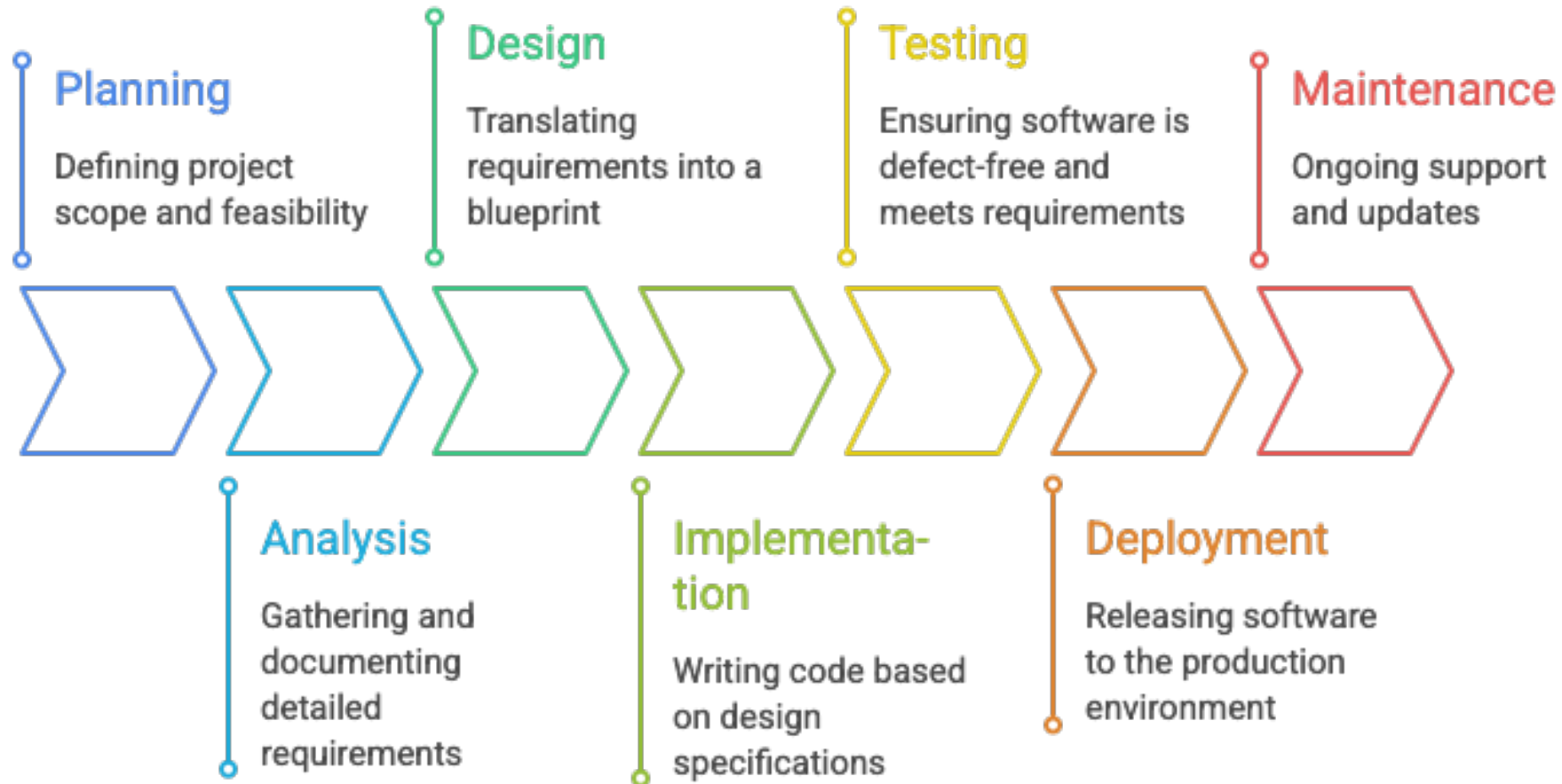
Major Cloud Vendors

- Amazon Web Services (AWS)
- Google Cloud Platform (GCP)
- Microsoft Azure
- Oracle Cloud
- Alibaba Cloud
- Huawei Cloud

SDLC

Software Development Life Cycle

Software Development Life Cycle Phases



Made with  Napkin

For large scale project, this cycle can easily take months or years to complete.

Problem with traditional SDLC

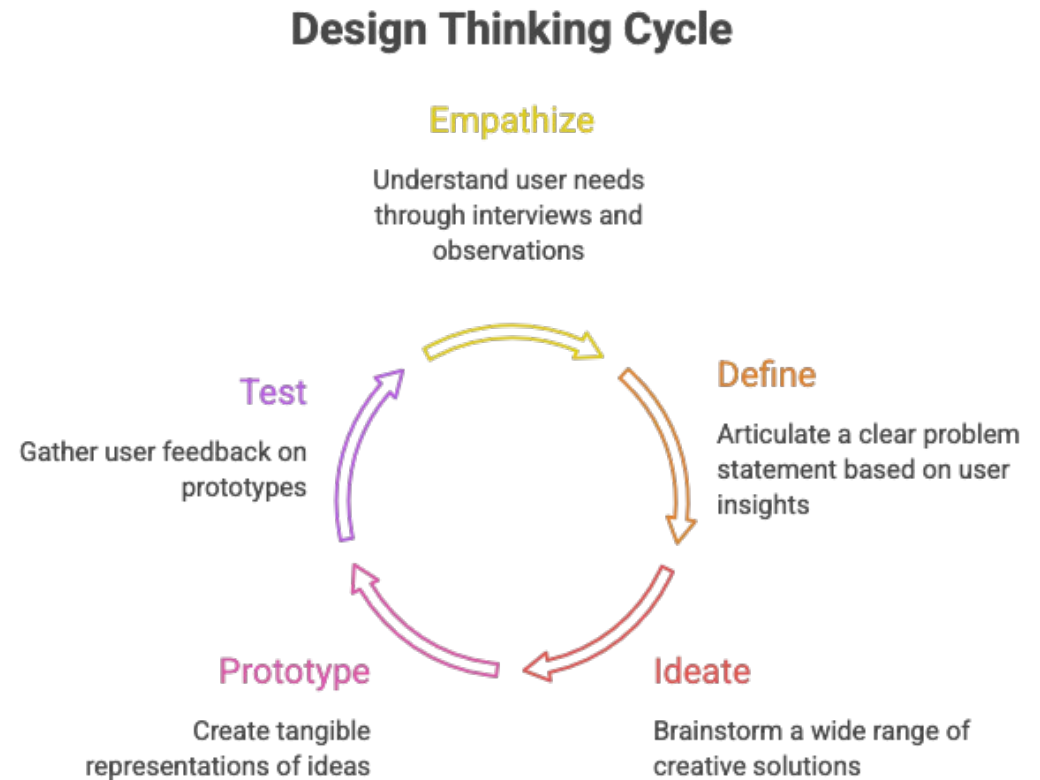
- The primary drawback of the traditional Waterfall SDLC model is its rigid, linear structure, which makes it **highly susceptible to project failure** if requirements change, as it **defers critical testing until the end** and **restricts the ability to make adjustments** mid-development.
- Waterfall SDLC is NOT a good fit for modern innovation as software requirements are often unknown and change rapidly

Design Thinking

User-centered creative problem-solving and innovation

What is Design Thinking?

- Design thinking is a user-centred, iterative methodology used for creative problem-solving and innovation.
- It focuses on understanding user needs and challenging assumptions to generate effective solutions.



Made with  Napkin



Design Thinking Session

User Centered Design Canvas

A tool that focuses on users and leads to innovation

3. PROBLEMS	4. MOTIVES	1. BUSINESS	8. COMPETITIVE ADVANTAGES	6. SOLUTIONS	
	5. FEARS	2. USERS			7. ALTERNATIVES
		9. UNIQUE VALUE PROPOSITION			

Rapid Prototyping

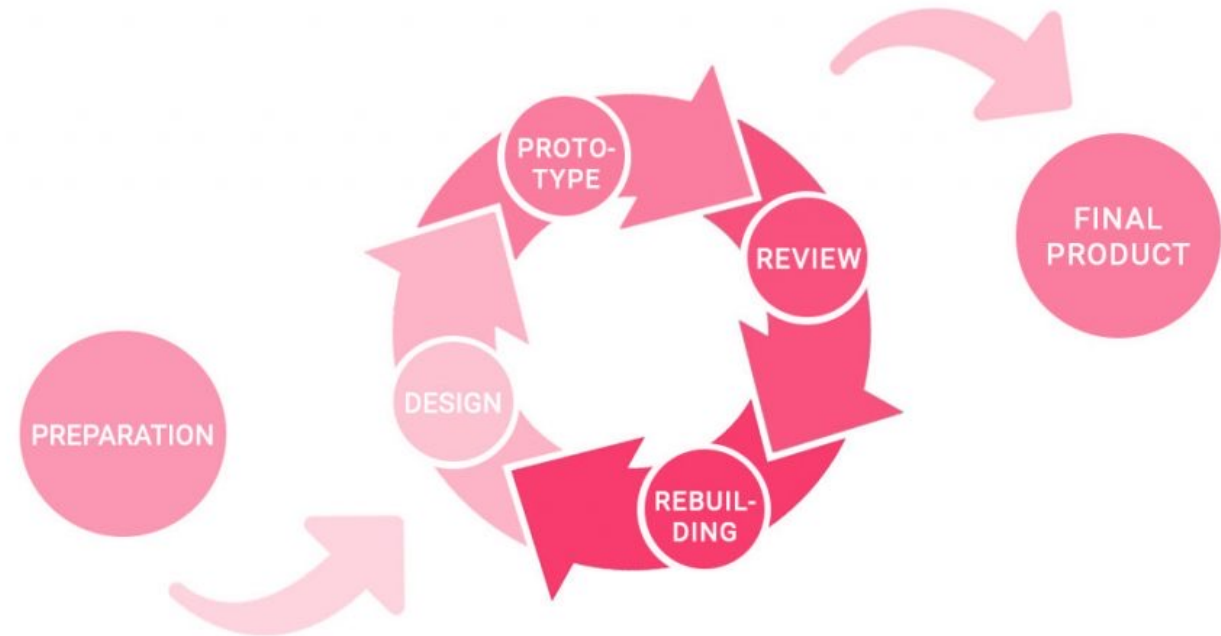
Little-by-little Agile Development

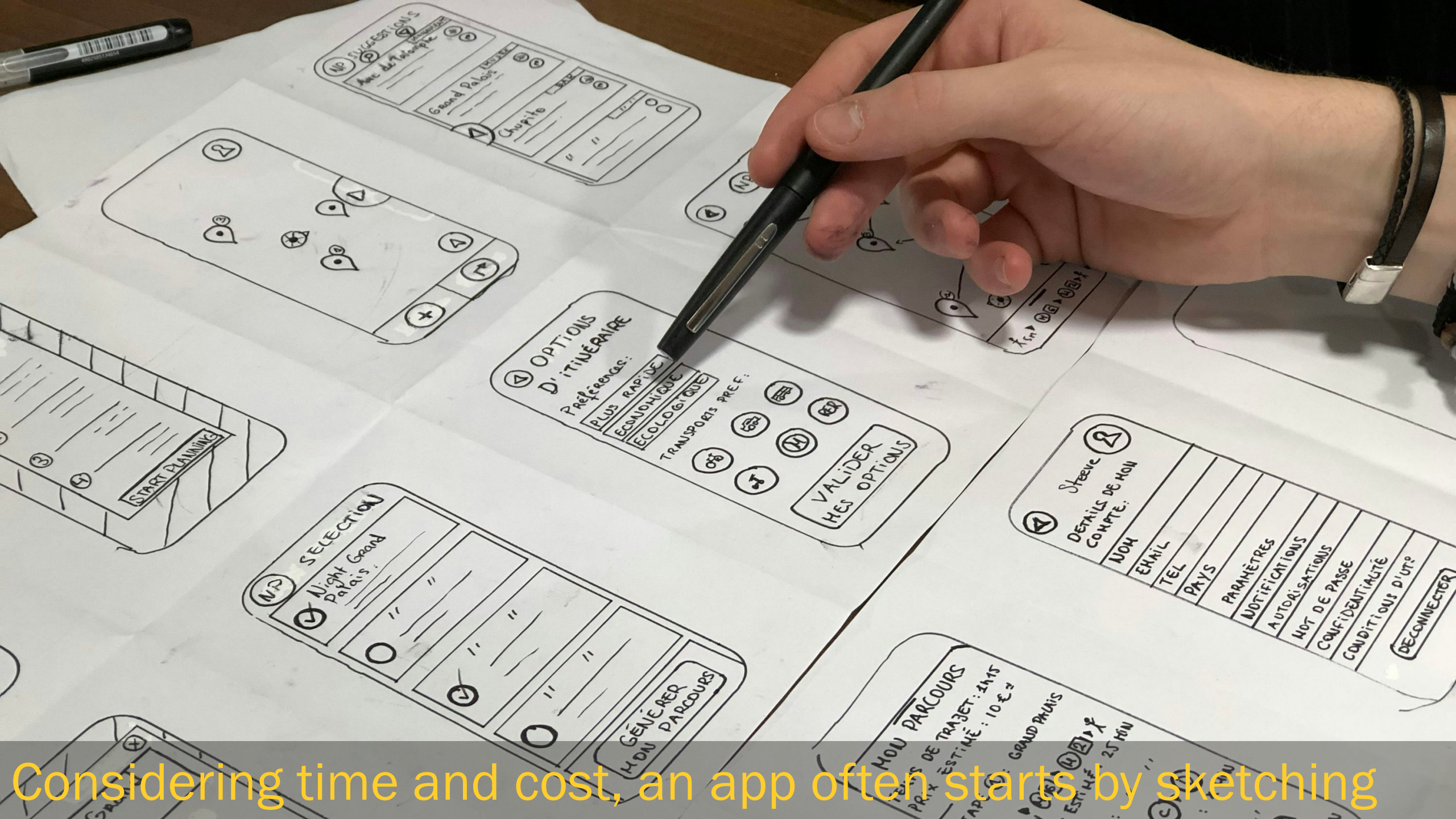
Prototyping is very common in product development



Rapid Prototyping

An iterative process where teams quickly build simplified, testable models of an idea to gather feedback and validate concepts before investing significant time, code, or engineering resources into full development.





Considering time and cost, an app often starts by sketching

GenAI Tools

for prototyping and development

Reminder #1

AI products evolve rapidly.
Features and UI change very often.

Reminder #2

AI is NOT always right.
AI makes things up – hallucination.
Use multiple tools for validating.

Popular AI Prototype/Dev Tools

 Claude  Gemini  GitHub Copilot  CURSOR

 Lovable  ***bolt***.new  V0  Base 44

 VisualGPT   Figma  newarc

Category	Tools	Best For
New App Builds	Lovable, Bolt.new, Gemini Canvas	Rapidly building and deploying full-stack MVPs from text prompts.
Code-First Development	Github Copilot, Cursor, MagicPatterns	Developers who want AI assistance while maintaining full control over their code and repository.
UI/Frontend Prototypes	Vercel v0, Figma AI	Generating React components, UI layouts, and design system-integrated prototypes.
Collaborative Platforms	Builder.io	Teams needing a shared source of truth between design and production code.

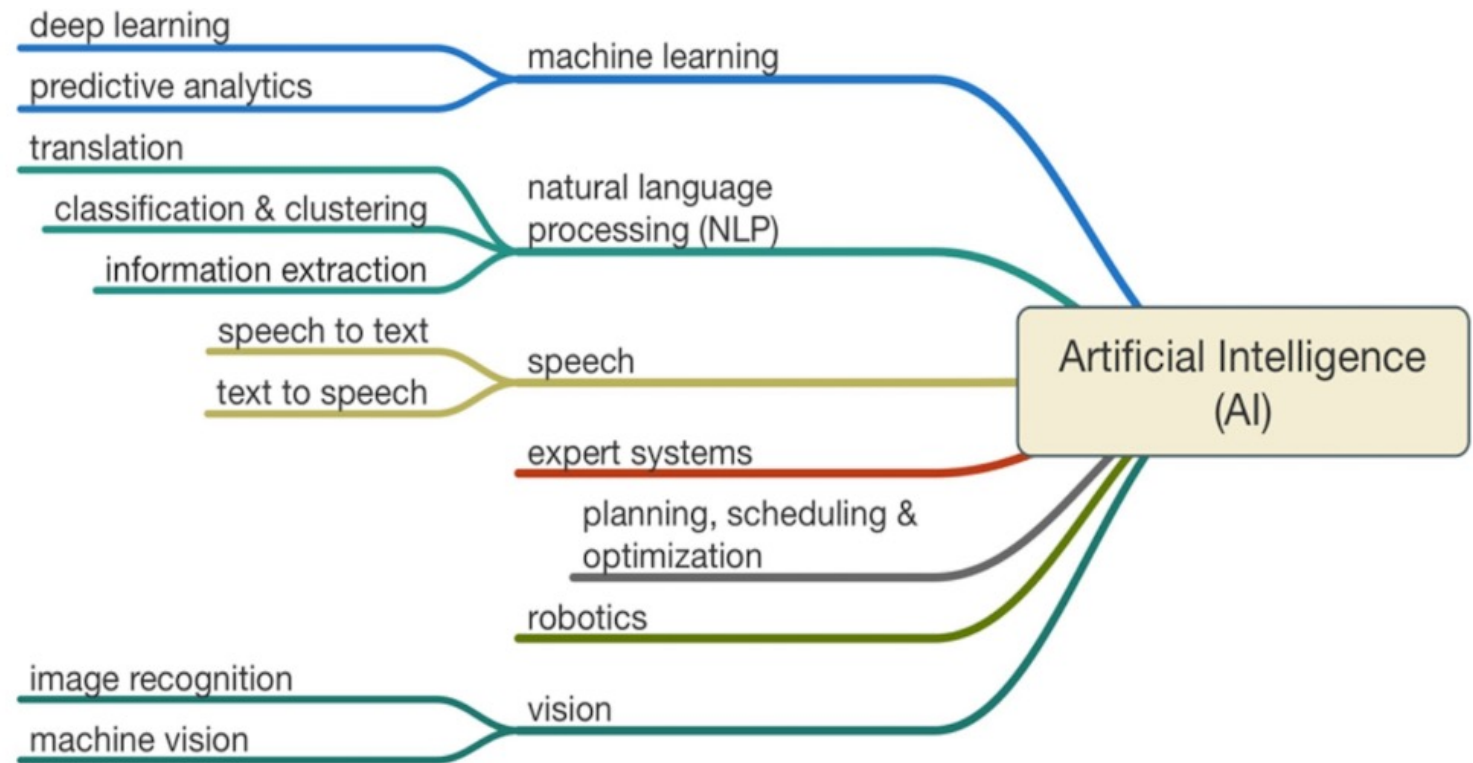
Understanding GenAI

General Definition of AI

AI is software / hardware that imitates
human behaviours and capabilities

AI Landscape

- The AI research and technology landscape is confusing to beginner
- You don't have to know them all to start learning practical AI



AI products are often a collections of technologies

Computer
Vision

Natural
Language
Processing

Speech
Recognition

Speech
Synthesizing

Machine
Learning

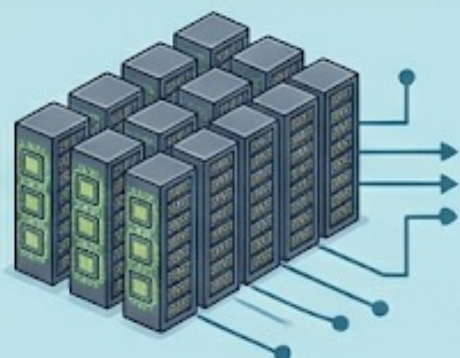
Generative
AI

LLM TRAINING vs. INFERRNCING: THE TWO PHASES OF AI

STEP 1: LLM TRAINING (Build the Model)



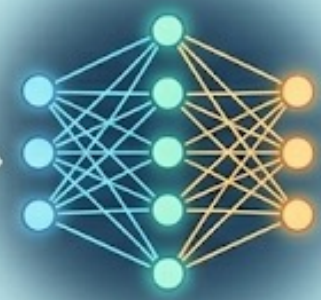
A MASSIVE TEXT CORPUS



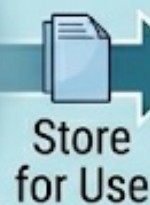
COMPUTE CLUSTER



LEARNING ALGORITHMS



TRAINED MODEL (The "Brain")

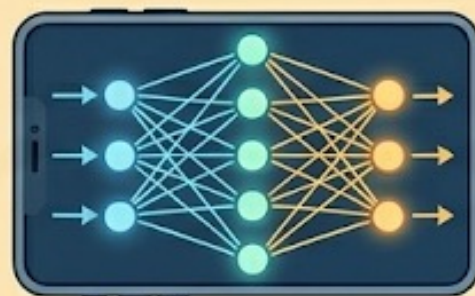


Process huge data, vast computer power, high cost, lengthy time (months)

STEP 2: LLM INFERRNCING (Using the Model)



"Write a poem about a cat"



The Brain



Output Answer

Input prompt, run model, low power, near-instant results

NVIDIA Corp

✓ Following

Share

\$210.69 ↑1,007.15% +191.66 5Y

Pre-market: **\$210.33** (↓0.17%) -0.36

Closed: Jun 22, 12:17:34 AM UTC-4 · USD · NASDAQ · Disclaimer

1D 5D 1M 6M YTD 1Y 5Y MAX



🔍 Compare to

Stock

US listed security

US headquartered

PREVIOUS CLOSE **\$204.65**

DAY RANGE **\$206.50 - \$211.39**

YEAR RANGE **\$142.03 - \$236.54**

MARKET CAP **5.10T USD**

AVG VOLUME **162.70M**

P/E RATIO **32.27**

DIVIDEND YIELD **0.47%**

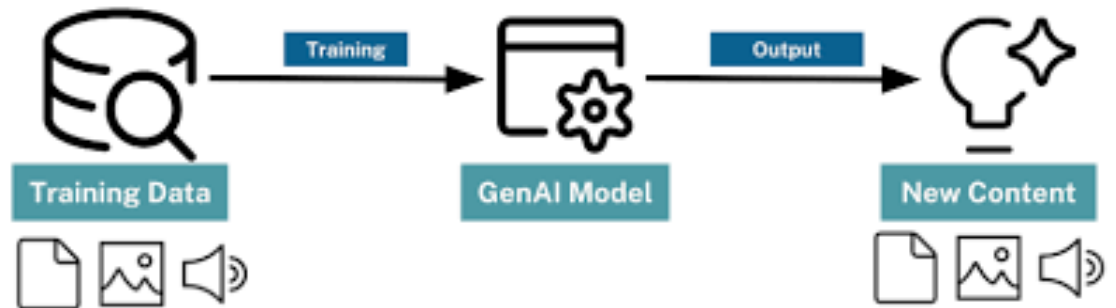
PRIMARY EXCHANGE **NASDAQ**

Generative AI

生成式人工智能

Generative AI

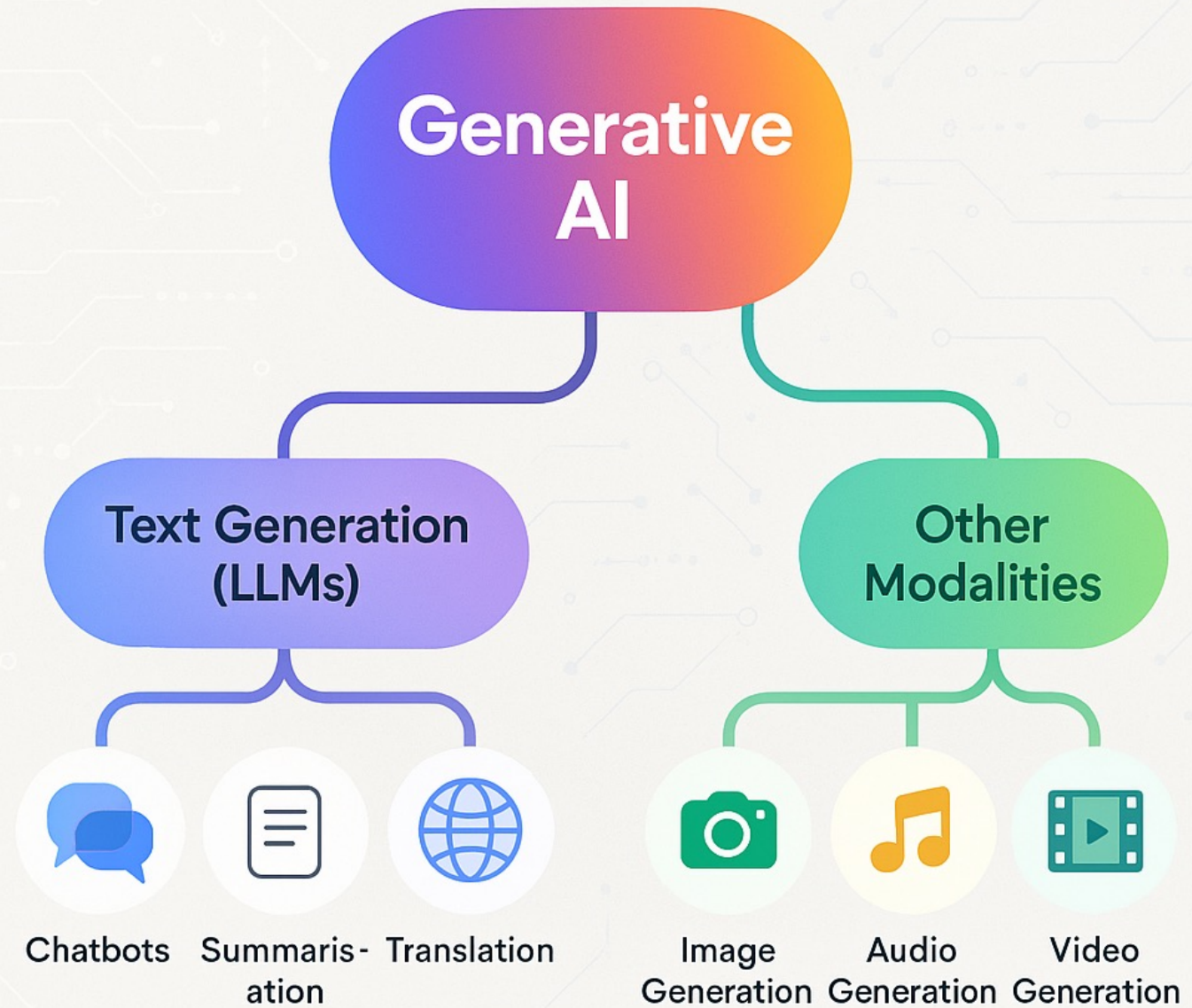
- Generative AI is built upon **LLM** to create **new content**—such as **text**, **images**, **videos**, or **audio**
- It learns patterns from massive existing data and **generating novel outputs** based on user prompts



Text Generations VS. Multi-modal

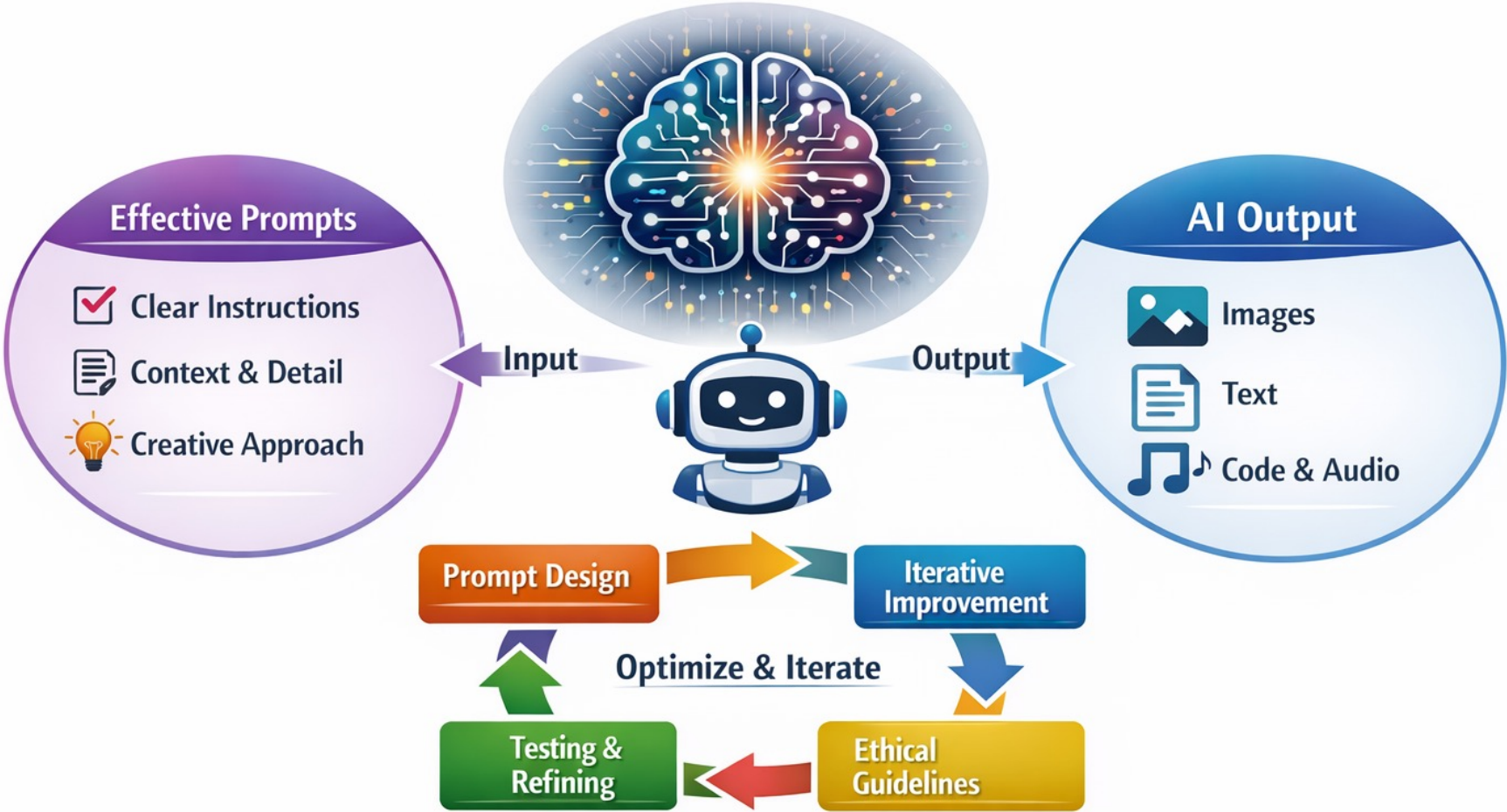
DeepSeek is at the
moment texts only chatbot

While Qwen is multi-modal



It's all about
Prompting

Gen AI Prompt Engineering

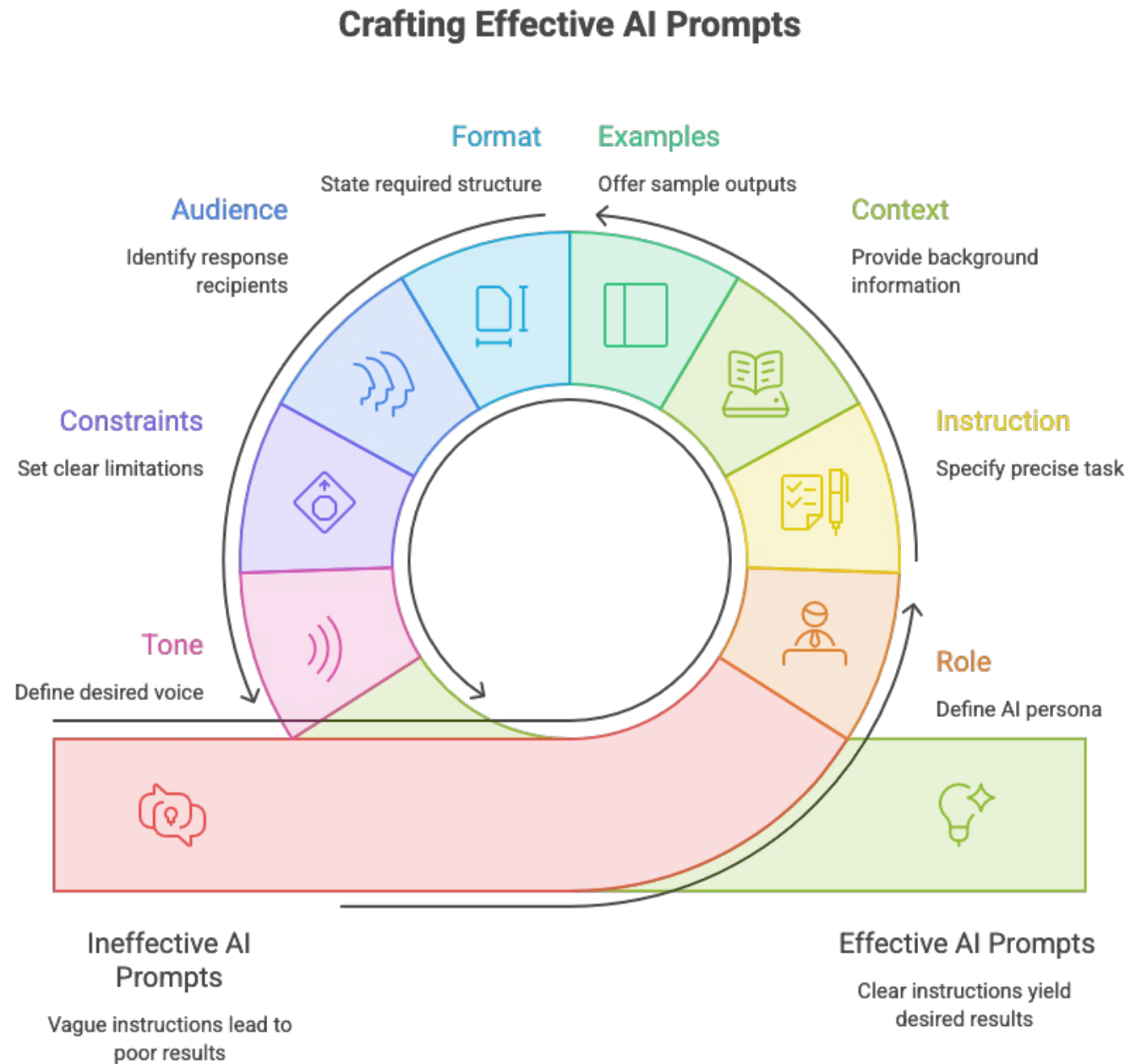


RICE FACT

Prompt Framework

RICE FACT

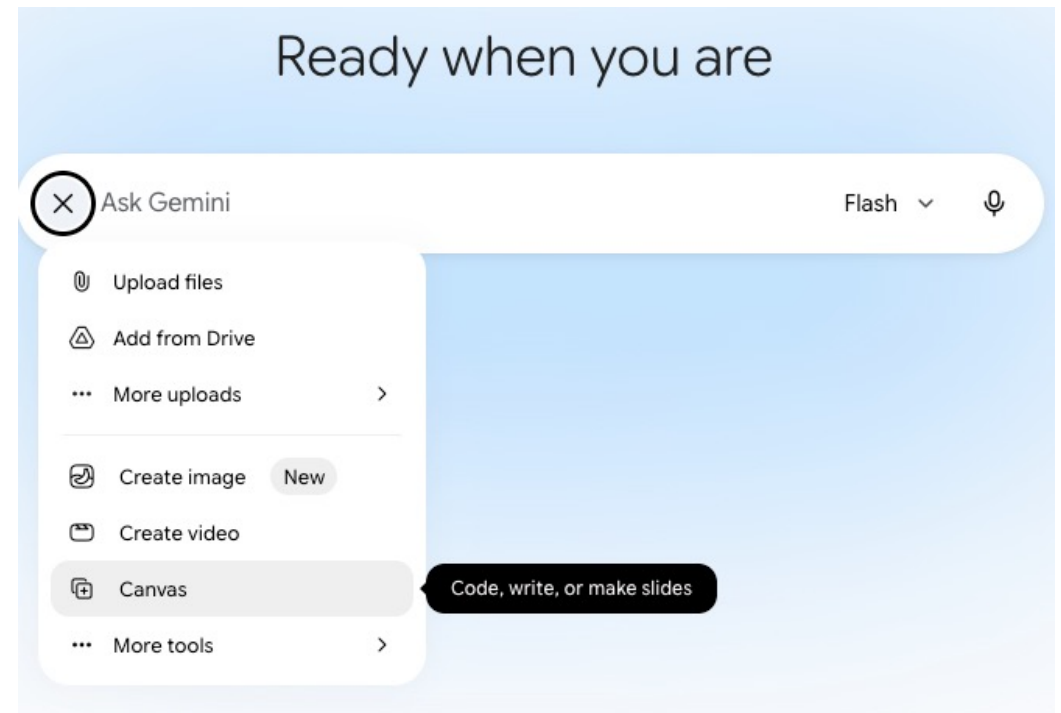
Writing Effective Prompts



Generating Interactive Contents

Using Google Gemini

Gemini **Canvas** transform abstract ideas into **tangible, interactive** web contents



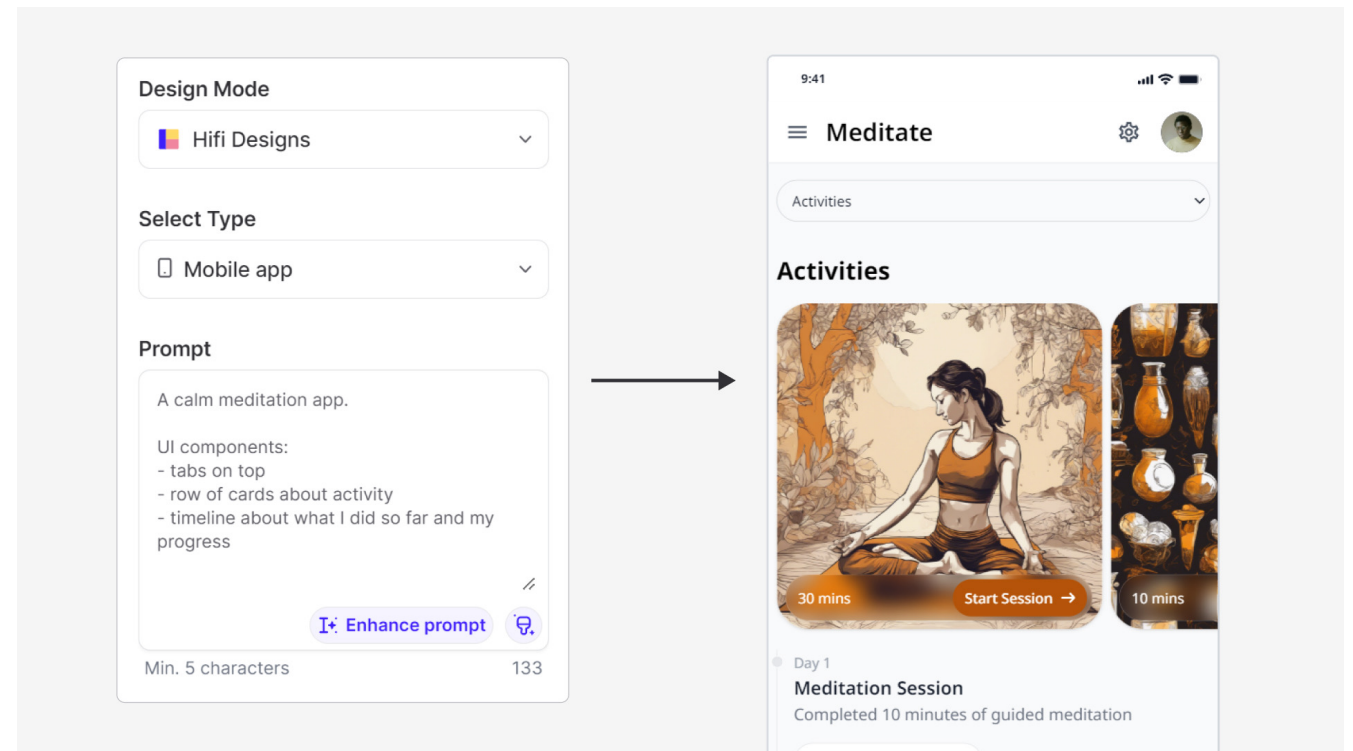
Generating UX Design

Using Figma **UX Pilot**



<https://www.figma.com>

UX Pilot is an AI-powered platform and Figma plugin that accelerates the design process by automating tasks like wireframe generation, UI layout creation, design reviews, and user journey mapping directly within the Figma environment.



AI Powered Data Analysis & Data Visualization

- Google Looker + Gemini
- Tableau Pulse
- Microsoft Power BI Copilot
- Julius AI



Vibe Coding

Prompt Effectively to Generate Program Codes

Vibe Coding is
Programming Without the Codes

Building Apps by Vibe Coding

Vibe coding is an approach to software development where a developer **describes what they want in natural language** and relies on an AI model to generate and iteratively refine the code, often without deeply inspecting its internals.





Vibe Coding Tools



你好，我是 豆包 ●

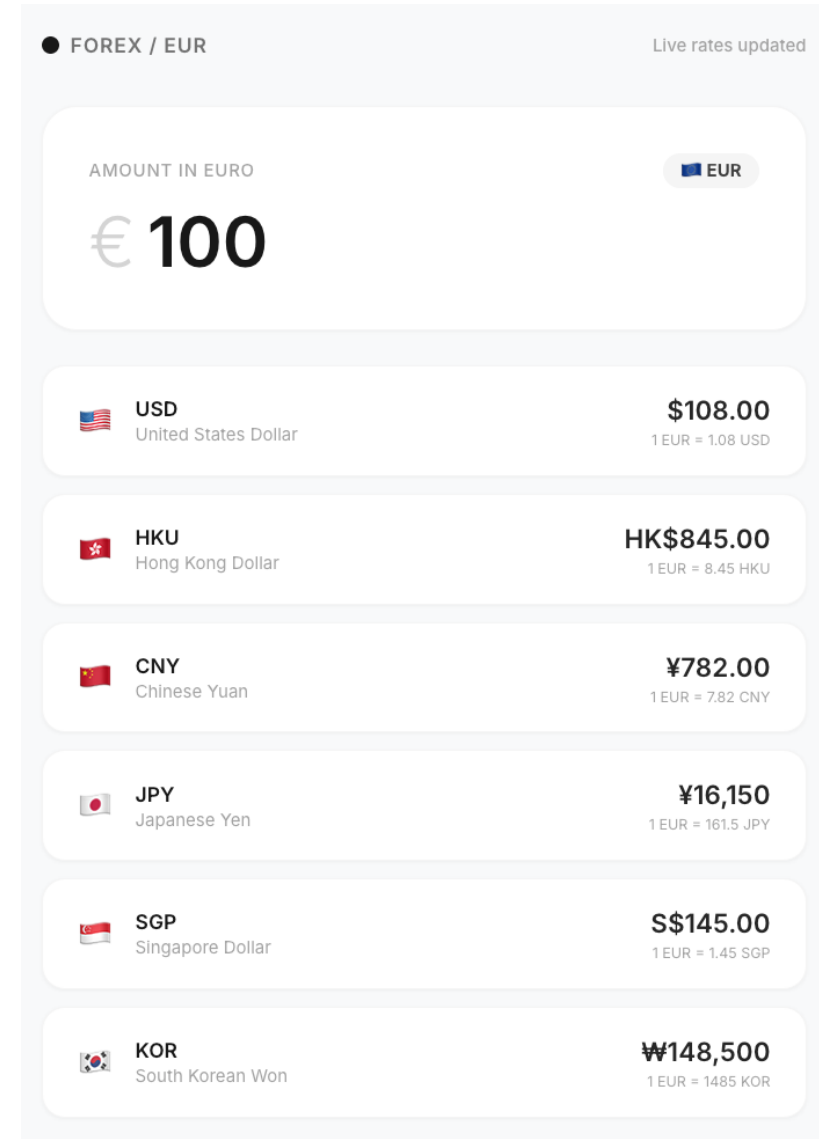


Vibe Coding

Hands-on Time

1. Let's Build Prototypes/MVPs

- Use the following prompt in Gemini to generate UI concept.
- If you use Canva, you will be able to fine-tune your design.
 - create a simple exchange app that allow me to input currency in Euro and show exchanged amount in USD, HKU, CNY, JPY, SGP, KOR. Create a minimal screen design for this app concept.



2. Codes Generation

- Let's use Lovable or v0 to create the MVP
 - Upload you UI design concept image
 - Create an exchange app using the uploaded UI design. Connect to <https://exchangeratesapi.io/> API to get the update exchange rate. Using this API key "xxxxxxxxxxxxx" for connection.

● FOREX / EUR		Live rates updated
AMOUNT IN EURO		EUR
€ 100		
 USD United States Dollar	\$108.00 1 EUR = 1.08 USD	
 HKD Hong Kong Dollar	HK\$845.00 1 EUR = 8.45 HKD	
 CNY Chinese Yuan	¥782.00 1 EUR = 7.82 CNY	
 JPY Japanese Yen	¥16,150 1 EUR = 161.5 JPY	
 SGD Singapore Dollar	S\$145.00 1 EUR = 1.45 SGD	
 KOR South Korean Won	₩148,500 1 EUR = 1485 KOR	

Critical Safety Issues Here

- We are including the API key in the prompt. This is generally NOT a good idea as API key can easily be exposed and charges will occur on us if anyone uses the exposed key
- Secret key is usually entered as an environment variable in actual software development.
- We do this here just for learning.
- We are using a FREE account with a capped limit. And we can revoke the API after this testing.

Vibe Coding Challenges

Vibe Coding Challenges

- **Debugging complex logic errors** without understanding the underlying source code.
- **Blindly introducing severe security vulnerabilities**, data leaks, and unscalable system architecture.
- **Managing regressions and technical debt** when iterative AI prompts break existing features.
- **Handling production deployment**, database schema migrations, and complex external integrations.



Starting Building Up Your Github Portfolios

In an AI-driven market, an active GitHub portfolio is the ultimate proof that you can actually build and execute solutions, not just pitch them.

Thank You!