



# Intro to building LLM Apps

# Abdalla Mohamed



**R&D Engineer @ Stakpak  
Founding AI Engineer @ Seqoon  
Teaching assistant @ GUC**



**paratrooper**



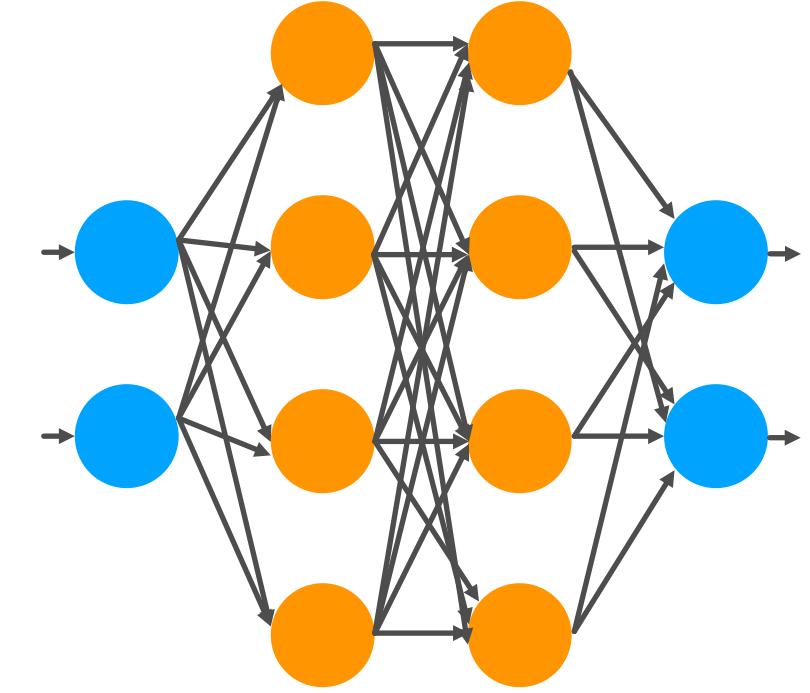
**Weightlifting**



**Data science & machine learning  
Mechatronics & Autonomous Systems**



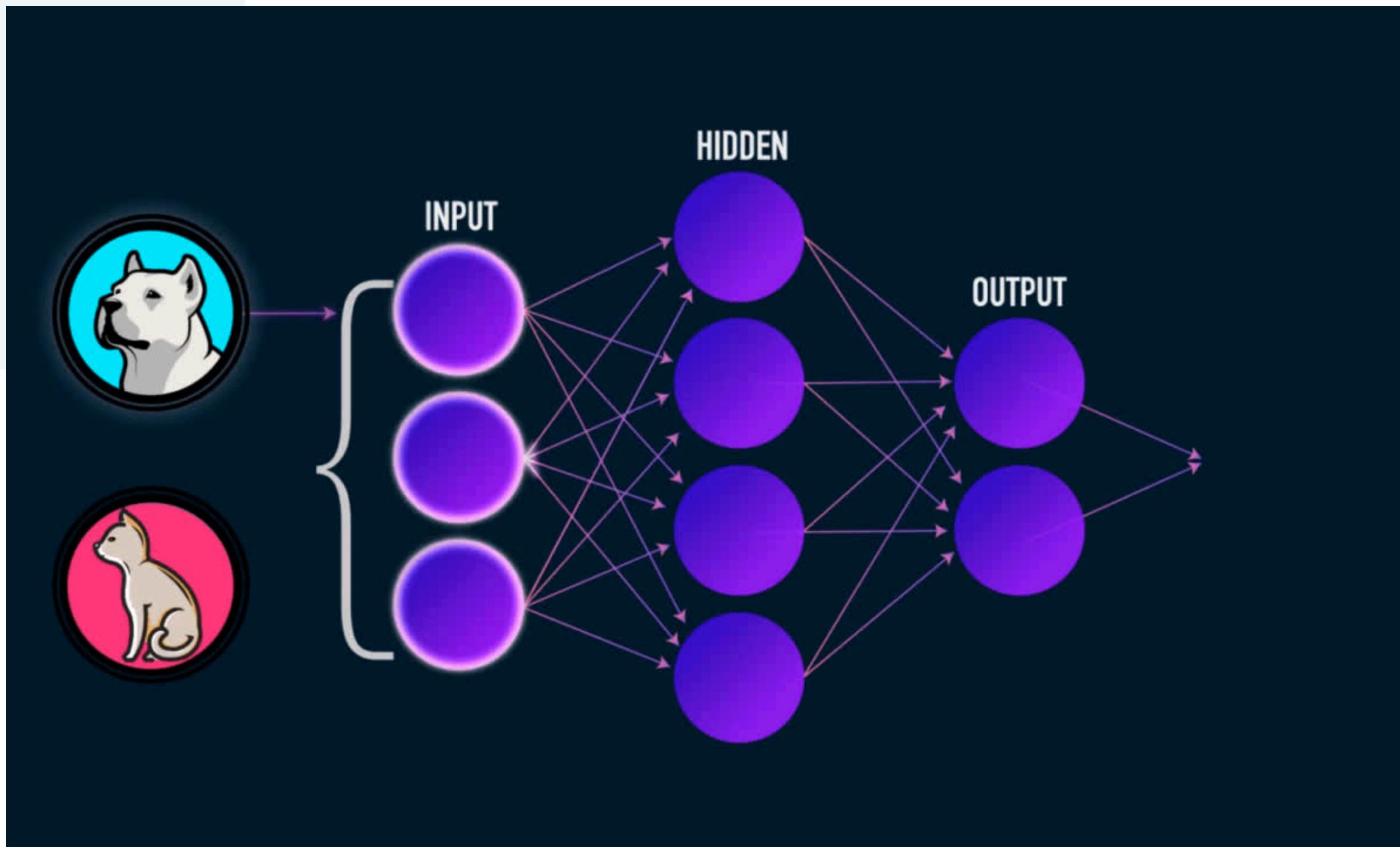
# WHAT IS AN LLM?



	A parrot	LLM (Large Language Model)
Learns language patterns	✓	✓
Doesn't understand a thing about what it learns	✓	✓
Occasionally speaks nonsense (hallucinates)	✓	✓
Is a cute birdie parrot	✓	✗

# HOW NEURAL NETWORKS WORK?

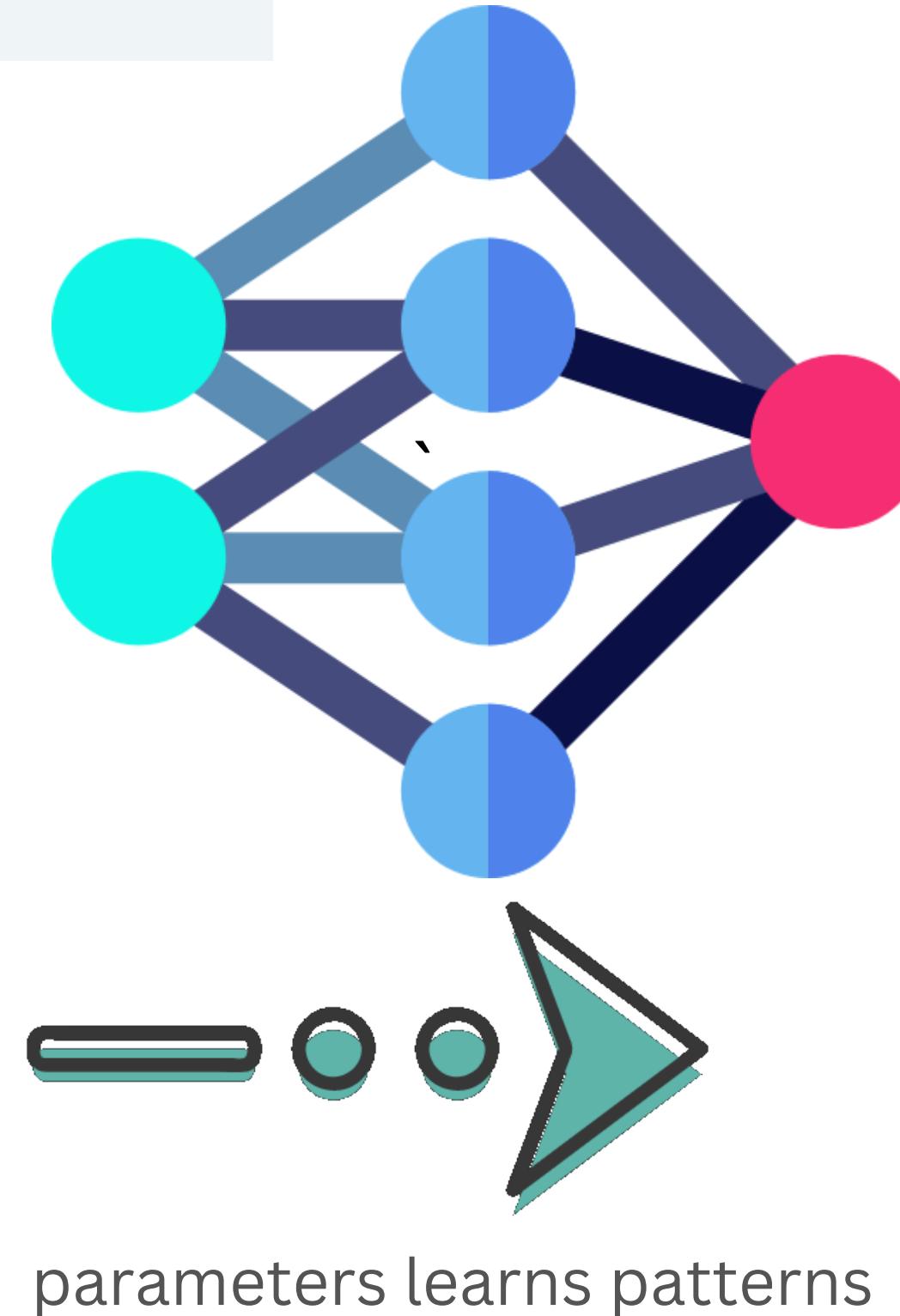
*IT IS ALL ABOUT DETECTING PATTERNS THEN PREDICTING ..*



# LARGE LANGUAGE MODELS

"An apple a day keeps the..."

context



"...doctor away"

Next words prediction

# LARGE LANGUAGE MODELS



# LARGE LANGUAGE MODELS

Name	Model family	Number of parameters	Closed/Open source	Instruct version available	Fine-tuned
Llama 3	Llama 3	8B, 70B	open	yes	no
Mixtral 8x22	Mistral	8x22B	open	yes	no
GPT-4.1	GPT-4.1	unknown	closed	yes	no
Codellama	Llama 2	7B, 13B, 34B, 70B	open	yes	yes (e.g. Python)
...	...	...	...	...	...

# G

Generative

# P

Pretrained

# T

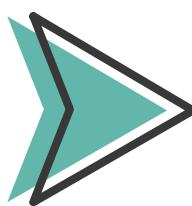
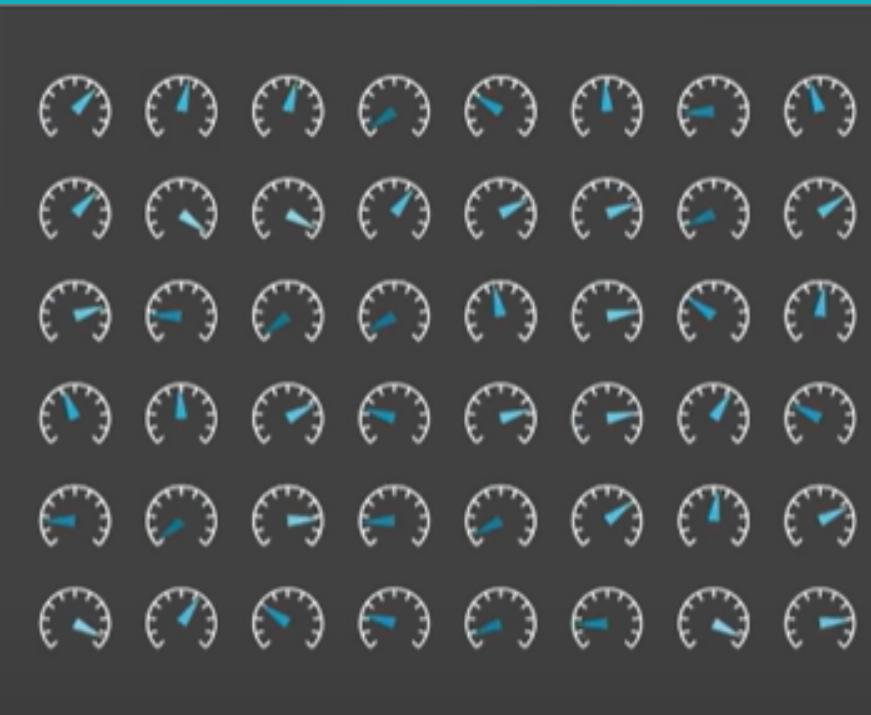
Transformer

magical black box

Prompt =  
Input Query  
+  
Instructions



Tunable Pretrained parameters



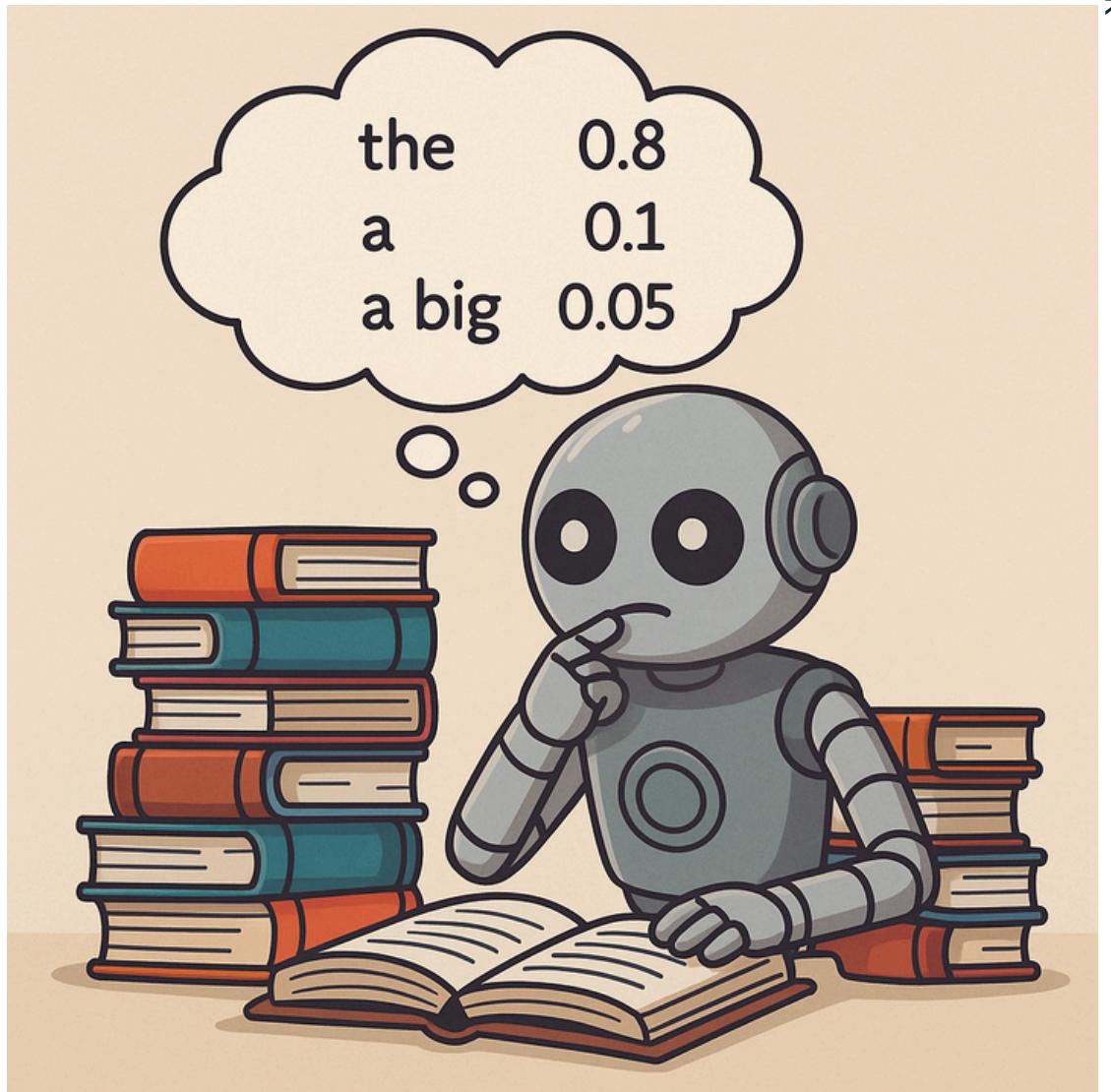
generated text

🧠 Note: The context (prompt) has a limited size – usually a few thousand tokens (pieces of words), not unlimited text!

🧠 Note: Generated text = output tokens

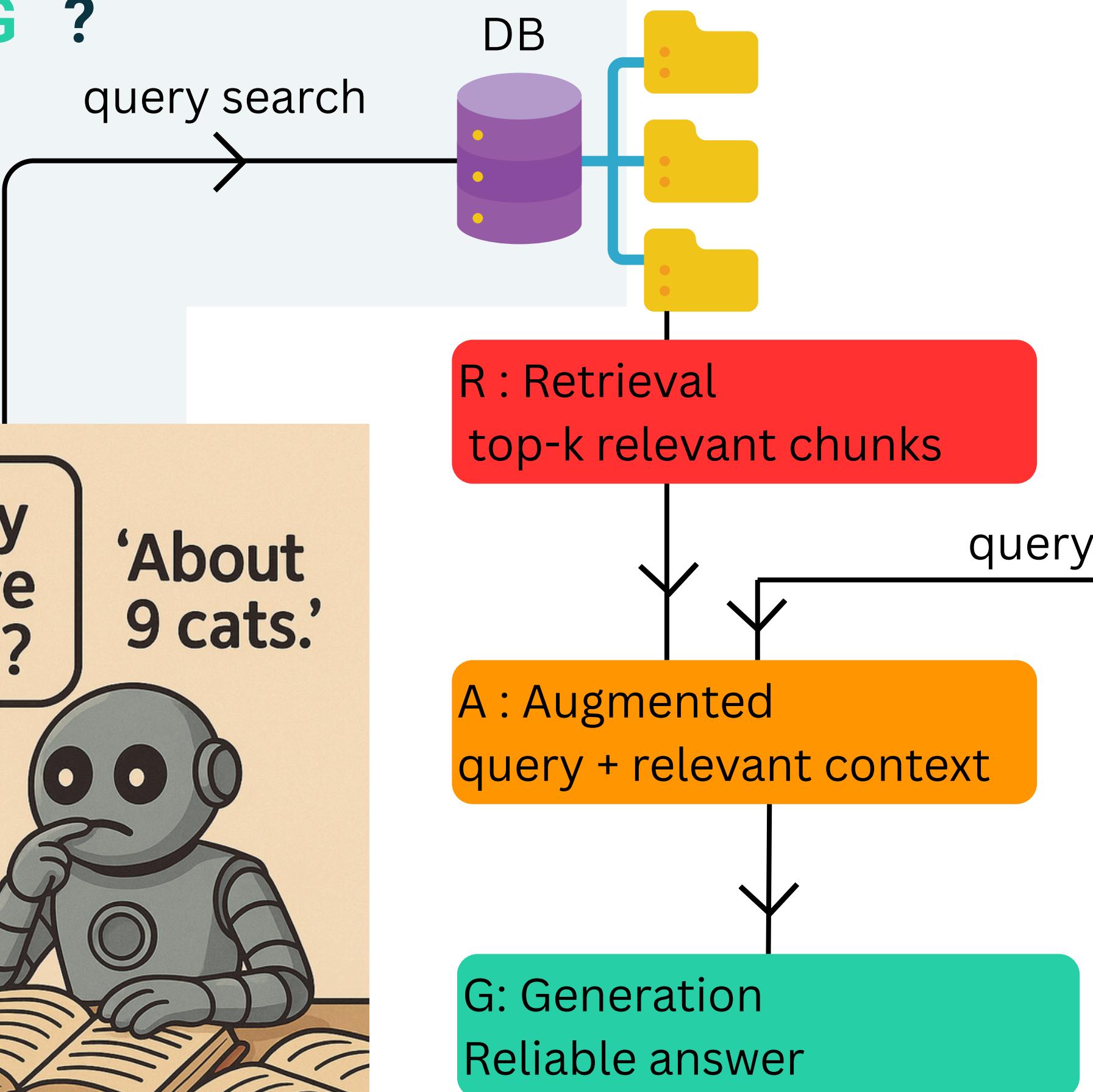
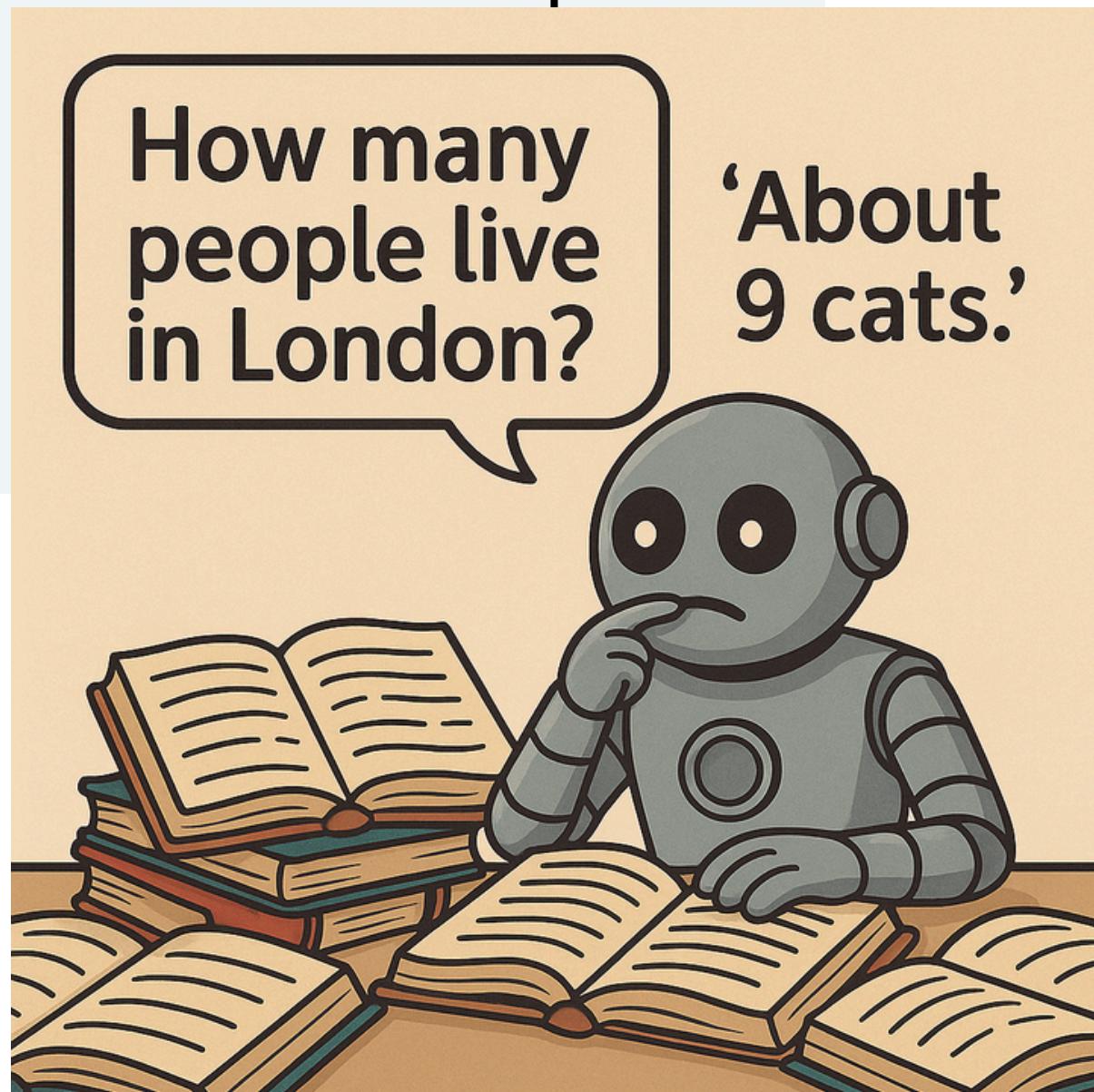
# HALLUCINATIONS

- LLMs are super powerful, but not always reliable
- LLMs guess or go generic when they don't know.
- LLMs predict the most likely words – not actual facts.
- Pretrained data isn't always up to date !

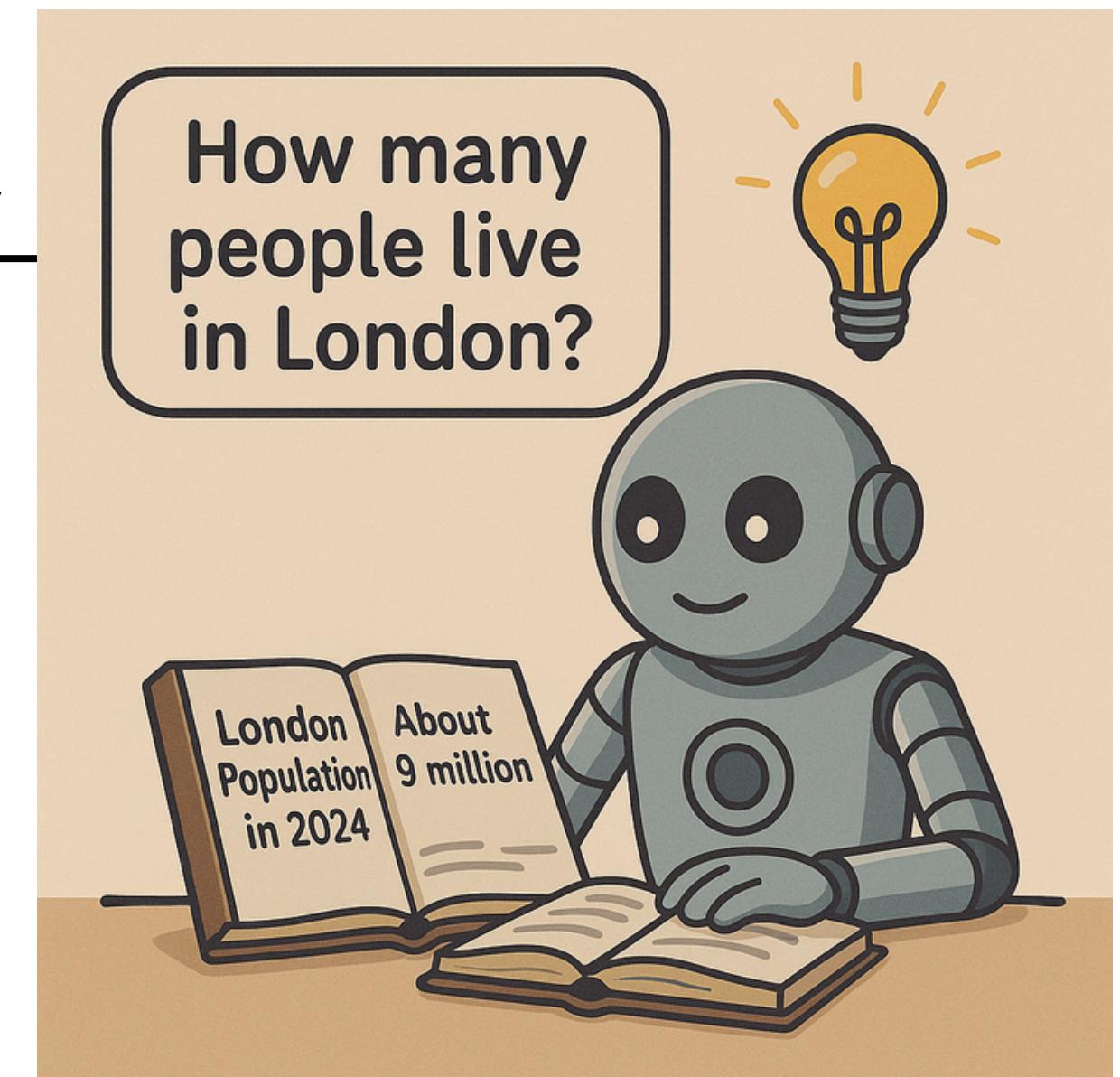


# W H Y R A G ?

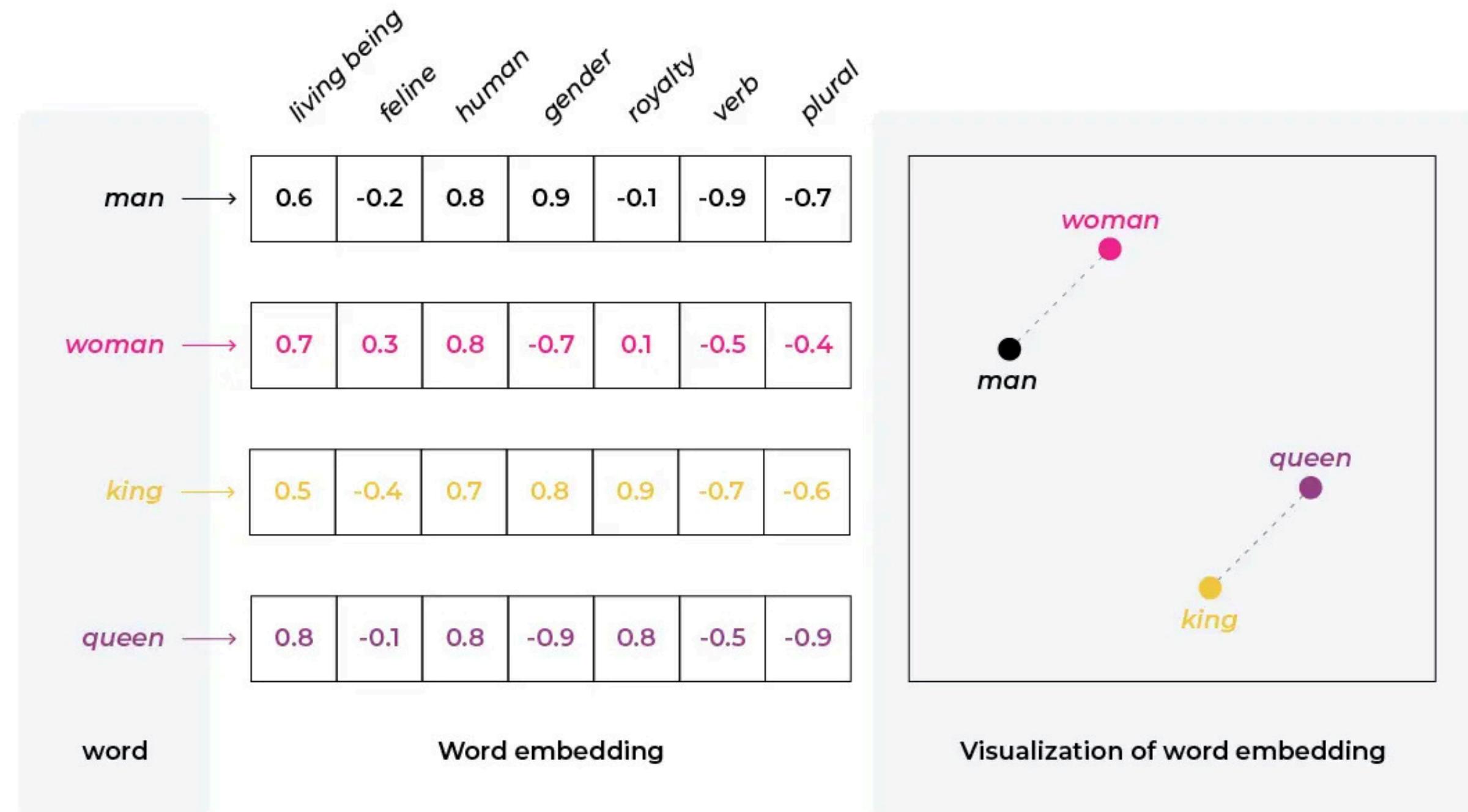
S T A K P A K



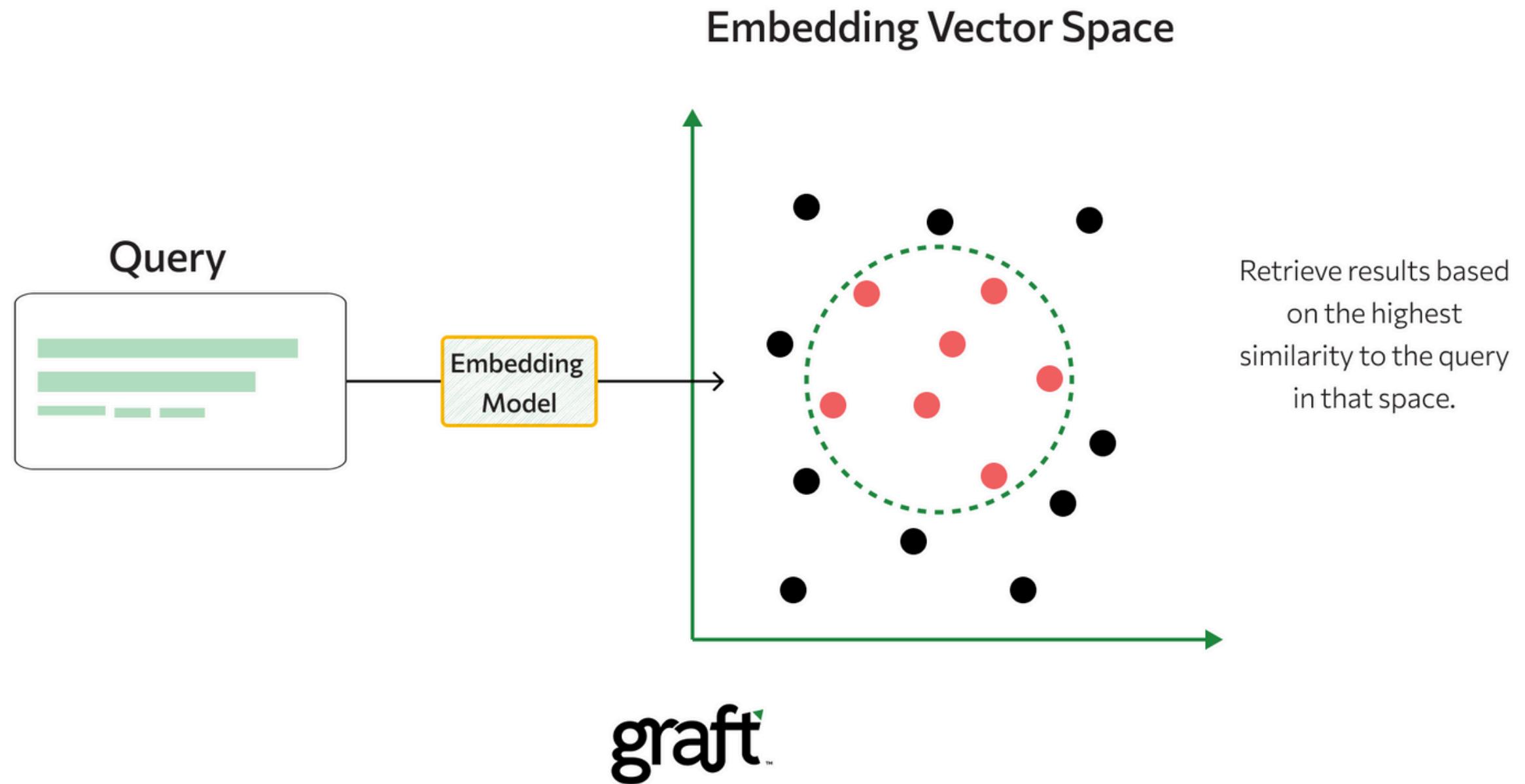
💡 RAG = Fewer hallucinations. More grounded, factual and up-to-date answers.



# EMBEDDINGS



# SEMANTIC SEARCH (VIA VECTOR SIMILARITY)



# LLM TOOLS

With the right prompt, LLMs can decide when to call a tool – no manual trigger needed.

## LLMs Can Use Tools

LLMs follow instructions to use tools via special prompts.



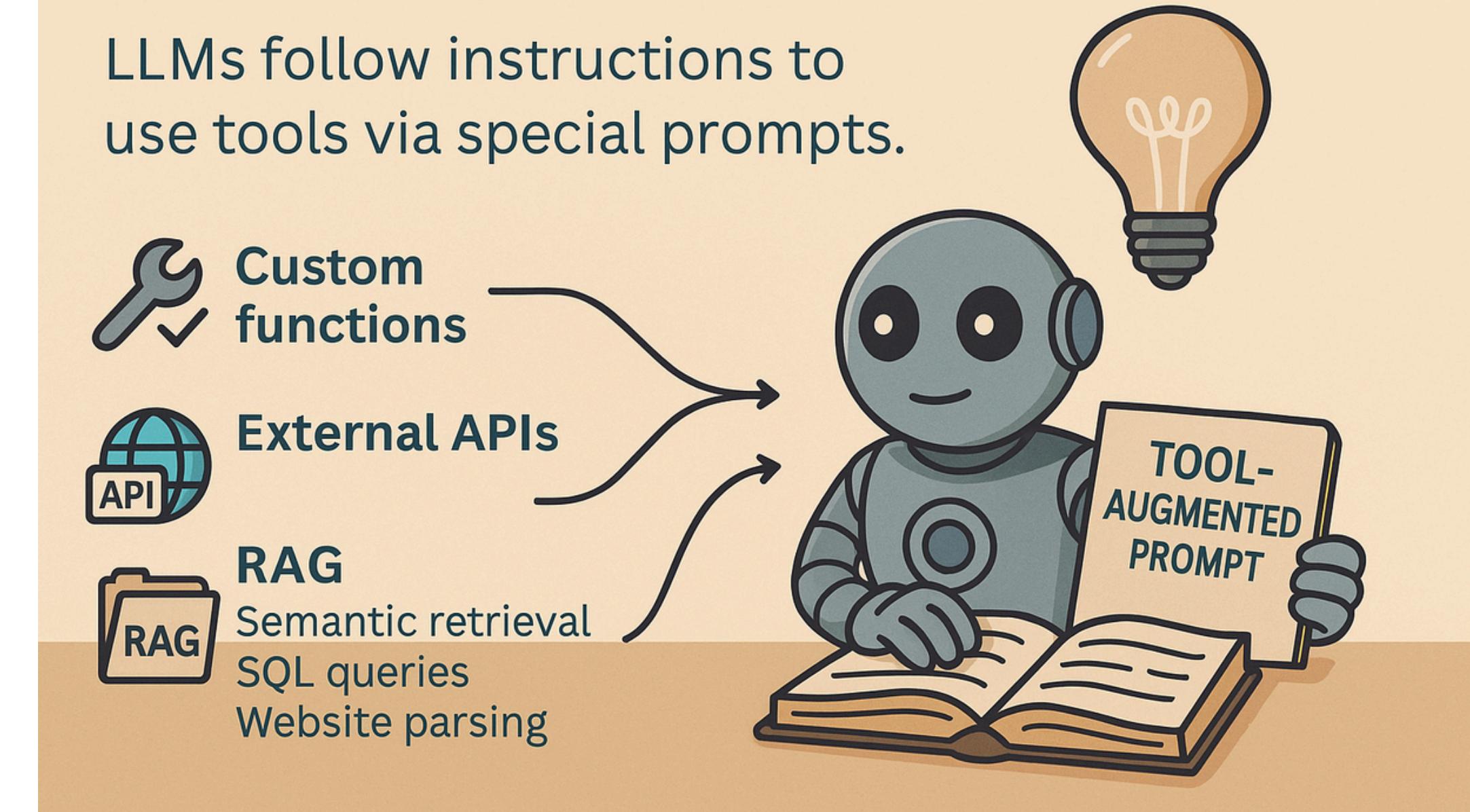
Custom  
functions



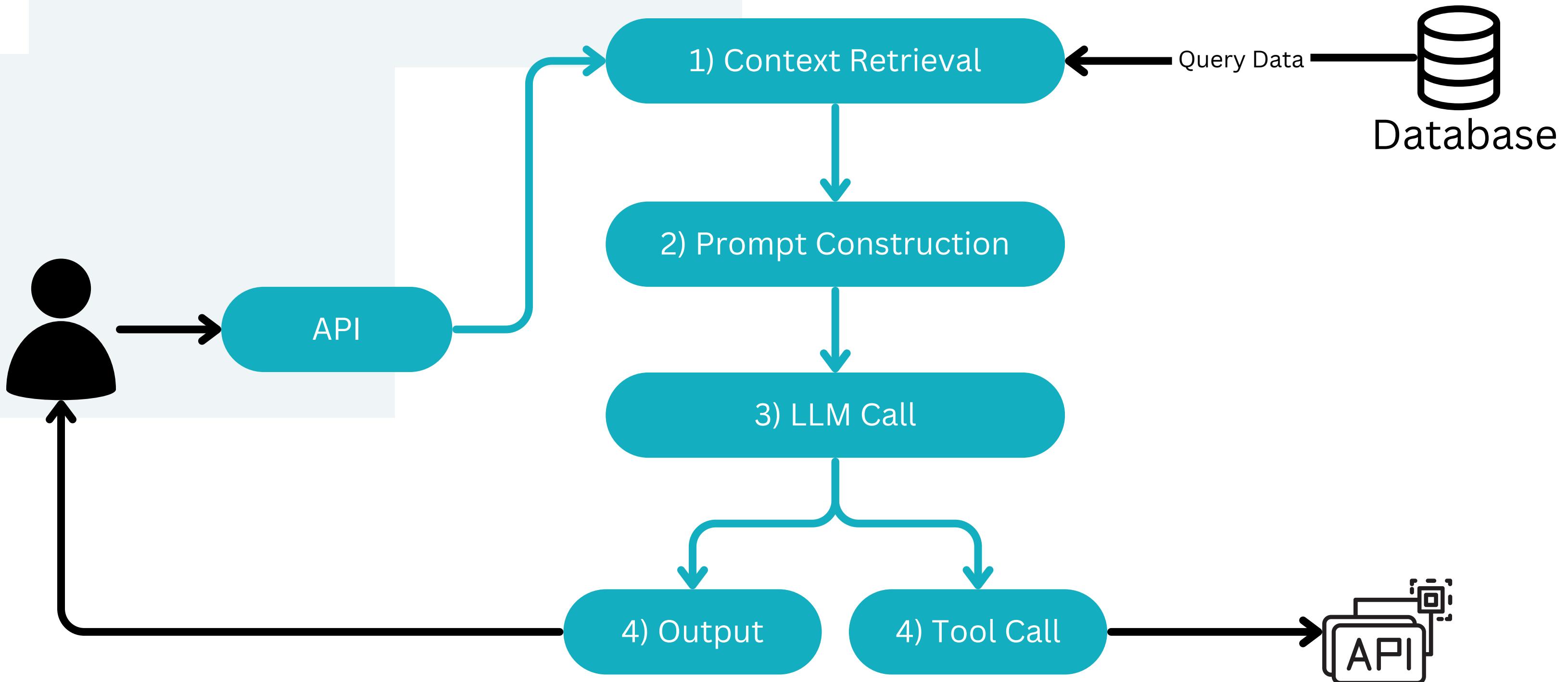
External APIs



RAG  
Semantic retrieval  
SQL queries  
Website parsing



# LLM APP ARCHITECTURE



Thank you



# Intro to building LLM Agents

# George Fahmy

📍 Founder & CEO @ Stakpak

DevSecOps @ Levelset

Founding engineer @ Thndr

Founding engineer @ Liquidity Network

Hacking since 2014

🌴 Calisthenics

Riding cruisers

Tech community volunteering

🤓 Developer experience

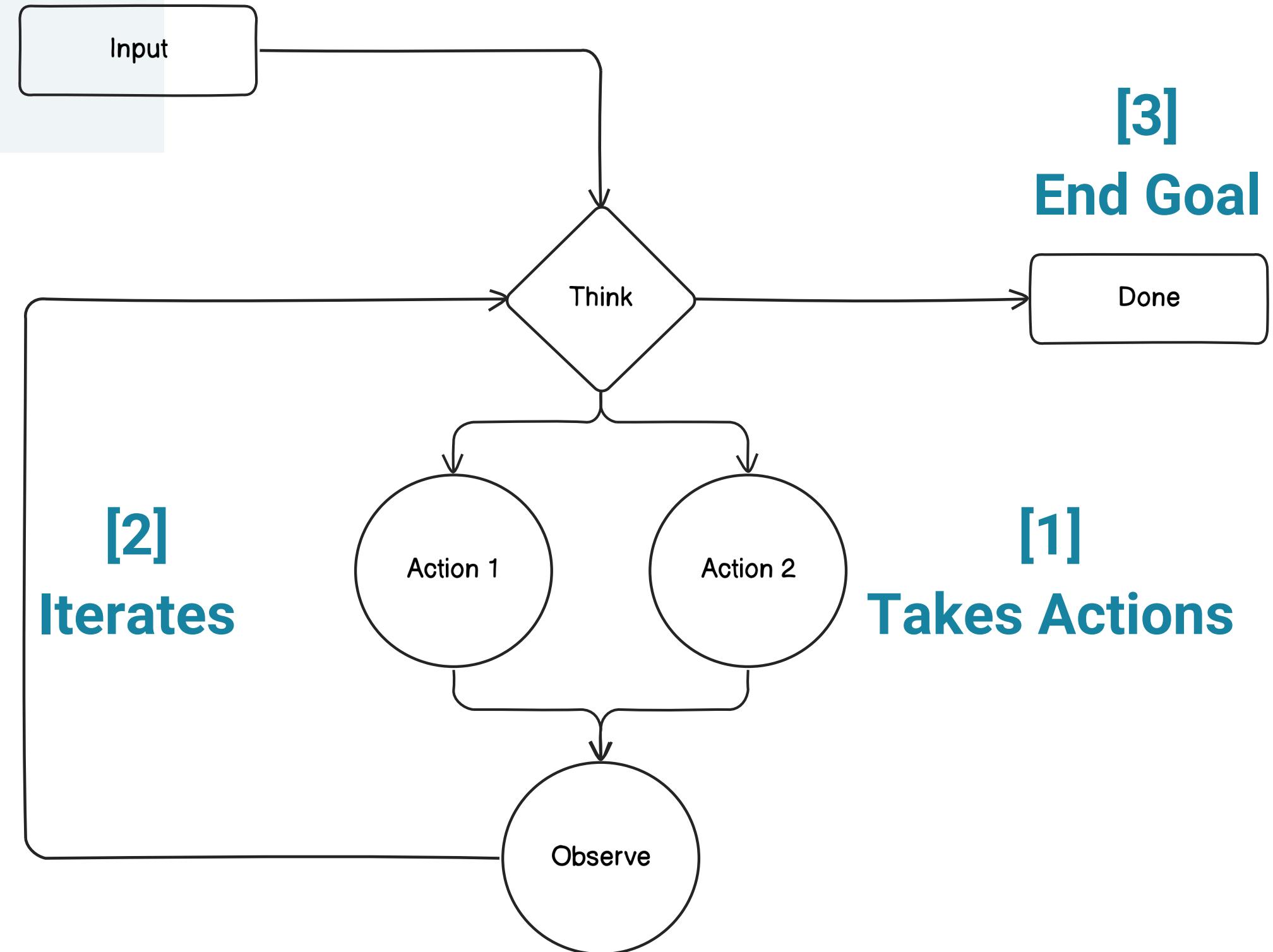
Security



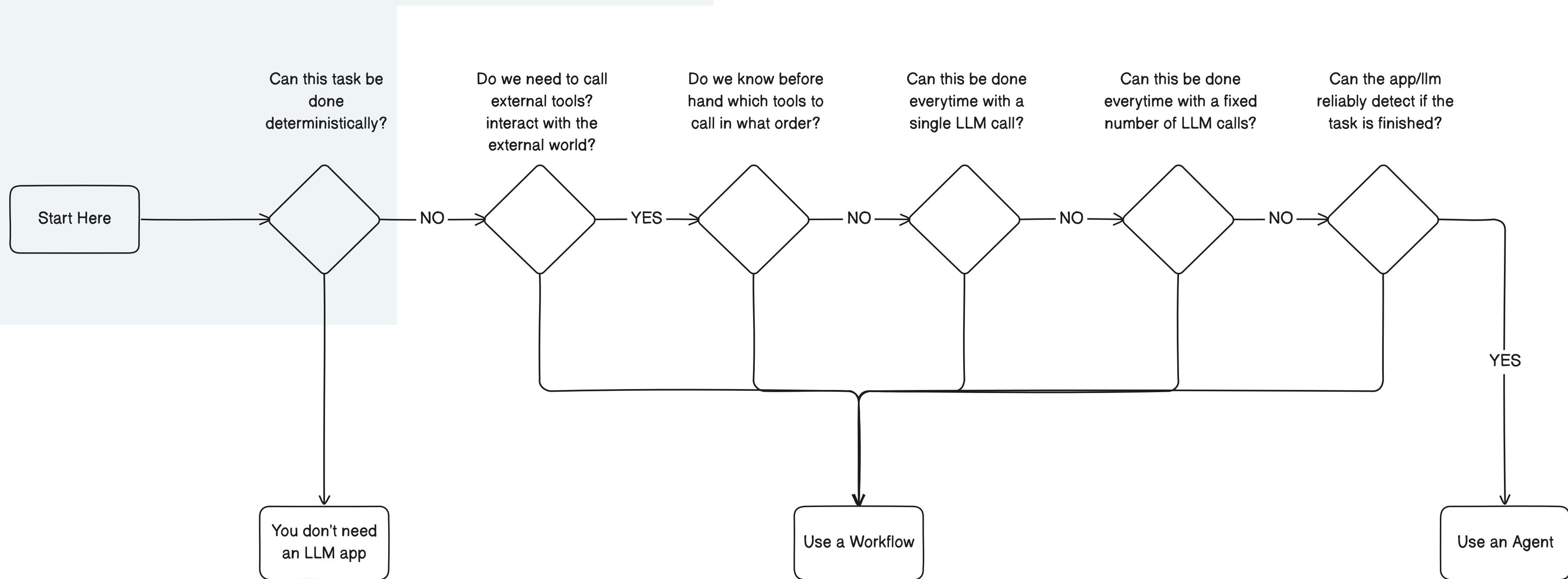
# AGENTS



Norbert



# DO YOU REALLY NEED AN AGENT?



# Coding Time!

Thank you and  
please reach out

