# Incorporating AI into Teaching

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FMA 2025

# JPMorgan: Chatbots to Agents

**CNBC, September 30, 2025:** In 2023, JPMorgan gave employees access to OpenAI's models through LLM Suite.

It was essentially a corporate ChatGPT tool used to draft emails and summarize documents.

About 250,000 JPMorgan employees have access to the platform today ... Half of them use it roughly every day.

JPMorgan is now early in the next phase of its AI blueprint: It has begun deploying agentic AI to handle complex multistep tasks for employees, according to an internal road map provided by the bank.

# From Makers to Checkers

**Derek Waldron, JP Morgan Chief Analytics Officer:**

> What we're working towards is that every employee will have their own personalized AI assistant; every process is powered by AI agents, and every client experience has an AI concierge.
>
> You'll still have people at the top who are managing and have relationships with clients, but many, many of the processes underneath are now being done by AI systems.
>
> Workers would shift from being creators of reports or software updates, or 'makers' ... to 'checkers' or managers of AI agents doing that work.

# MIT/Media Labs Report

### Pilots to Production

**Only 5%** of AI pilots reach production.

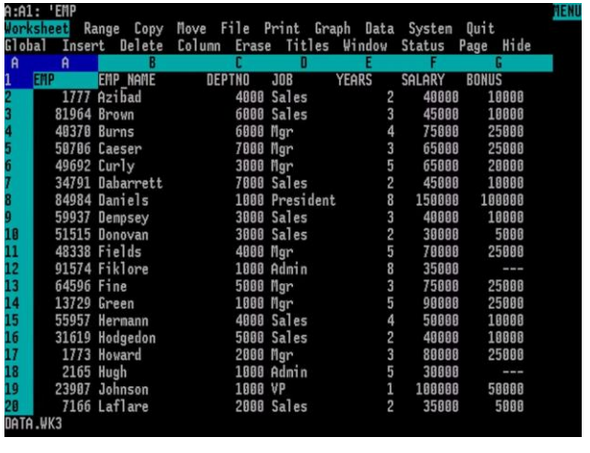
### Used by Everyone

Workers from **over 90%** of companies surveyed reported regular use of personal AI tools for work tasks.

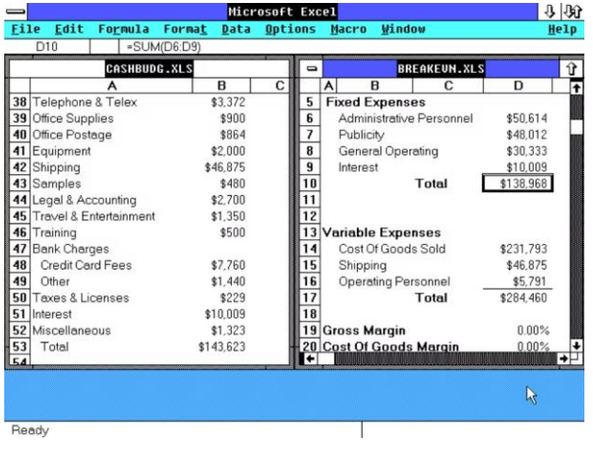
**Almost every single person** used an LLM in some form for their work.

# Change was only at the margins for the past 40 years


**VisiCalc (1979)**




**Lotus 1-2-3 (1983)**




**Excel (1987)**

For 40 years, the fundamental tool of business analysis remained essentially the same.

# Now We're All Learning Together

AI has created an unprecedented situation:

Faculty, students, and industry professionals are all navigating the technological shift simultaneously.

# Roadmap for Today's Discussion

### A Course on AI for Finance

Dedicated curriculum focused on AI applications in financial analysis

### Updating Existing Courses

Integrating AI tools and concepts into traditional finance curriculum

### Previous Disruptive Technologies

How education adapted to calculators and spreadsheets

### Deep Dive into Claude Code

Exploration of advanced AI coding agent for financial analysis

# Course on AI for Finance

# Core Themes

**Chatting:**

- Treat AI as a colleague: collaborate, evaluate, iterate
- Coding: LLMs are unreliable for arithmetic; coding is essential

**Building**:

- Apps: to reuse tested code
- Custom chatbots: system prompts, RAG, or fine tuning
- Agents: chatbots with tools


# Prompt Engineering

> **Ethan Mollick, Wharton:**
>
> Treat AI like an infinitely patient new coworker … As it is a coworker, you want to work with it, not just give it orders, and you also want to learn what it is good or bad at … Working with AI is a dialogue, not an order.

Students ask how to prompt, but **practicing collaboration** is the key.

# Learning How to Work with AI

1

## Learn Capabilities

Discover what AI does well and where it struggles through hands-on experimentation

2

## Refine Prompts

Develop more precise prompts based on understanding of AI strengths and limitations

3

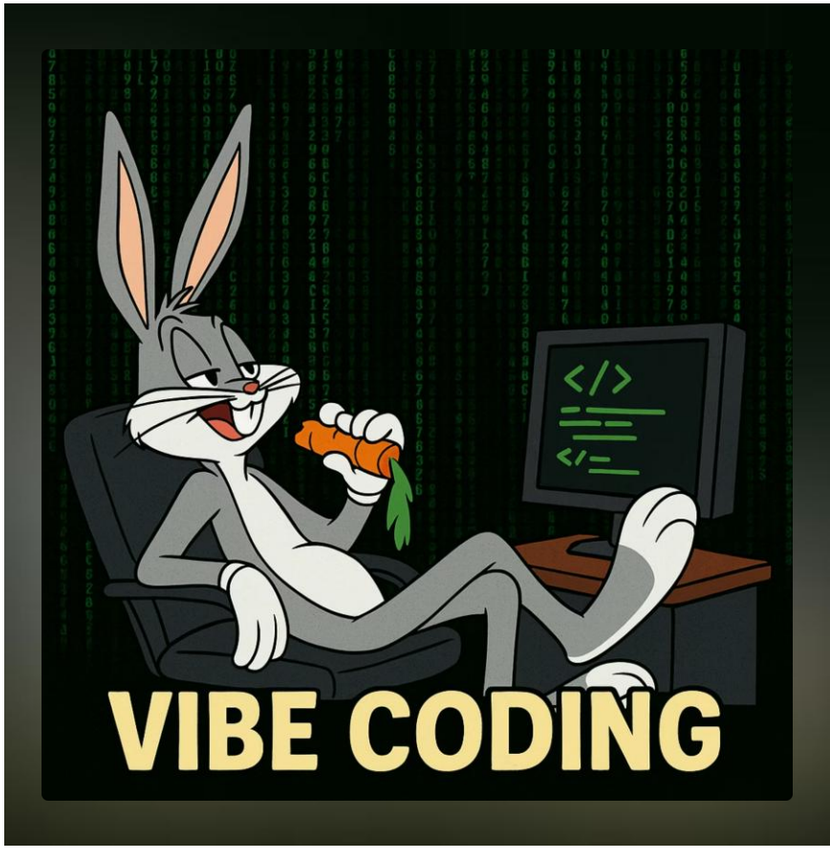
## Save & Reuse

Build a library of effective prompts for common financial analysis tasks

**Class Exercise:** Chat with a chatbot about financial analysis, evaluate the output, then develop a reusable prompt that achieves better results faster for similar future analyses.

# Using AI to Write Code

> **Y Combinator CEO Garry Tan and Managing Partner Jared Friedman, March 2025:**
>
> For roughly a quarter of the startups in our Winter 2025 cohort, **95% of the codebase was written by AI.**




# Claude + Python at Bridgewater

> **Aaron Linsky, CTO, AIA Labs at Bridgewater:**
>
> We've been developing capabilities powered by Claude since 2023 within AIA Labs.
>
> **Claude** powered the first versions of our Investment Analyst Assistant, which streamlined our analysts' workflow by generating **Python code**, creating **data visualizations**, and iterating through **complex financial analysis tasks** with the precision of a junior analyst."

# Coding Tools

### Chatbots with Code Execution

ChatGPT, Gemini, Claude, **Julius.ai** - integrated environments for coding and testing

### Python Environments with AI

**Google Colab**, VS Code, Cursor, Windsurf - traditional development enhanced by AI assistance

### All-in-One Solutions

**Replit** - complete development and hosting platform with AI integration

### My Current Preference

Claude Desktop (cloud Python) and **Claude Code** (local Python)

# Claude Can Create Excel

Claude became able to generate fully functioning, nicely formatted Excel workbooks in September 2025.  Microsoft has introduced the same Anthropic technology into Excel itself.

**Claude prompt:** "Create an Excel file illustrating two-stage DCF valuation."

Claude Excel File

# Valuation with Claude

**HBS Case *Valuing Wal-Mart 2010*:**

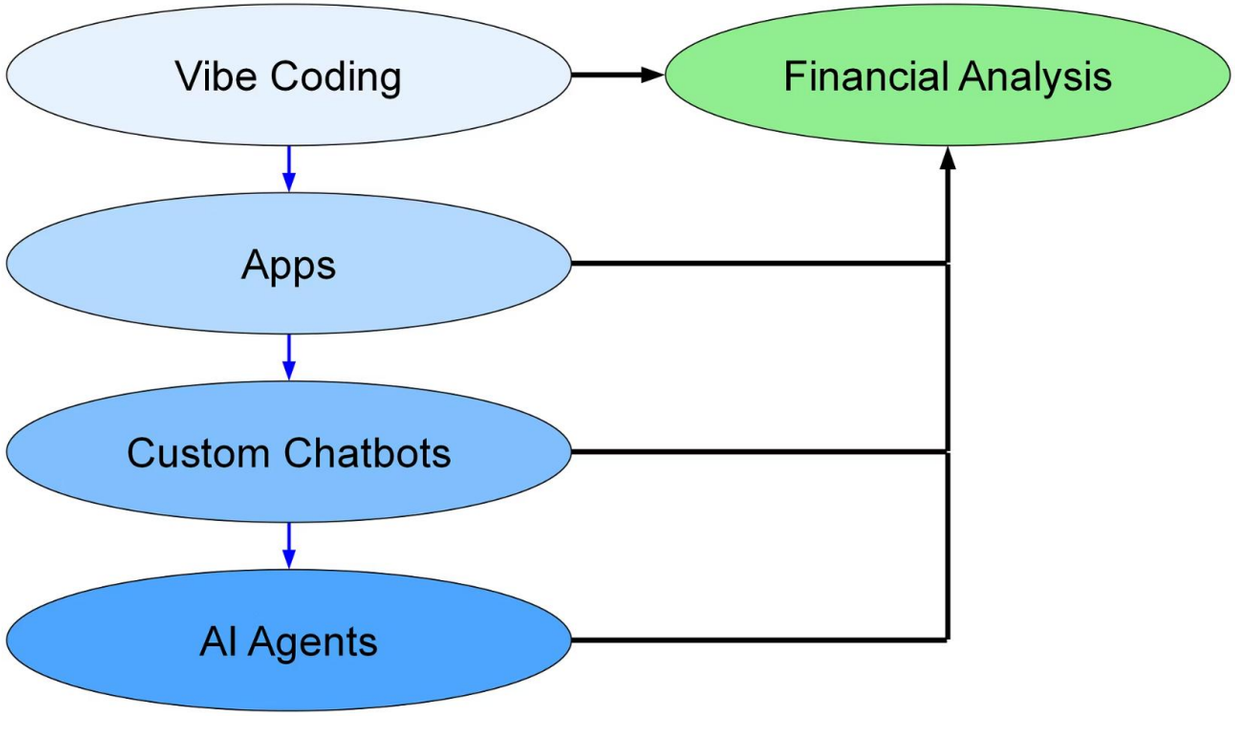
Read the uploaded case. Ignore the valuation method described in the case. Do a two-stage DCF valuation. Create a PowerPoint deck and fully functioning and professionally formatted Excel workbook.

Document your assumptions and your reasons for them. Put years in columns and items in rows throughout the Excel workbook and PowerPoint deck.

Currently requires Claude Max subscription.

Microsoft's
Vibe Working

Powered by Claude




# AI Plumbing

- Store code in an app
- Chatbots are apps
- Agents are chatbots with tools (tools=apps)

# Why Teach the Plumbing?

- Students gain perspective on how things fit together in the AI space
- Building apps/chatbots/agents to do finance can deepen understanding of finance
- Students may end up at small or medium size firms and be the plumbers
- May check a box for recruiters

# Chatbot Elements

1. **User Interface**
   The front-end interface where users interact with the system

2. **API Connection**
   Secure connection to Large Language Model (OpenAI, Anthropic, Google, etc.)

3. **System Prompt**
   Foundational instructions that define the chatbot's behavior

4. **Document Retrieval**
   Optional capability to access specific documents or knowledge bases

5. **Tool Integration**
   Optional connections to external tools, databases, or APIs

# System Prompts: The Foundation

A system prompt is text sent to the LLM alongside each user prompt. It contains essential information and instructions that shape the AI's behavior and responses.

System prompts are fundamental to creating reliable, consistent AI behavior. They define the chatbot's personality, expertise level, response format, and operational constraints.

Explore Anthropic's System Prompts

# RAG: Retrieval Augmented Generation

### Document Storage

Store relevant documents in a searchable database or vector store

### Relevance Matching

Choose most relevant document chunks using vector similarity algorithms

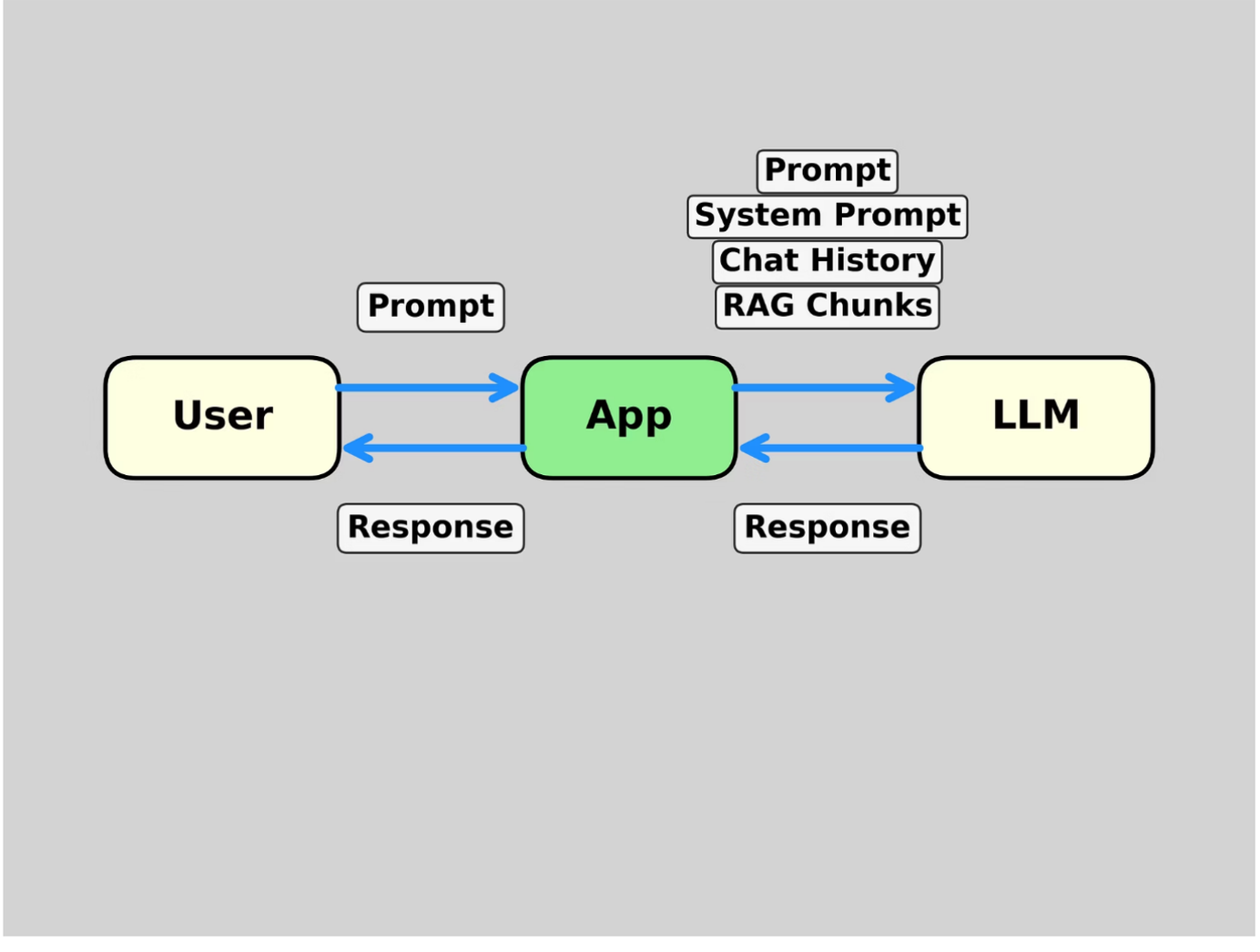
### Context Integration

Send relevant chunks to LLM along with user prompt and system prompt

RAG is a key element of many corporate AI implementations.

# Example RAG Chatbot

Visit chat.derivative-securities.org




# Chatbot Architecture

# Claude Code Live Demo

```
Create a streamlit app that takes a user prompt and sends it to
OpenAI GPT 4.1 using my OPENAI_API_KEY stored in
C:\users\kerry\Dropbox\.ENV.

In the system prompt, tell GPT to respond in Spanish. Run the app.

Use my NGROK_TOKEN in C:\users\kerry\Dropbox\.ENV to tunnel the
app.
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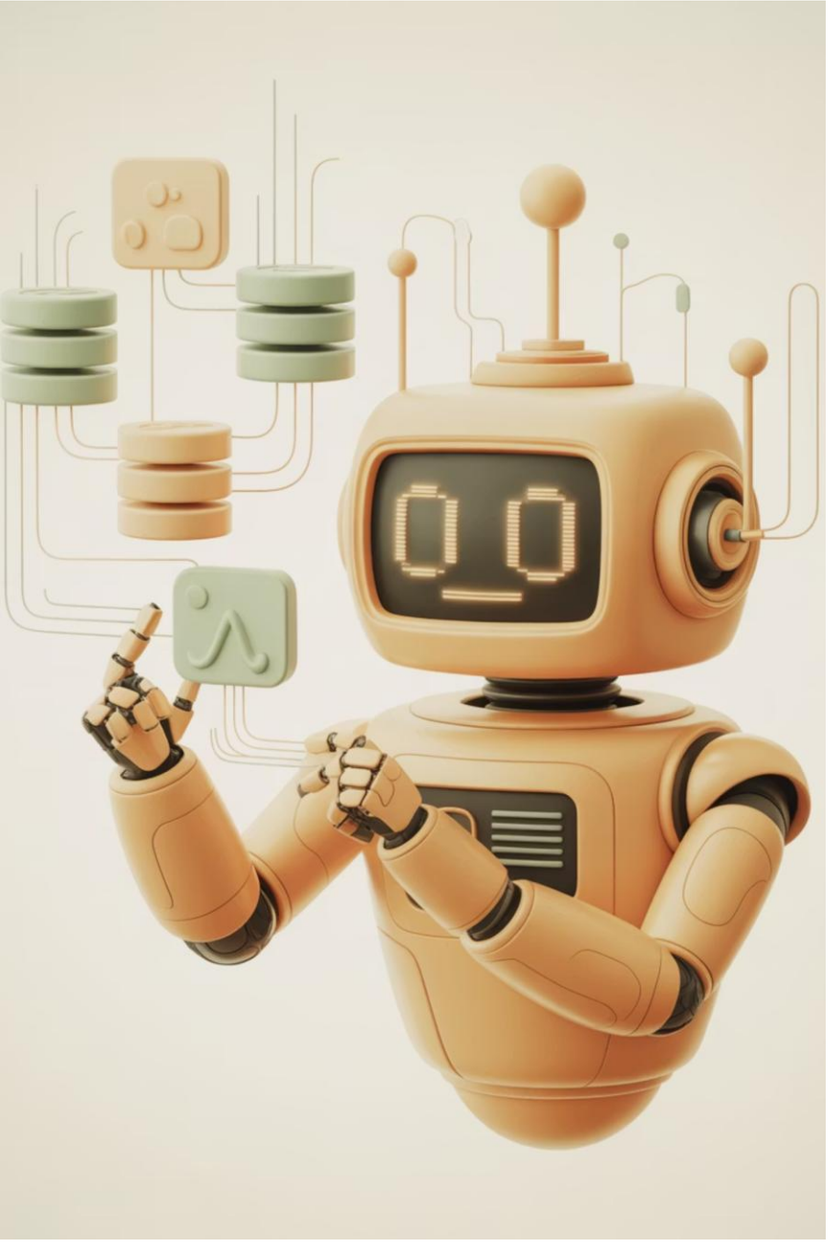


# Agents = Enhanced Chatbots

**Definition**

An AI agent is a chatbot equipped with tools to perform actions beyond conversation.

**Database Integration**

Database tools are particularly valuable for chatbots in financial applications.

# Claude for Financial Services:

Anthropic: Through data providers, Claude (for Financial Services) has real-time access to comprehensive financial information.

**Data Platforms**

Box, Daloopa, Databricks

**Financial Data**

FactSet, Morningstar, Palantir

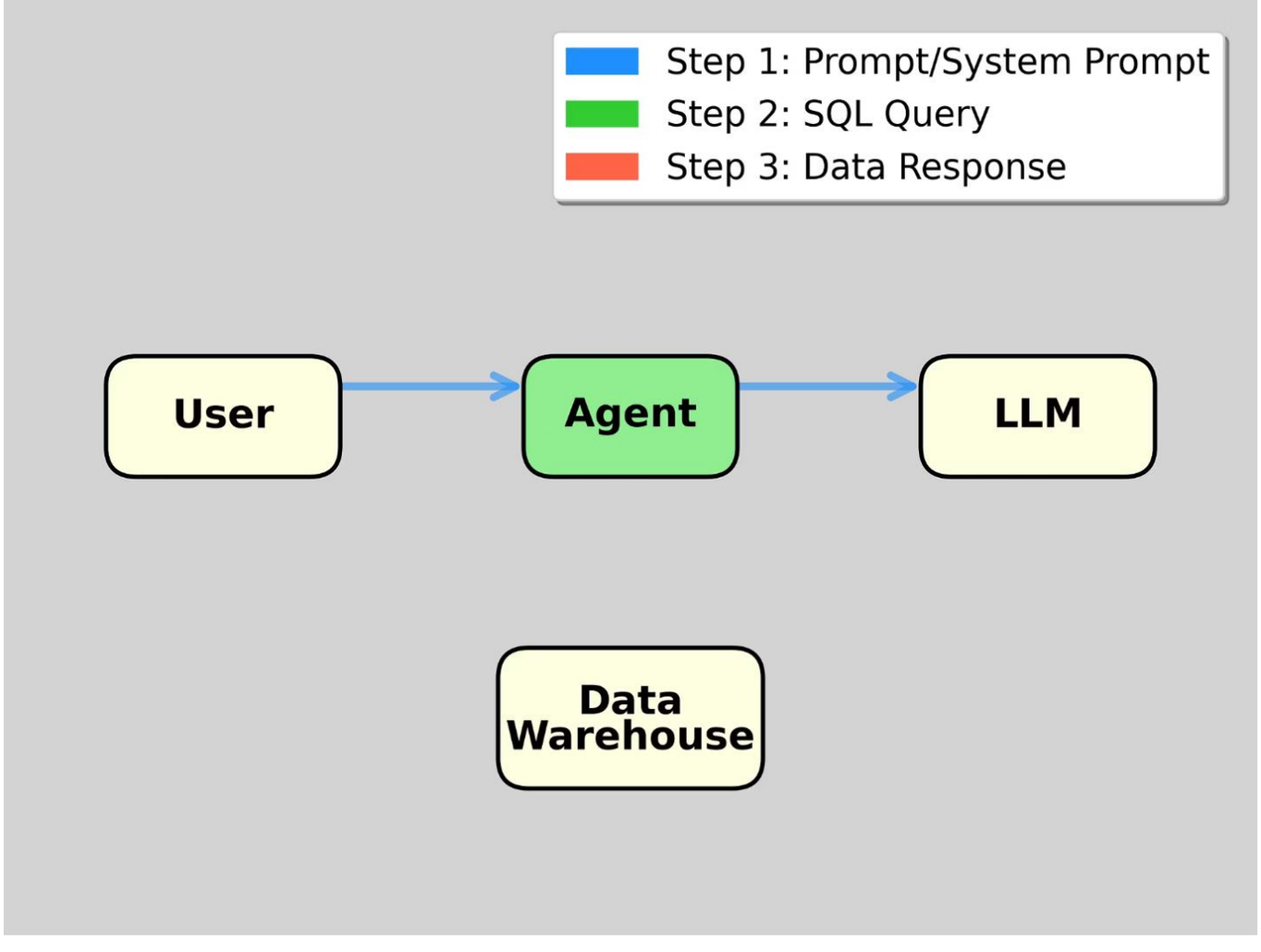
**Market Intelligence**

PitchBook, S&P Global, Snowflake

# Why MBAs Should Learn about Agents

> **Fortune, September 14, 2025:**
>
> PromptQL, an enterprise AI platform created by San Francisco-based developer tooling company Hasura, is doling out **$900-per-hour** wages to its engineers tasked with building and deploying AI agents to analyze internal company data using large language models (LLMs).
>
> Tanmai Gopal, PromptQL's cofounder and CEO, said '**MBA types** ... are very strategic thinkers, and they're smart people, but they **don't have an an intuition for what AI can do**.'

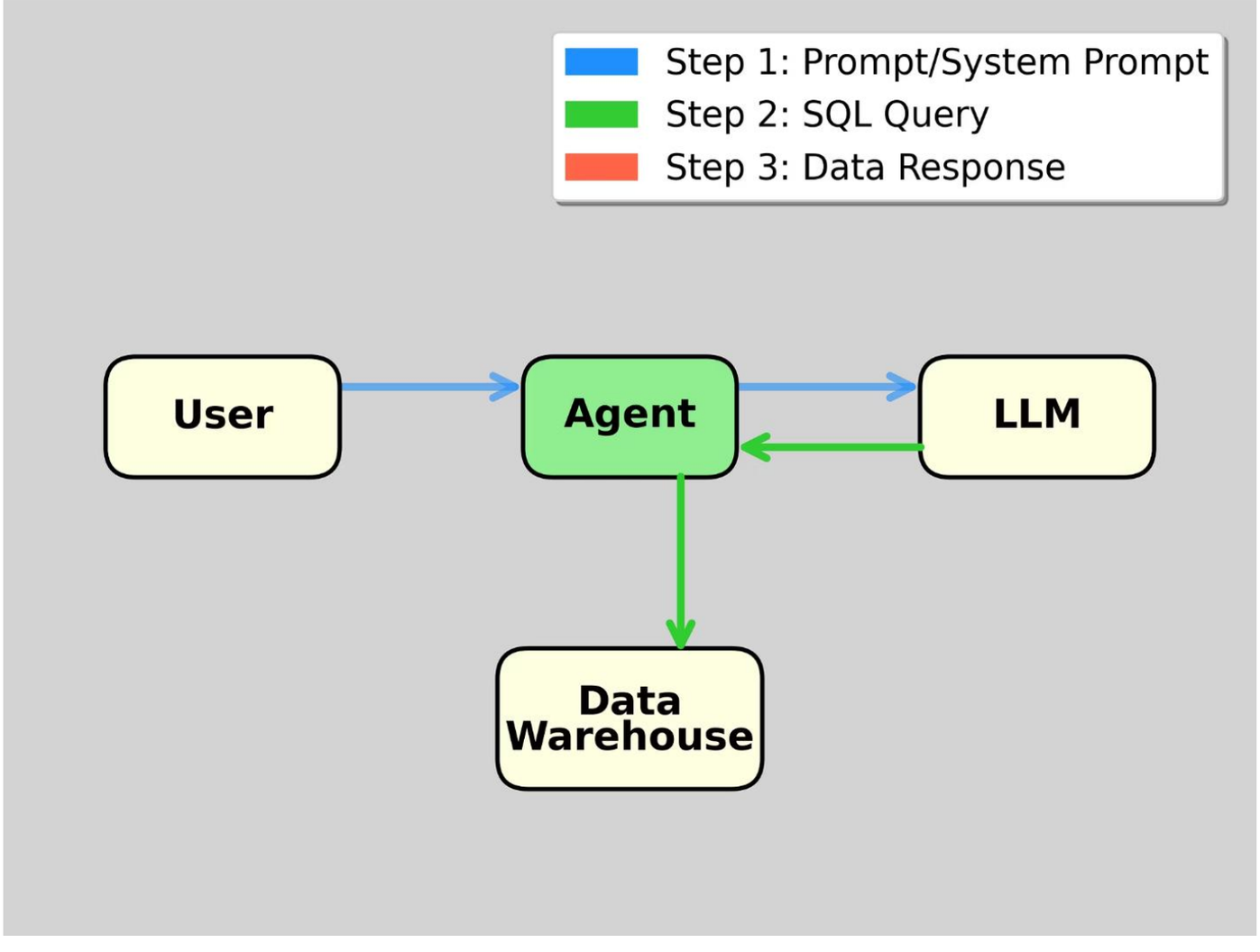
# Database Agent




(1) User prompt → LLM

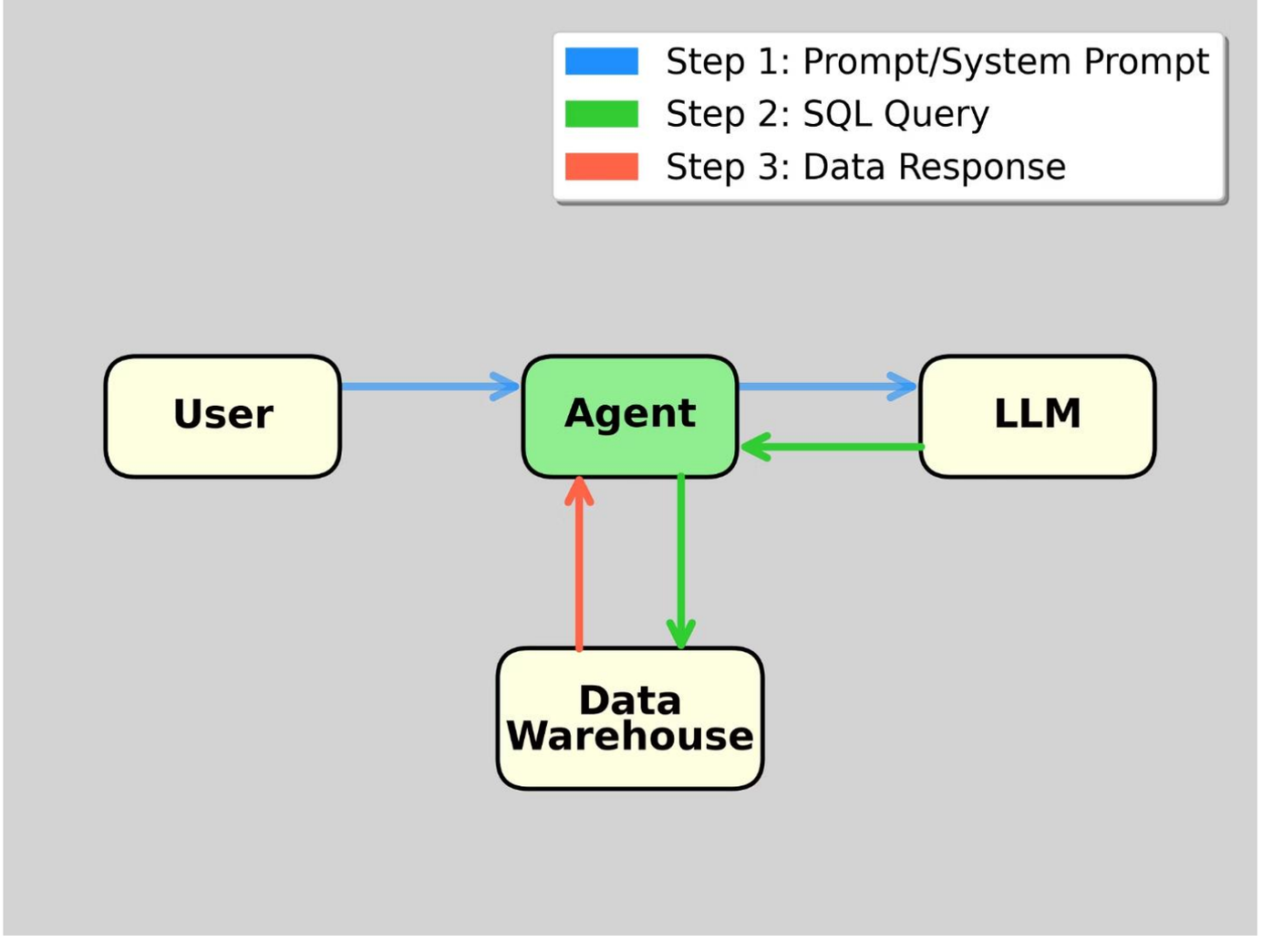
May be multiple rounds to clarify prompt

# Database Agent




(2) SQL → Data Warehouse

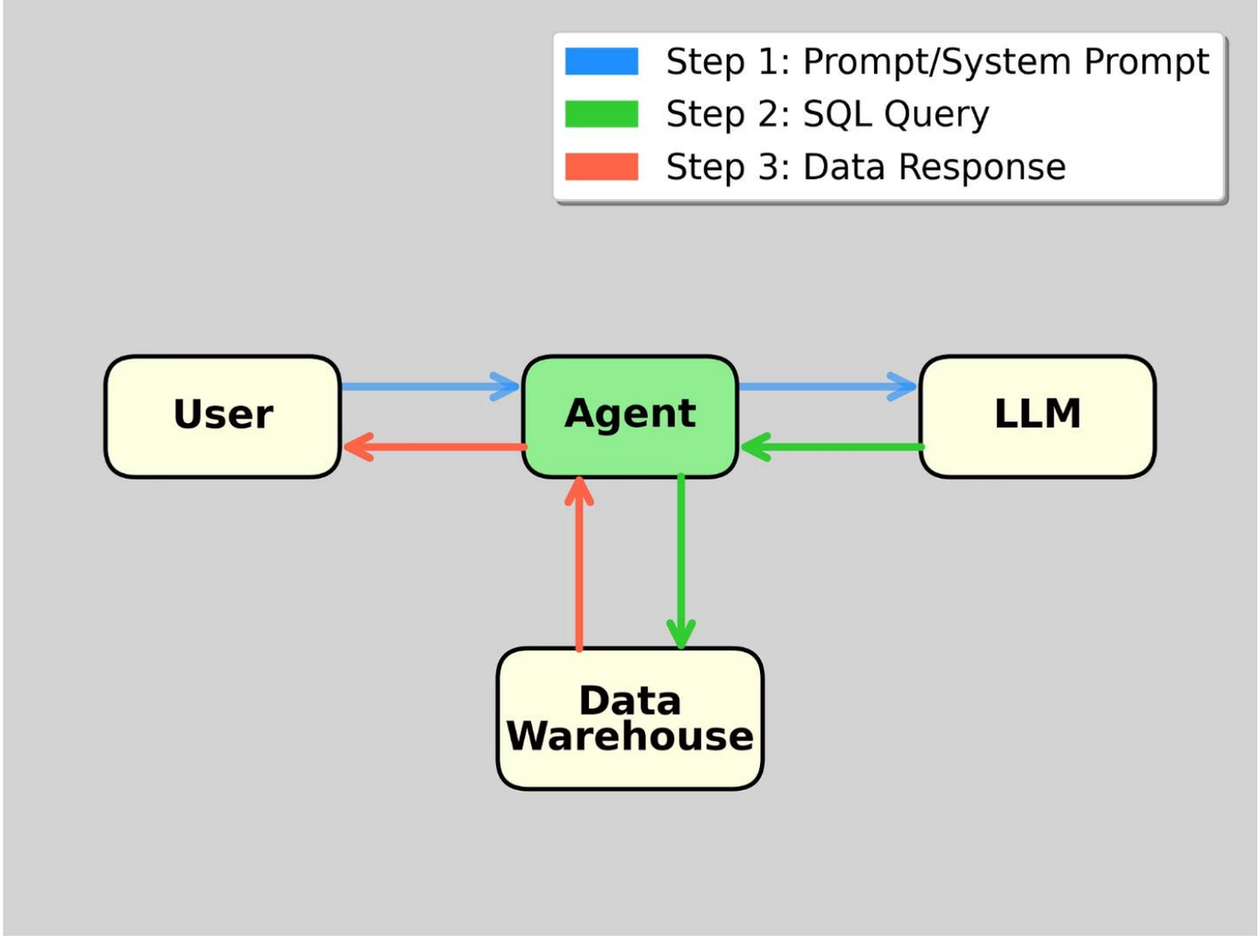
# Database Agent




(3) Data or Error → Agent

Error message will be sent to LLM for new SQL

# Database Agent




(3) Data → User

Could attach more tools.

For example, Python to analyze data.

Then Output → User

# Example: Rice Business Data Portal

Visit data-portal.rice-business.org

Demonstrates how students (and workers) can interact with complex databases using natural language.

# No-Code Solution: OpenAI Custom GPT

### System Prompt

Just describe what you want your assistant to do

### RAG Integration

Allow your GPT to access and reference your documents

### Built-in OpenAI Tools

Web browsing, DALL-E image generation, and Python code

### External Tools

Connect to third-party APIs and services

*ChatGPT Plus subscription required for both creators and users*

# Notebook LM

Capabilities:

| | | |
|---|---|---|
| Chat | Audio overview | Video overview |
| Flash cards | Quiz | Reports |
| Mind map | | |

Easy sharing in university Google accounts, even available in Canvas

# Previous Disruptive Technologies

# Handheld Calculators

## The Concerns

Educators worried students wouldn't learn fundamental arithmetic operations


## The Reality

Studies haven't found significant negative effects on basic math skills. However, primary schools still provide practice and assessments without calculators.

Some hoped schools could move beyond calculation to teach deeper mathematical concepts. That didn't happen either.

# Personal Computers & Spreadsheets

We added courses on how to use spreadsheets

We updated existing courses to use spreadsheets

We assess how well students can use spreadsheets (no pencil and paper valuation analyses)

Teaching how to do finance in spreadsheets is a main educational goal.

# Why Spreadsheets Succeeded

## Business Relevance

Spreadsheets are extensively used in real business environments

## Educational Value

Ideal for teaching the logic of valuation and capital budgeting concepts

## Tool Evolution

Spreadsheets don't automatically do what we want students to learn

# AI: A Different Challenge

### ✓ Business Usage

AI is increasingly used across business functions

### ✓ Educational Tool

AI provides excellent tutoring and learning support

### ✗ Automation Risk

AI can automatically perform many tasks we previously taught manually

AI is more like calculators than spreadsheets. We face similar concerns about skill atrophy. Like primary schools with arithmetic, we'll need practice and assessments without AI to ensure fundamental competencies.

# Updating Existing Courses

# A New Teaching Sequence

1

### Concepts First

Begin with fundamental concepts using slides or board presentations as usual

2

### Tool Implementation

Demonstrate implementation in traditional tools (usually Excel) as usual

3

### AI Enhancement

**New step: Apply concepts using chatbots and AI agents**

### Traditional Approach

Teach Excel implementation → students build Excel models

### Additional Piece

Teach AI implementation → students conduct AI chats or build AI apps

# The New Skills Landscape

**Brookings Institute, 2025:**

As AI models begin to handle underwriting, compliance, and asset allocation, the traditional architecture of financial work is undergoing a fundamental shift.

As job descriptions evolve, so does the definition of financial talent. **Excel is no longer a differentiator. Python is fast becoming the new Excel.**

But technical skills alone will not cut it. The **most in demand profiles today are those that speak both AI and finance**.

# Three Legs of Assessment

### Assignments

"Turn in your chat, its output, and your evaluation of the output"

### Exams Without AI

In-class assessments ensuring students understand fundamental concepts independently

### Exams With AI

More ambitious assessments leveraging AI assistance - complex cases can become exams with AI support

# AI as Educational Partner

AI can be a highly effective tutor, and we should leverage it in our teaching.

### Replace Reading Assignments

Ask students to chat with chatbots instead of traditional reading assignments

### Pre-Class or In-Class

Assign pre-class or in class before slides and class discussion.

**Assignment:** "Ask your chatbot to teach you about [topic]. Tell it to ask you questions to ensure you are understanding."

# If Chatbot Reliability is a Concern

### Use RAG

Build custom systems (could use Google's Notebook LM or Custom GPT) for specific source control

### Build with AI Reports

Can have AI create a comprehensive report, then edit if needed and use

### Reliability Reality

LLMs today are significantly more reliable than earlier versions - hallucinations have diminished

# Notebook LM

Capabilities:

| | | |
|---|---|---|
| Chat | Audio overview | Video overview |
| Flash cards | Quiz | Reports |
| Mind map | | |

Easy sharing in university Google accounts, even available in Canvas

# NotebookLM Example

**Step 1:**

I asked ChatGPT to prepare a detailed report on binomial option in markdown format. I could have used a different chatbot.

Link to ChatGPT conversation:

https://chatgpt.com/share/68e7cbf4-013c-8006-89bb-1166720463ff

**Step 2:**

I uploaded the markdown file to NotebookLM and asked it to generate flash cards and a video overview.

Link to NotebookLM notebook:

https://notebooklm.google.com/notebook/7e3e40f0-a937-46cb-8eea-7c713bdcb8d4

# Effect of AI on Junior Employment

**Harvard economists' study:**

- AI is reducing employment of junior workers but not senior workers

Lichtinger and Maasoum (20,000+ SSRN downloads in one month)

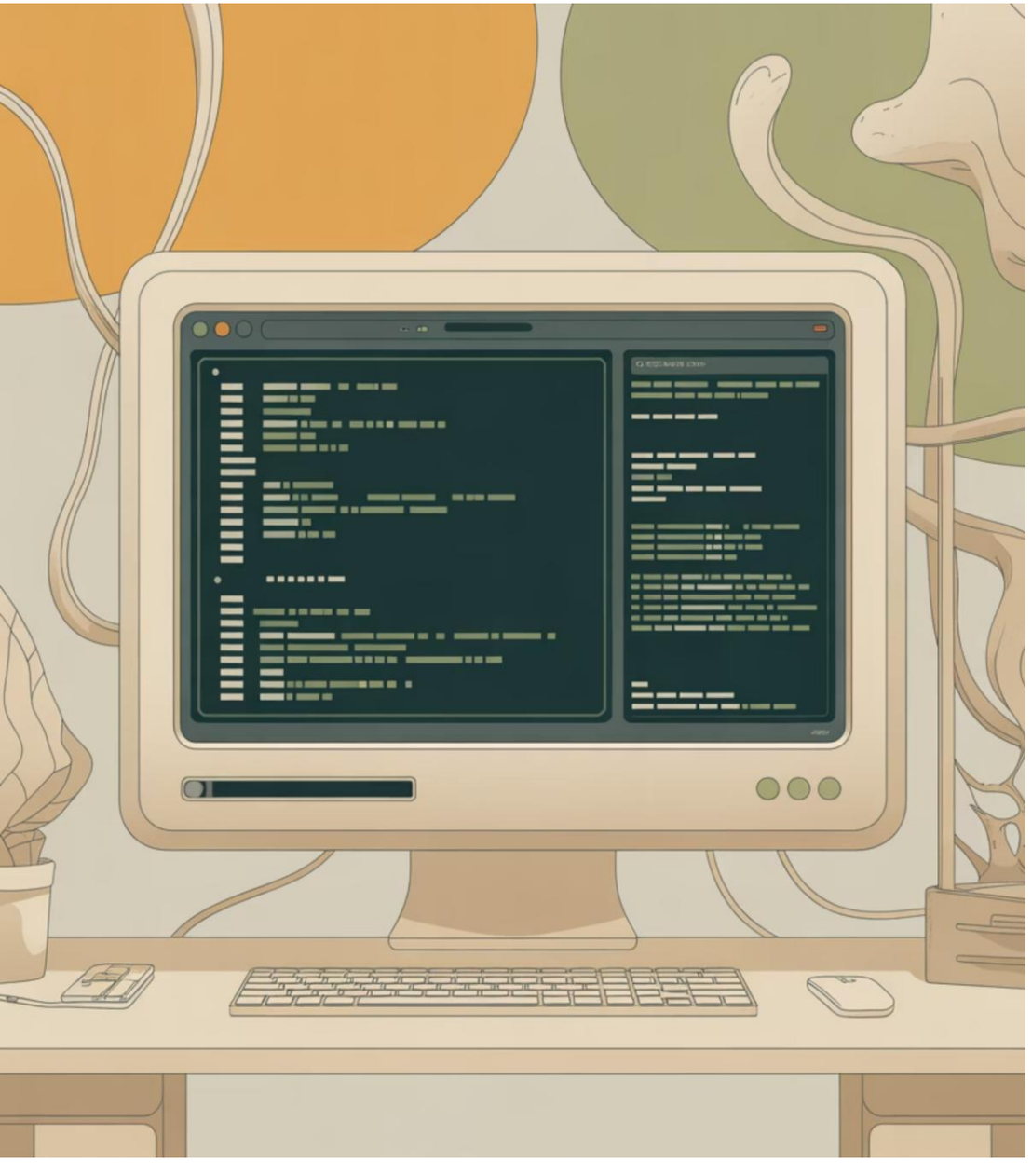
**JPMorgan quote:**

- "Many, many of the processes underneath are being done by AI."

**Junior professors?**

Scott Latham, UMass, Chronicle of Higher Education:

Are you Ready for the AI University?



# Deep Dive into Claude Code

# Claude Code

Part of a new generation of terminal-based coding agents, along with OpenAI Codex and Gemini CLI.

It integrates well with popular development environments like VS Code.

Built on standard Anthropic models, Claude Code appears to have an exceptionally well-designed system prompt that optimizes it for development tasks.


*Requires Claude Pro subscription*

# Claude Code's Capabilities

## File Operations

Create, edit, copy, move, and delete files

## Document Creation

Generate and edit **LaTeX** documents. Generate **Word** docs and **PowerPoint** presentations

## Python Development

Write, edit, and execute **Python scripts** and **Jupyter notebooks**

## Deployment

Create **GitHub** repositories and **deploy apps** on hosting platforms like Hugging Face Spaces, Streamlit Community Cloud, Koyeb, and Render

# Claude Code in VS Code Demo

```
Create a Jupyter notebook for mean-
variance optimization.

Prompt the user for the number of
assets, their means, standard
deviations, and correlations and the
risk-free rate.

Only ask for the minimum number of
correlations required to compute the
correlation matrix.

Assume short sales are allowed.

Compute and display the tangency
portfolio.
```

# MCP Servers

Anthropic's Model Context Protocol (MCP) enables adding custom tools to chatbots.  I've added an MCP server for the Rice database to my Claude Code setup.

**Demo Query:** Get TSLA's ROE by quarter on a trailing 4-quarters basis for Q1 2020 through Q3 2025 **from the Rice stock database.**

Get TSLA's adjusted closing price starting Jan 1, 2020. Filter to keep only end-of-quarter prices.

Plot the ROE and filtered price series in the same figure, with ROE on the left y-axis and price on the right y-axis.

# Some Additional Resources

Scan the QR code to access
genai4finance.kerryback.com