Incorporating AI into Teaching

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Rice University
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.

Past, Present, & Future of UI's

- **Terminal Era:** Unix, MS-DOS, Linux, ...
- **Graphical User Interface:** Point & click
- **Chat:** AI agent does everything. **Agents will change the way people use computers.**

OpenAI's Apps, Agent Builder, & Agent SDK (10-6-2025)

- Built on MCP
- OpenAI apps: ChatGPT becomes the user interface. **Goal is to be the new Apple App Store.**
- Launched with Coursera, Expedia, Spotify, Zillow, …
- Tools for building apps:
  - Agent Builder: no-code platform
  - Agent SDK: code platform

Claude as an Excel Agent

Claude became able to generate **fully functioning, nicely formatted Excel workbooks** in September 2025.

Microsoft has introduced the same Anthropic technology into Excel itself. ChatGPT can also generate Excel, but it is not yet as good (but wait a week).

Prompt: Read the uploaded HBS case (Valuing Wal-Mart 2010). Ignore the valuation method described in the case. Do a two-stage DCF valuation. Document your assumptions and your reasons for them. Create a professionally formatted Excel workbook.

Microsoft's Vibe Working

Powered by Claude

OpenAI Hires Ex Investment Bankers

Bloomberg 10-21-2025:

OpenAI has initiated a new program contracting approximately 100 former junior investment bankers.

They are tasked with creating detailed prompts and spreadsheet model responses.

OpenAI wants to get calculations, layouts, and formatting exactly right.

Roadmap for Today's Discussion

A Course on Gen AI for Finance

Deep Dive into Claude Code

Previous Disruptive Technologies

AI in Finance Courses

AI as a Teaching Partner

A Course on Gen 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
- **Universal agents**: Claude, ChatGPT

Chatting

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.**

Chat, evaluate, revise, save effective prompts

AI and Coding

Aaron Linsky, CTO, AIA Labs at

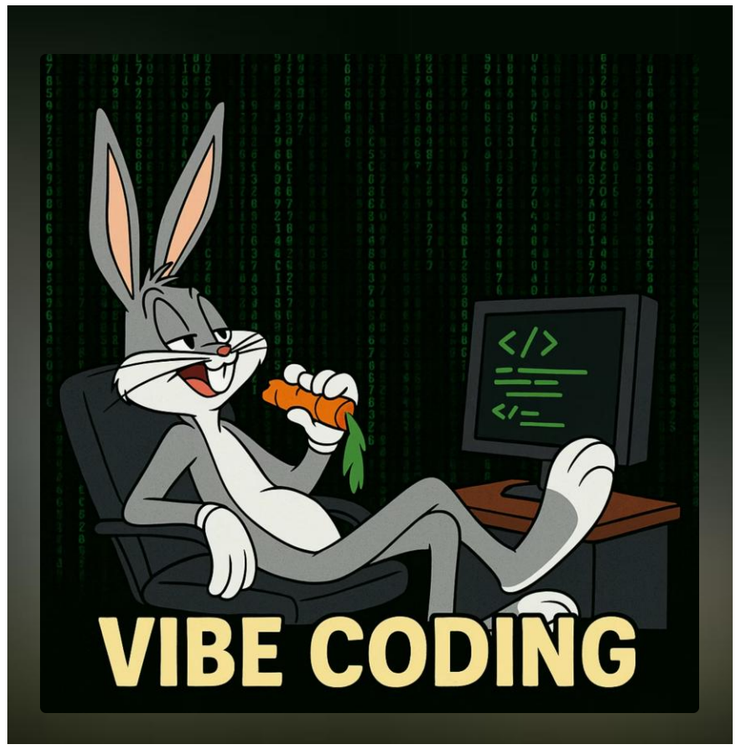
We've been developing capabilities powered by Claude since 2023 within AIA Labs.

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.

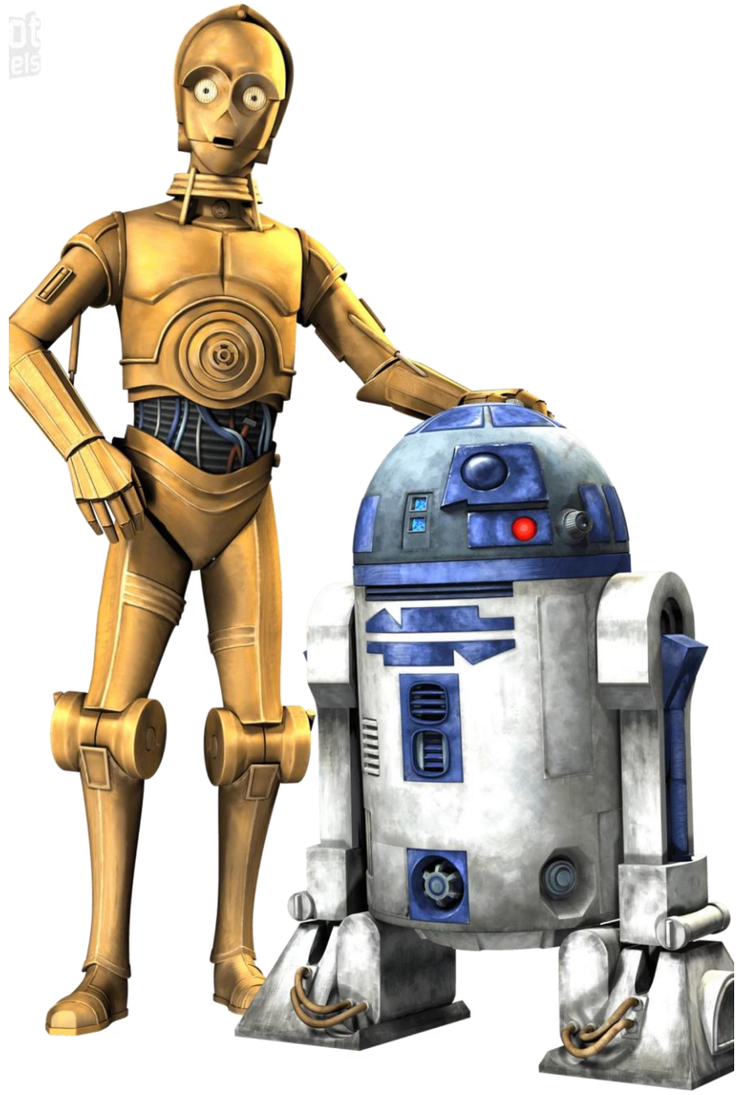
Beyond Finance

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.**



Building Chatbots and Agents



Custom Chatbot Elements

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

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

System Prompt
Instructions that define the chatbot's behavior (on top of API system prompt)

Document Retrieval
Optional capability to access specific documents or knowledge bases

Tool Integration
Optional connections to external tools, databases, or APIs

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

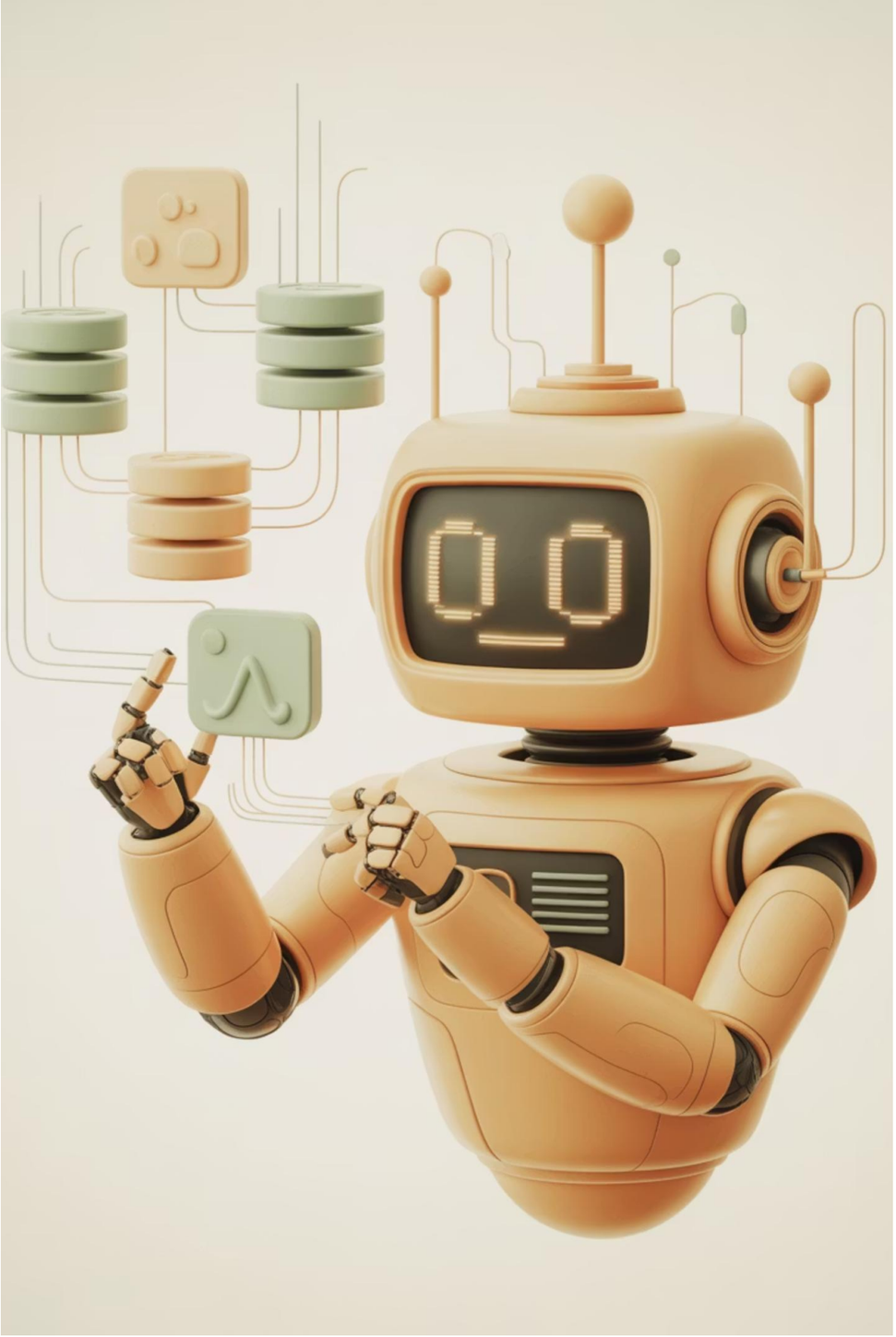
Context Integration

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

RAG is a key element of many corporate AI implementations.

A Vibe-Coded RAG Chatbot

Visit chat.derivative-securities.org



Agent = Enhanced Chatbot

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

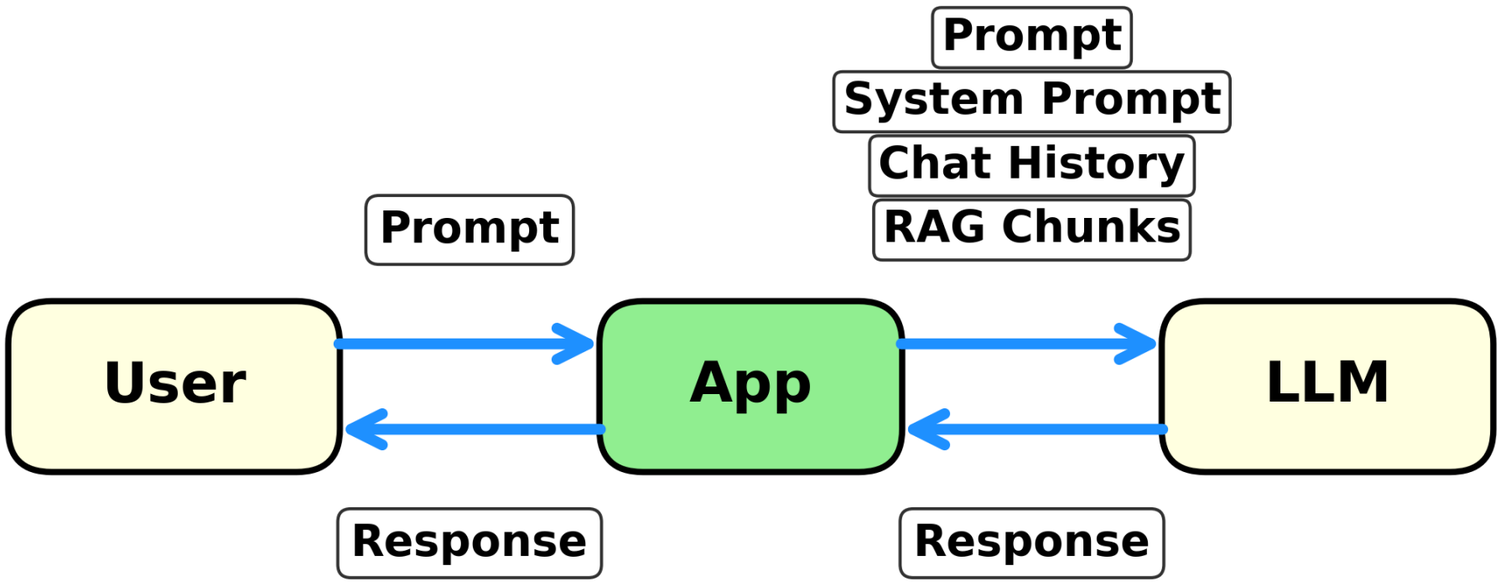
Financial Data

FactSet, Morningstar, Palantir

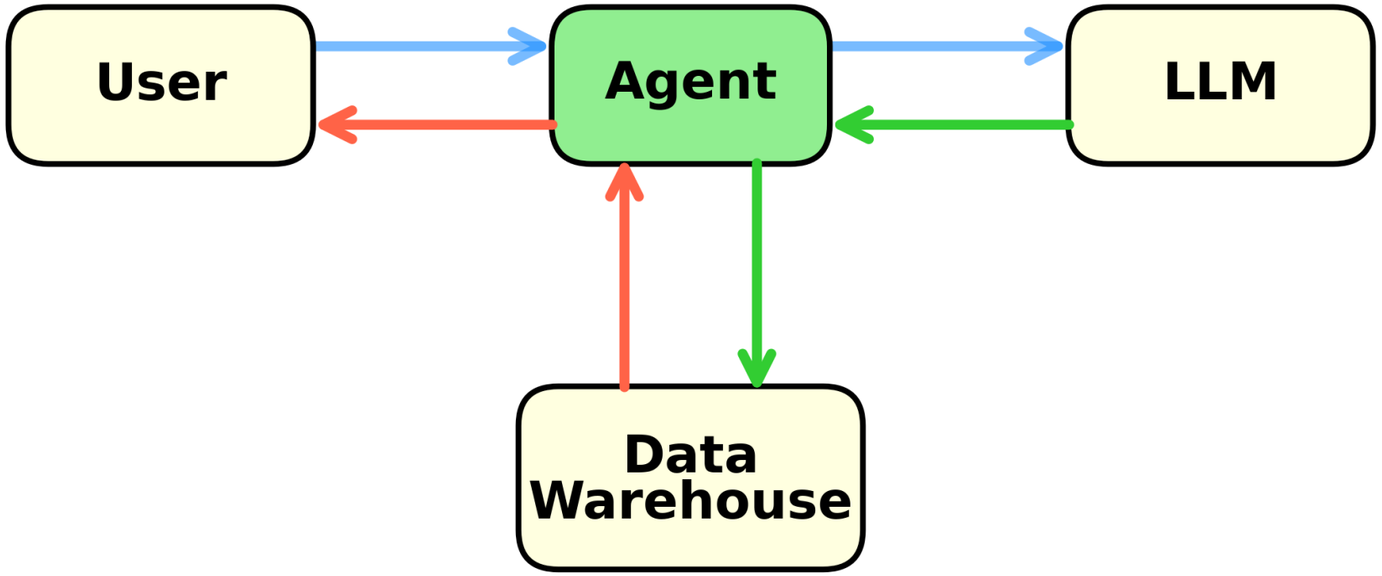
Market Intelligence

PitchBook, S&P Global, Snowflake

Custom Chatbot Architecture



Database Agent



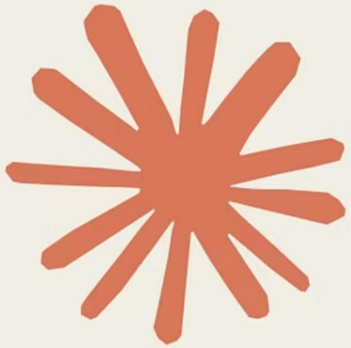
Could attach more tools. For example, Python to analyze data. Then Output → User

A Vibe-Coded Database Agent

Visit data-portal.rice-business.org

Example prompt:

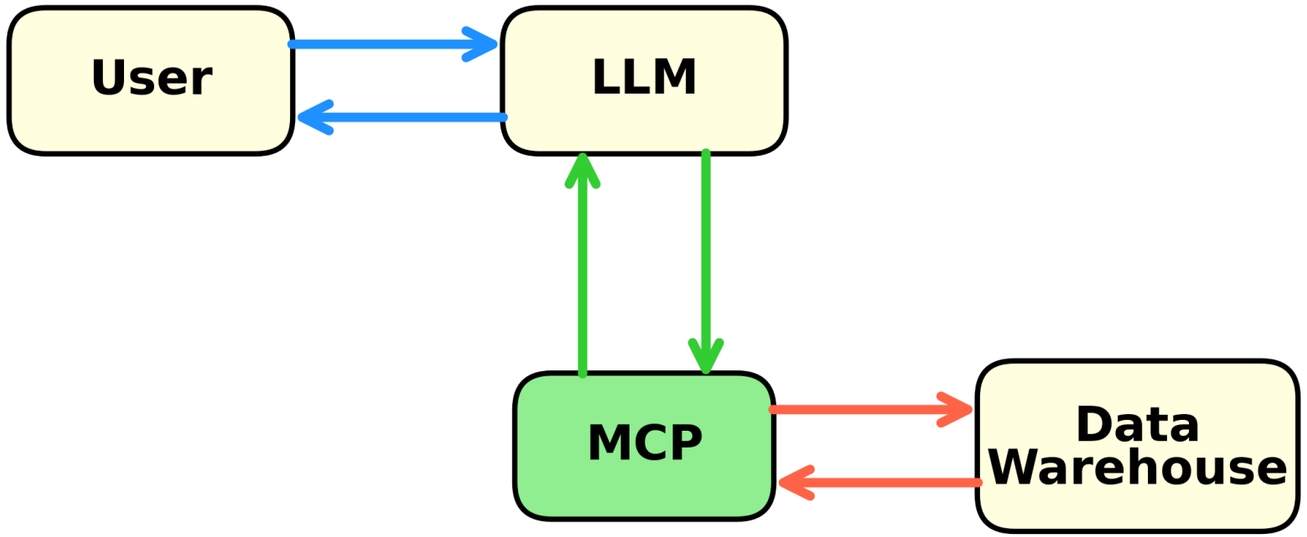
Get TSLA's ROE by quarter on a trailing 4-quarters basis for Q1 2020 through Q3 2025 from the Rice stock database.



Claude

BY ANTHROP\C

Model Context Protocol (Nov, 2024)



Agent logic embedded in MCP server (local or cloud) and instructions to LLM

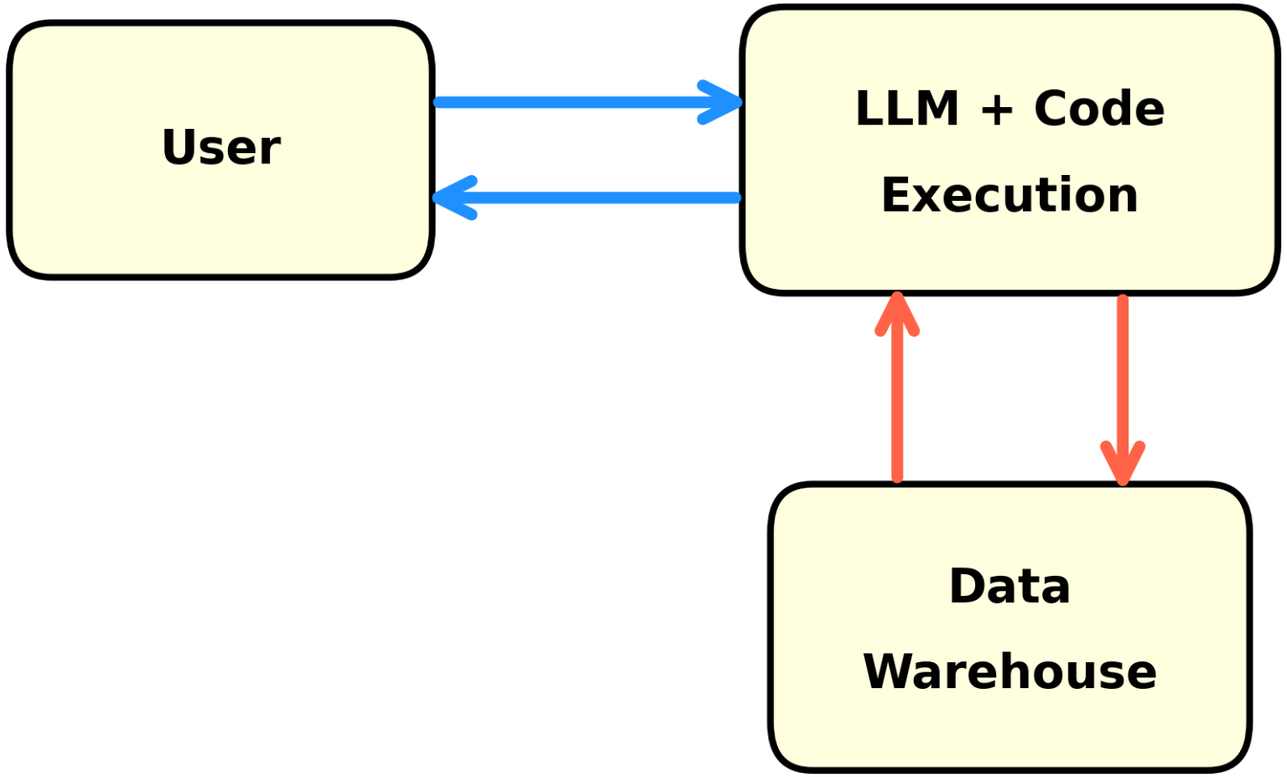
User experience is simplified. Use single chatbot for everything.

Backbone of OpenAI's Apps

Claude Skills

- Introduced on 10-16-2025, Claude Skills are customized prompts plus auxiliary materials such as code scripts.
- Claude can generate Excel files because of **Anthropic's new Excel Skill**.
- Anthropic has created a number of Skills, **even a Skill for creating Skills**. Users can easily create their own Skills (ask Claude to do it).
- Claude consults Skills as needed.

Claude Skills (10-16-2025)

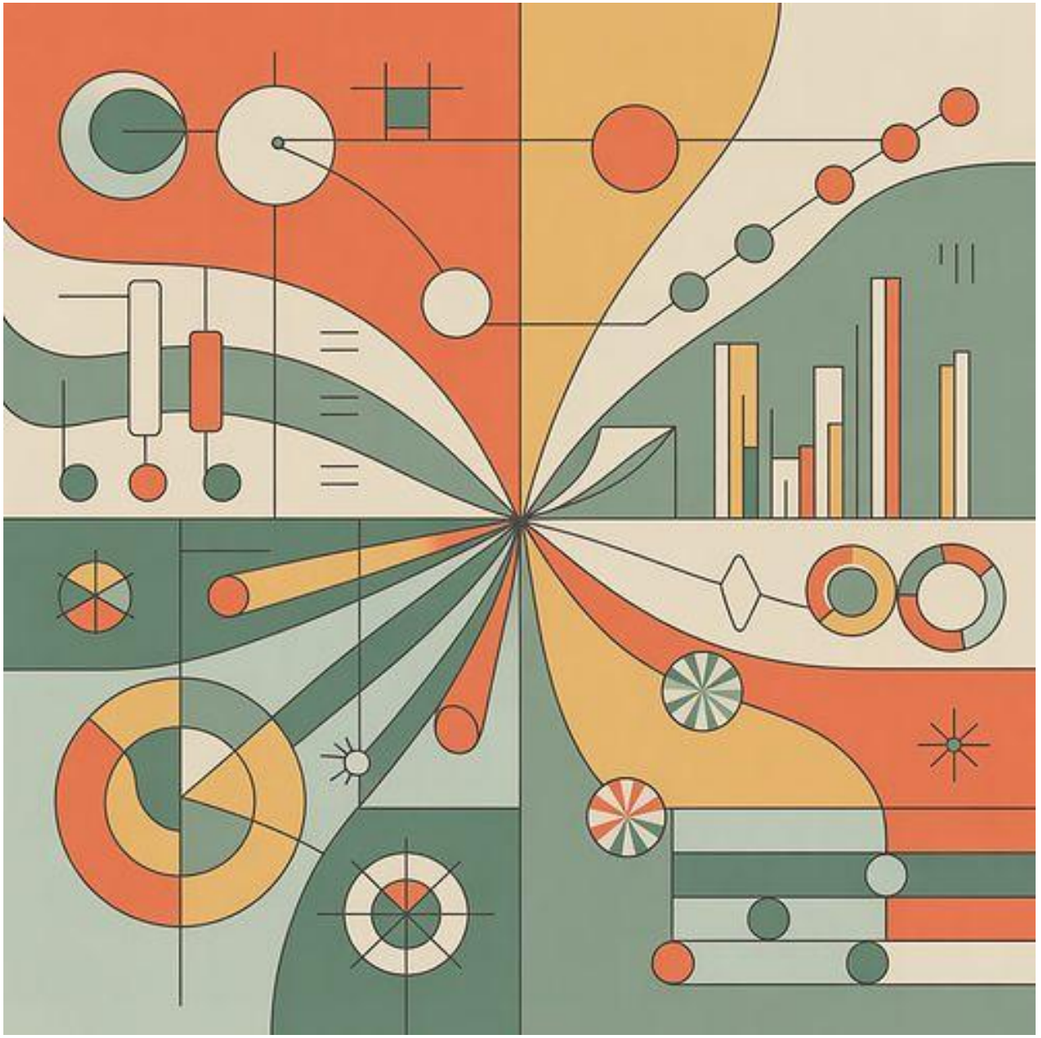


User chats with Claude as with MCP

Agent logic embedded in Skill – instructions that Claude reads when needed + Python scripts it can execute

Developer experience is simplified

Claude has a Skill for creating Skills!



Vibe Coded Claude Skill

I created a skill for the Rice stock database.
Actually, I just asked Claude to create it for me.

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

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.

Using standard Anthropic models, it is optimized for development tasks.

Requires Claude Pro subscription

Varieties of Claude

Claude.ai

Interact with Claude directly through its intuitive web interface for general tasks and conversations.

Claude Desktop

Access Claude as a dedicated desktop application for enhanced productivity and offline capabilities.

Claude Code in Terminal

Integrate Claude's coding capabilities into your command-line workflow for quick code generation and debugging.

Claude Code in VS Code

Leverage Claude's advanced code assistance directly within your VS Code development environment.

Claude Code's Capabilities

File Operations

Create, edit, copy, move, and delete files

Document Creation

Generate and edit **LaTeX** documents. Generate **Word** docs, **PowerPoint** presentations, and **Excel** workbooks

Python Development

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

Deployment

Create **GitHub** repositories and **deploy apps** on hosting platforms

Claude Code Example 1: Creating Apps

Create a Streamlit app that allows a user to input (i) years to retirement, (ii) current investment account balance, (iii) planned annual savings, (iv) expected rate of return, and (v) standard deviation of rate of return.

Simulate 1,000 possible lifetimes and display statistics and a probability density curve for the account balance at retirement.

Run the app and tunnel it using my ngrok token stored in .env.

Claude Code Example 2: Creating and Using Skills

Claude Prompt 1: Research how to install Skills and then **install the xlsx and docx Skills**.

Claude Prompt 2: Create a **mean-variance-optimization Skill**.

It should prompt the user for the number of assets and their expected returns, standard deviations and correlations (the minimum number of correlations needed to compute the correlation matrix), and for the risk-free rate.

Then calculate the tangency portfolio, allowing short sales.

Then create a Word doc containing the relevant data, the tangency portfolio, and your explanation of why the tangency portfolio is what it is. Save the doc in the user's working directory.

Claude Code Example 2: Creating and Using Skills

Claude Prompt 1: Research how to install Skills and then **install the xlsx and docx Skills**.

Invoke the new Skill and use it.

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Claude Code Example 2: Creating and Using Skills

Claude Prompt 1: Research how to install Skills and then **install the xlsx and docx Skills**.

Invoke the new Skill and use it.

Claude Prompt 3: Review the conversation and improve the Skill.

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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.

Teaching how to do finance in spreadsheets is an important educational goal.

AI: A Different Challenge

✓ Business Usage

AI is increasingly used across business functions

✓ Educational Tool

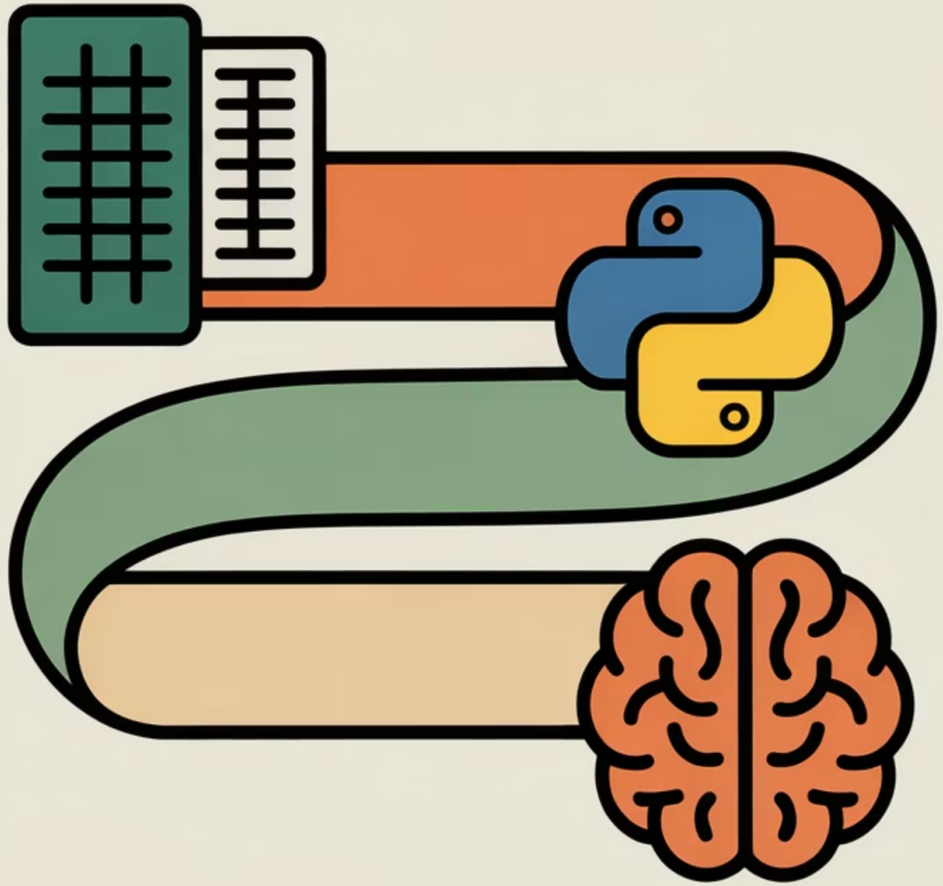
AI provides excellent tutoring and learning support

✗ Automation Risk

AI can automatically perform many tasks previously taught manually

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

AI in Finance Courses



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**.

A New Teaching Sequence

1. **Concepts First**
   Begin with fundamental concepts using slides or whiteboard as usual
2. **Traditional Tool Implementation (Maybe?)**
   Demonstrate implementation in traditional tools (usually Excel) as usual
3. **AI Tool Implementation**
   New step: **Apply concepts using chatbots and AI agents**

Traditional Approach

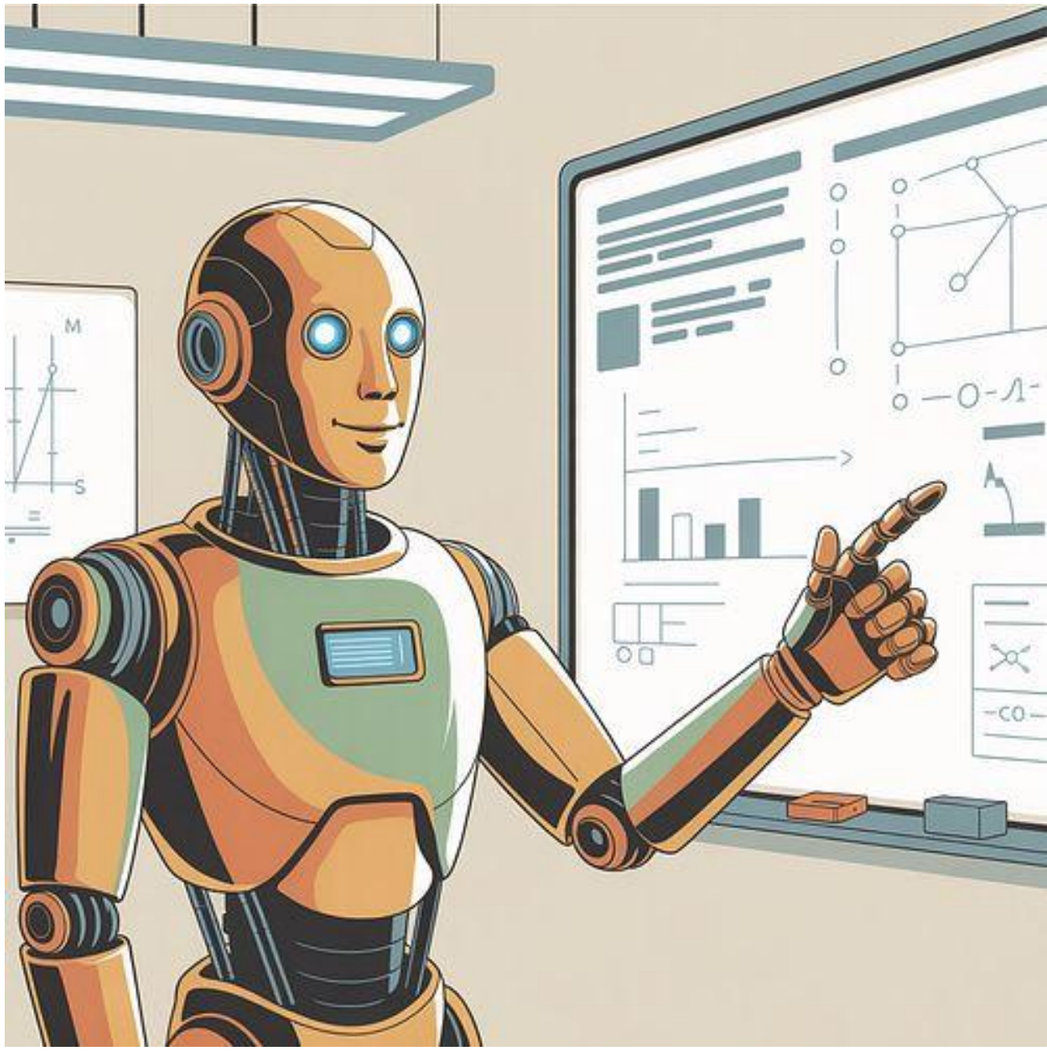
Teach Excel implementation → students build Excel models

Additional Piece

Teach AI implementation → **students chat or build AI apps**

Do We Need the Excel Step?

- Linear regression
- Simulation
- Mean-variance Optimization
- Option valuation
- DCF analysis



Do We Need the Excel Step?

- ❌ Linear regression
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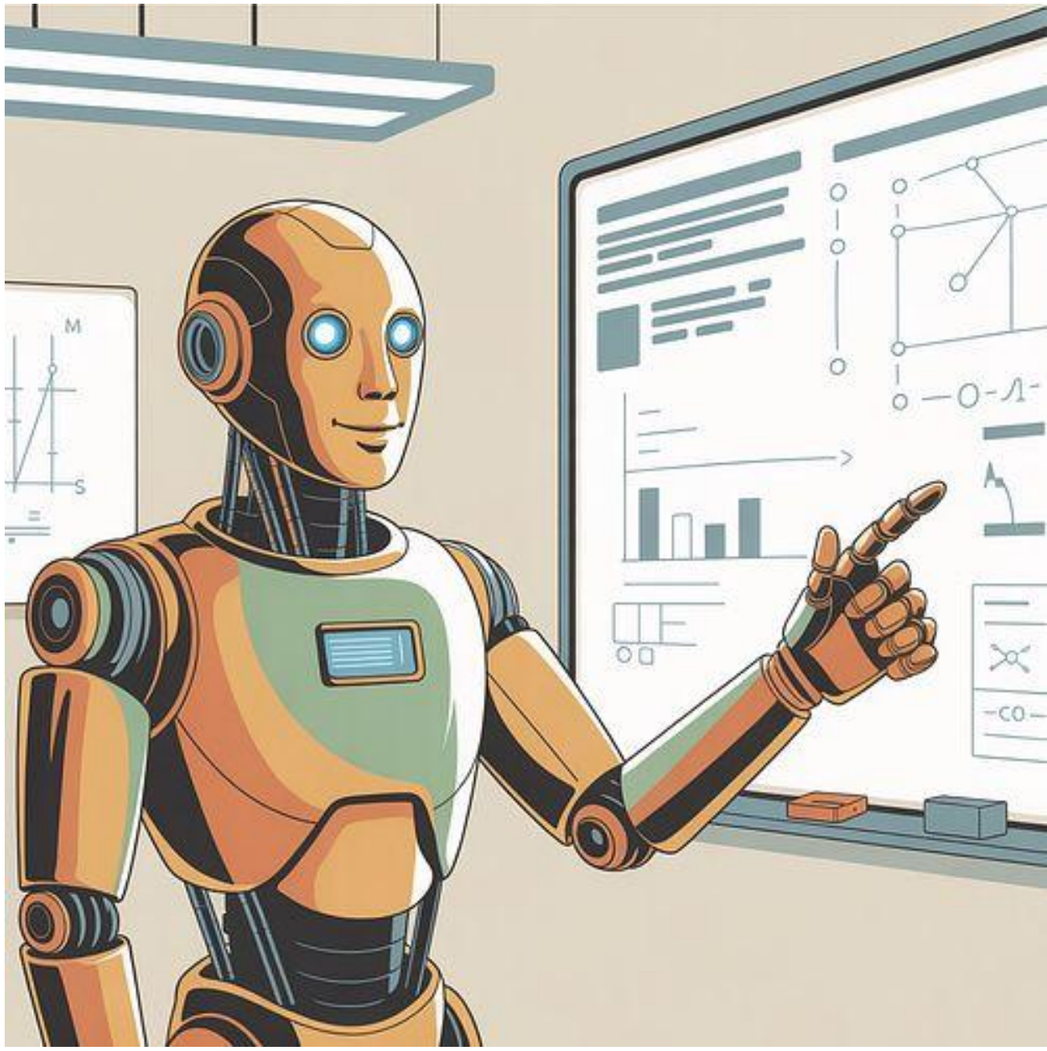
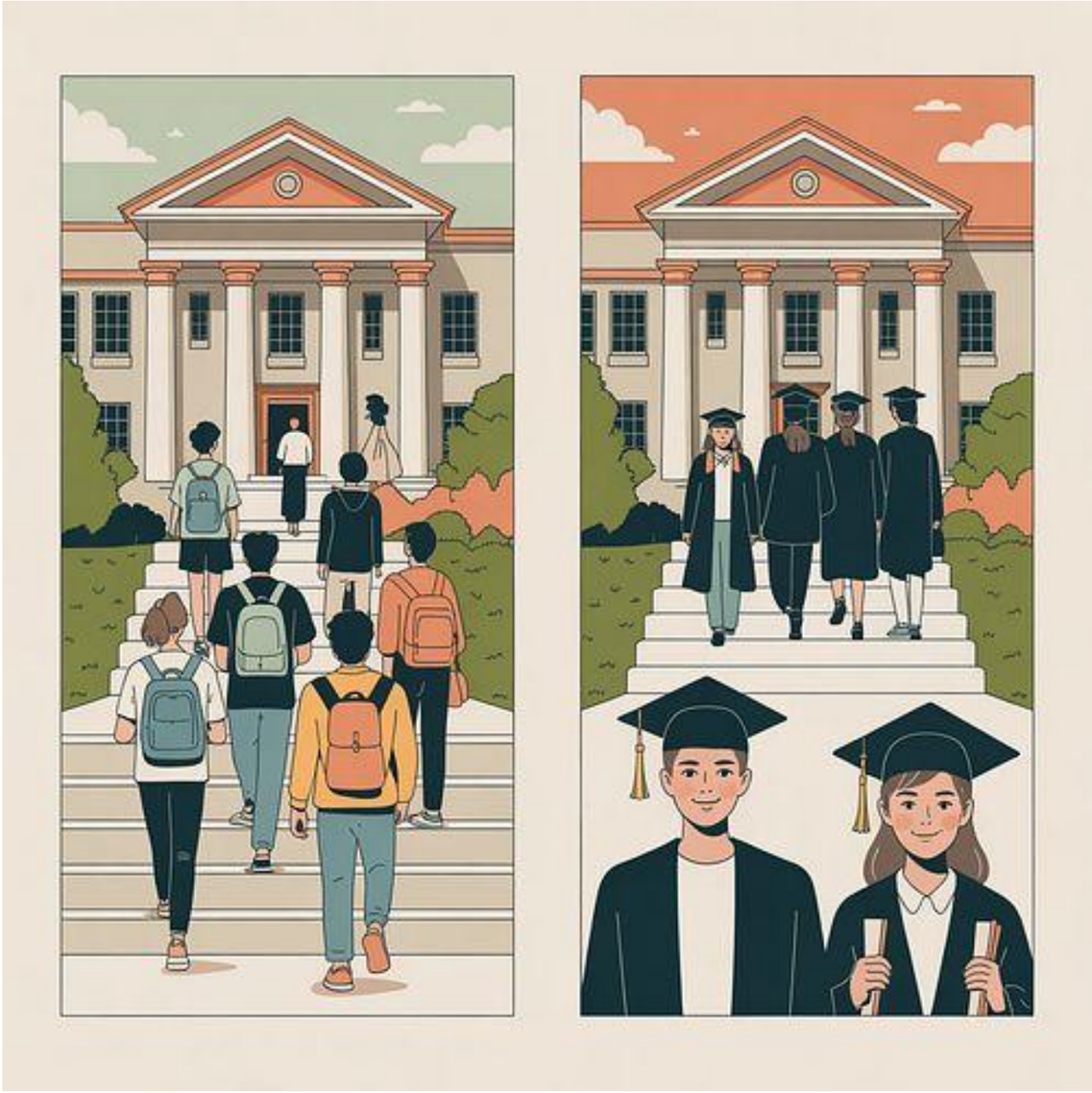
- ❌ Mean-variance Optimization
- ❌ Option valuation
- ✅ DCF analysis



When Should Students Learn Claude

Or Whatever is the Best AI Tool at the Time)

- First term as a tools course (or in Data Analysis, for example)
- Last term as an advanced elective



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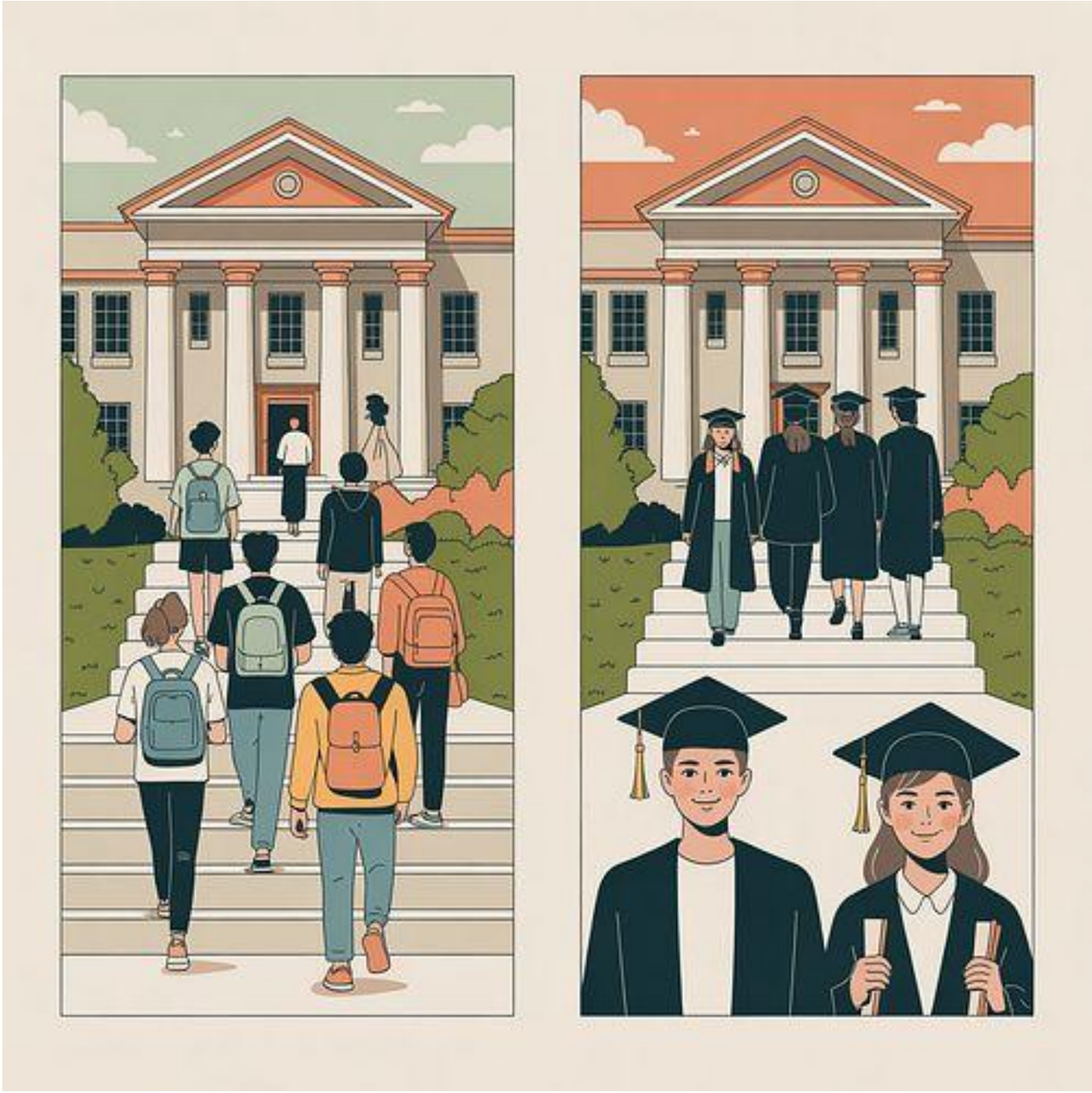

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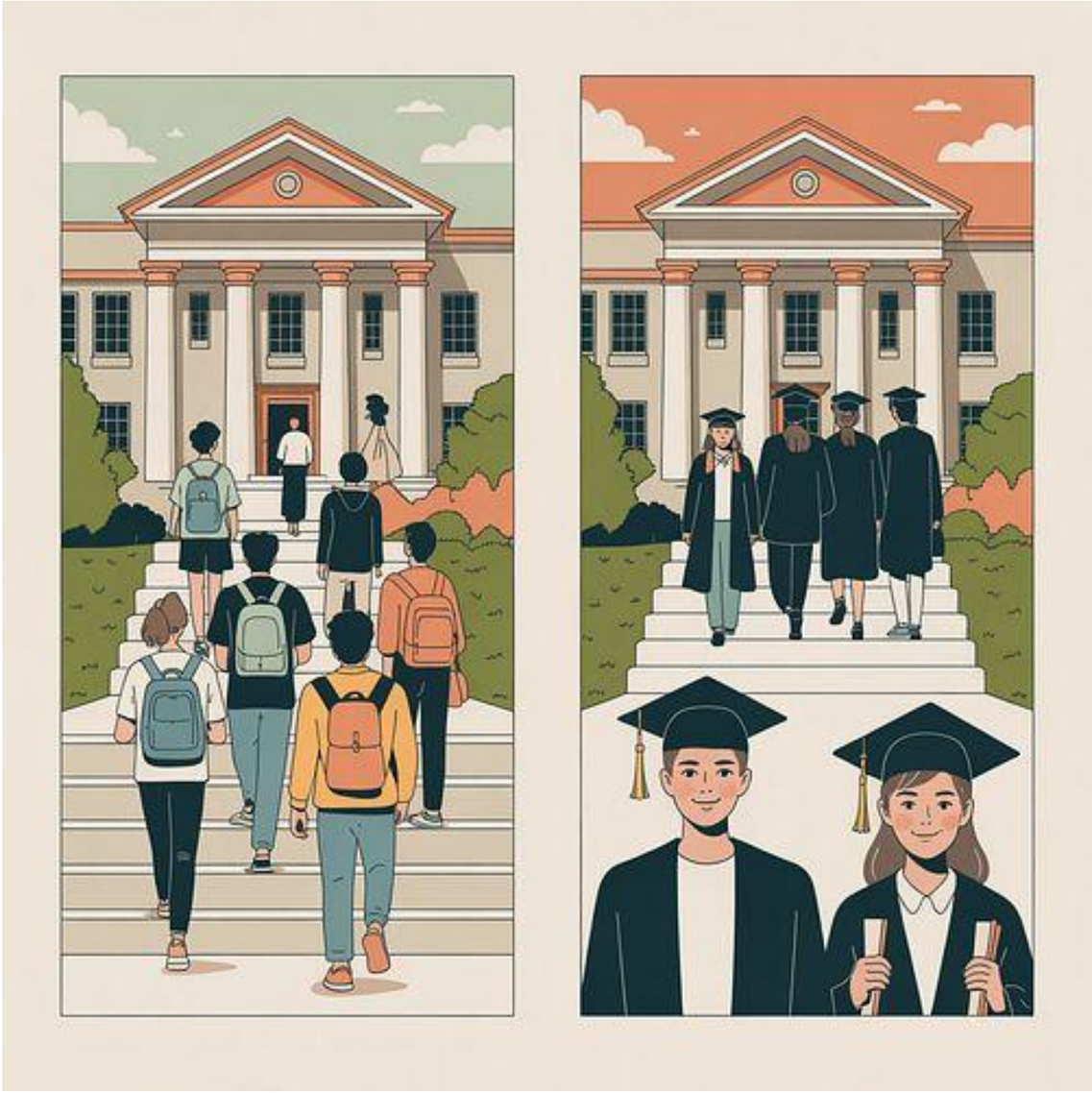
HBS licensed Julius.ai to use in Data Analysis course.



How Can We Assess – in All Courses?

Oral Assessments

Cold calling, presentations with tough questions – force students to defend their work

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 Teaching Partner

Learning from Chatbots

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.

"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

Can use Google's Notebook LM

Build with AI Reports

Ask AI for report and use it for RAG

Reality

LLMs are significantly more reliable today

NotebookLM Example

Step 1:

I asked ChatGPT to prepare a detailed report on binomial option pricing.

Step 2:

I uploaded the report to NotebookLM and asked for a video overview.

Link to NotebookLM video:

https://genai4finance.kerryback.com/Binomial_Option_Model.mp4

Domain Knowledge will be More Important than Ever

- AI will level the playing field for tool skills (assuming students can use AI).
- That will make domain knowledge more important than ever as a differentiator.
- I think that means **we should teach even more cases.**
- But maybe not as group projects. One Person + AI >= Two People

We're All Learning Together

So, please, share your thoughts. Let’s discuss.

Some Additional Resources

Scan the QR code to access
genai4finance.kerryback.com