

# **AI with Code Execution**

MGMT 675: Generative AI for Finance

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# Roadmap

1. Claude.ai — Web Chat

*Chatbot + code execution*

2. Claude.ai — Artifacts

*Interactive charts and apps*

3. Claude Desktop — Chat

*Same, but installed on your machine*

4. Claude Desktop — Cowork

*Claude acts on your files autonomously*

5. Claude Desktop — Code (Local)

*Claude runs code on your machine*

6. Claude Desktop — Code (Remote / GitHub)

*Cloud execution via GitHub*

# The Big Idea



Each step gives Claude more **capability** and more **access** to your work.

## Claude.ai — Web Chat

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## Step 1: Claude.ai — Web Chat

Go to `claude.ai` in any browser. No installation required. Icon at top left opens sidebar.

### What it can do

It's a chatbot with a code execution tool. It can answer questions, explain concepts, brainstorm, draft text, summarize documents you paste in. It can also generate charts, Excel files, Word docs, and PowerPoint decks.

### Example

*"Create an Excel file to illustrate two-stage DCF analysis."*

## Artifacts

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## Step 2: Artifacts — Interactive Charts and Apps

- Still in `claude.ai`, Claude can produce **interactive charts and apps** that appear in a side panel.
- Choose Artifacts → Create an Artifact → apps or websites.
- Artifacts aren't throwaway — they persist and can be shared.
- Click **Publish** to get a shareable link — anyone can view and interact with it, no Claude account needed

## Artifact Examples

### Example 1

*"Here is an Excel file [upload [this file](#) to `claude.ai`] containing monthly returns for WMT and SPY and the one-month T-bill yield. Create an interactive scatter plot of AAPL excess returns vs. market excess returns, show the regression line, and display alpha and beta. Include the month in the hover data."*

### Example 2

*"Create an app that permits a user to input a bond yield, years to maturity, and coupon rate. Tell the user to input the yield and coupon rate as annual rates. Assume semi-annual coupon payments. Compute the bond price. Create an interactive plot showing the relationship between the bond's yield and its price."*

### Publish



## Claude Desktop — Chat

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## Step 3: Claude Desktop — Chat

Download the Claude app from [claude.com/download](https://claude.com/download).

### What changes from web?

- Same chat + artifact capabilities
- Installed application
- Foundation for Cowork and Code tabs (next steps)

### Setup

Install the app → sign in with your Claude account → use the **Chat** tab. That's it. Same experience as the web, but now you have access to Cowork and Code, which we will investigate later.

## Chatbots, System Prompts, and Skills

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# What is a Chatbot?

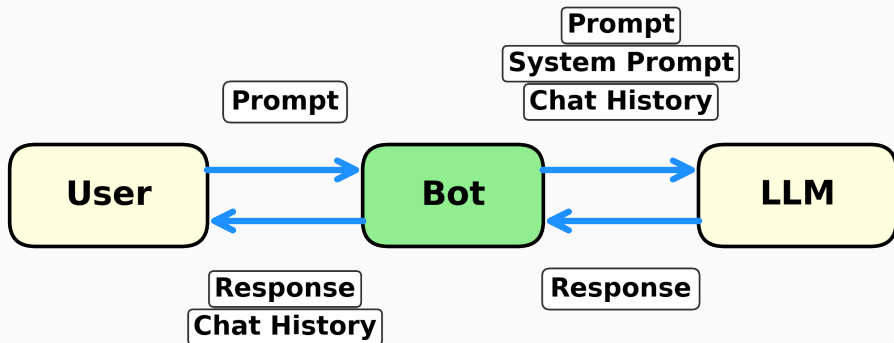
## Simple Definition

A chatbot is a program that:

1. Accepts user input (prompt)
2. Adds system prompt and sends to an LLM (large language model)
3. Displays the response
4. Captures prompts and responses in a loop and sends history to LLM each time

- ChatGPT, Claude, Gemini are chatbots
- The LLM is the “brain”
- The chatbot is the interface

# Chatbot Architecture



# The System Prompt

The **system prompt** is a special message that defines the chatbot's personality, knowledge, and behavior. It's the key to customization.

## What It Does

- Sets the chatbot's persona
- Defines its expertise
- Specifies response style
- Adds domain knowledge
- Sets guardrails/rules

## How It Works

- Sent to LLM with every prompt
- User never sees it directly

Anthropic's Published System Prompts for Claude

- Claude 'skills' are text files (instructions) that the chatbot sends to the LLM when needed
- An overview of available skills is part of the system prompt
- The overview tells LLM: 'ask for this skill in these circumstances ...'
- In those circumstances, LLM sends response to chatbot: 'send skill'
- Chatbot sends system prompt + prompt + chat history + skill
- LLM sends response

- The `xlsx` skill instructs Claude to:
  - Use Excel formulas instead of hardcoded values
  - Apply professional formatting (color coding, number formats)
  - Verify there are no formula errors (`#REF!`, `#DIV/0!`, etc.)
  - Follow financial modeling standards

[View the full `xlsx` skill documentation](#)



# Effective Prompting

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## Effective Prompting = Collaboration with AI

- AI is not a search engine—it's a **collaborator**
- Do not try to craft the “perfect prompt”
- Instead: have a **conversation**
- Think of AI as a capable colleague, not a vending machine
- The goal is *iterative refinement*, not one-shot perfection

# Do's and Dont's for Effective Prompting

## Don't Do This

- Try to anticipate every edge case
- Give up when the first response is wrong
- Treat AI as a one-shot tool

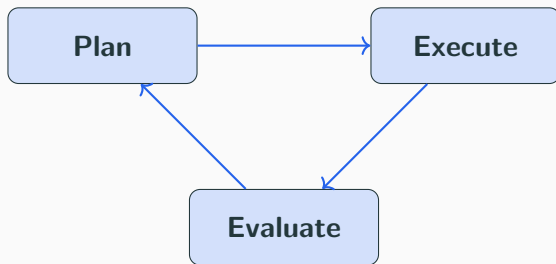
## Do This Instead

- Start with a rough request
- Refine based on the response
- Ask follow-up questions
- Iterate until you get what you need

## Ask the AI What It Can Do

- Ask: "What information do you need from me to do this?"
- Ask: "What are the different ways you could approach this?"
- Ask: "What should I consider before we start?"

# The Plan-Execute-Evaluate Cycle



- **Plan:** Define the task, gather requirements, outline approach
- **Execute:** Let AI do the work with your guidance
- **Evaluate:** Check results, identify gaps, refine
- Repeat until satisfied

## Cross-Evaluation with Other AI Conversations

- Start a **new conversation** to evaluate the plan and output
- Even with the *same model*, a fresh context can catch errors
- Ask the new conversation to review, critique, or verify
- Different phrasing may reveal blind spots
- Consider using a *different model* for additional perspective

*"I received this analysis from another session. Can you review it for errors or questionable assumptions?"*

# Claude Pricing Options

## Subscription Plans

- **Free:** Limited usage
- **Pro:** \$20/month — 5× free usage, Claude Code, Cowork, memory
- **Max:** \$100/month (5× Pro) or \$200/month (20× Pro)

## API (Pay Per Token)

- **Sonnet 4.5:** \$3 input / \$15 output per million tokens
- **Haiku 4.5:** \$1 input / \$5 output per MTok
- **Opus 4.6:** \$5 input / \$25 output per MTok
- Does not include Code, Cowork, or Excel add-in (subscription only)

## Example: What Does a Typical Query Cost via API?

A 1-page prompt  $\approx$  500 tokens. A 2-page response  $\approx$  1,000 tokens.

Using Sonnet 4.5: input =  $500 \times \$3/1\text{M} = \$0.0015$ , output =  $1,000 \times \$15/1\text{M} = \$0.015$ .