ME 401
Systems and Applications

Semester: Spring 2026
LLM: Anthropic, Sonnet 4.5

PRIMARY QUESTION

I am working to leverage generative AI for the purpose of exploring python as a means to automate engineering analysis automation

INITIAL THOUGHTS

I want to be very clear with the LLM about my goals and intended outcomes, so I need to provide clear context. I will then ask that it start with a counter prompt of clarifying questions so that I know what to expect and can compare the artifact to a clear line of inputs and context

PROMPT

1) we are building the simplest possible, human readable python script which accomplishes the following: 1. imports coolprop for thermodynamic analysis and matplot lib for TS, PV diagram creation 2. demonstrates basic object oriented programming (can be used in a larger context for cycle optimization and validation) 3. sets up an environment for the exploration of rankine cycle analysis, steam to begin with, but include a short comment about the steps required to explore non water working fluids 4. is designed to act as scaffolding for me, an senior level mechanical engineering student who wants to develop industry relevant python skills, but only has foundational analytical thermodynamic skills at this time start with clarifying question before creating any artifacts

2) start with basic cycle, add a short comment reminding me that more complex cycles can be explored with this tool. The script should focus on function inputs that can be given as parameters in a high level run script which will incorporate the other object option A, I want to focus on the concept of abstraction without being overwhelmed, show me the value of this concept the saturation dome would be helpful, keep units in SI (leave a comment prompting the future addition of a function to convert to imperial units) I am a total beginner and just want to explore the value of python for engineering analysis automation yes, provide a comment at the bottom of the script with recommendations for future expansion and exploration (keep it concise)

3) excellent, this is perfect. Now write me a concise follow up prompt for a new chat. This prompt will include the basic parameters being explored (OOP, thermo analysis, python scaffolding) and result in the creation of an optimization script using scipy.

RESULTS

The 2 inferences, 1 to provide context and prompt follow up questions and a second to clarify concepts and goals were sufficient to make a basic scripts that accomplishes the intended outcome.

OUTPUT

Helpful. –
The follow up questions were helpful and brought up some concepts I had not considered. The generated artifact seems to produce an excellent first pass at my goal. I will need to explore some of the functionality further, but this is an excellent starting point that allows me to compare my analytical skills with a computational output.

Unhelpful. –
no, unhelpful responses generated. By keeping the context narrow and very specific, the LLM was able to generate an artifact that meets my goals directly

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This memo is designed for use by the Wada Research Group to develop ethical and efficient engineering education strategies and technologies.