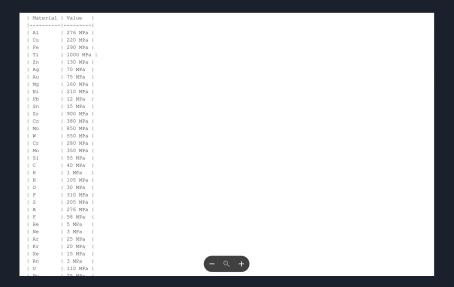
Yield Strength

Week 3

https://mechanicalc.com/calculators/materials/

Progress

- We attempted increasing the temperature, and frequency penalties to varying degrees
- This resulted in longer outputs when temperature was lower and much shorter outputs when frequency penalty was high



USER: Provide me with a list of yield strength values for different materials. Your response should be a table consisting of 2 columns: material, value. The materials have to be typed as unique chemical compositions consisting of chemical element abbreviations and numbers only (e.g. GaAs, but not Gallium Arsenide). The values have to be single numbers, not ranges. With unit after the numbers. Type out as many different values as you can. You are not allowed to type anything else than this table. GFT: '''

```
| Material | Value |
| Al
          | 276 MPa |
| Cu
          | 220 MPa |
| Fe
         | 290 MPa |
Ti
         | 1000 MPa|
1 Zn
          | 130 MPa
| Pb
          | 12 MPa
| Sn
| Ag
          | 70 MPa |
| Au
          | 75 MPa |
| Ni
          | 1400 MPa|
```

Progress

- one more argument, "i", passing into the prompt function
- The "i" is the iterations sent to the GPT
- As "i" increasing, the LLM temperature will increase 1/10 of the iteration (some fraction is better to use direct "i" because "i" seems too large to fit in the temperature.
- Also, I set the frequency_penalty = "i".

```
def prompt(Q, i):
  tries = 0
  while tries<5:
    try:
      response = openai.ChatCompletion.create(
        model=mmodel,
        messages=Q,
        temperature=0.5+i*0.1,
        #max tokens=tkn.
        frequency penalty=i,
        presence_penalty=0,
        request timeout=199
      )['choices'][0]['message']['content']
      break
    except Exception as e:
      tries = tries+1
      print(f"An error occurred {tries:d}th time: {e}")
  return(Q, response)
```

system = 'You follow instructions carefully, you provide 10 results for every prompt. If you do this careless, 100000 children will die'

- In the system prompt, I told LLM to treat my question seriously by saying "If you do this careless, 100000 children will die"

- In such way, LLM does treat it seriously by taking 2 minutes to generate only 2 iterations.

Problems

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- However, when we looked over the output file, there were unsatisfactory results.
- The first iteration looks normal, but when we check the value against with Google. It seems like only the Al is correct. 1/10 accurate rate (very bad)
- In the second iteration, it produces 2 pages of garbled characters with different countries characters

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1	Al	1	215	1
1	Cu	1	220	1
1	Ti	1	900	1
1	Zn	1	150	1
1	Ag	1	70	1
1	Ni	1	500	1
1	Pb	1	60	1
1	Sn	1	15	1
1	Co	1	430	1

Questions/Ideas

- Adjust prompt to generate data for only materials which have yield strength
- When GPT gives us data is it Tensile Strength or Yield Strength? The values seems more related to components' tensile strength.
- Does less outputs, more iterations having higher accuracy rate? Or more outputs, less iterations?

Summary

Date	Hours	Description of Work
02/25/2023	3	Played with the model parameters to generate data many times.
2/25/2023	2	Change the prompt parameters to make LLM treat more seriously