The final essay for the course is an open-ended assessment of the AI techniques that would be applicable to a specific setting. The essay is worth 10%; and is due at the end of the term. You may work either by yourself or with another. The group signup can be found [here].

There are two variations available for the essay:

(1) writing the content entirely yourselves; and

(2) asking ChatGPT (or similar) to do it for you and critiquing what it is that it writes.

To be clear, having an AI (or any other human/artificial entity for that matter) write things for you in variation (1) is a clear violation of academic integrity. If you want to toy around with LLMs, then please go with variation (2).

Format

Variation 1

- **Size:** No minimum, but an expectation of ~2 - 3 pages single-spaced. It's not about the word/page count but rather the content and insight you include.
- **File format:** Word or PDF
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Variation 2

- **Size:** Will vary greatly. please see the Prompt for what to include.
- **File format:** Word or PDF

Prompt

Variation 1

How would you apply some of the techniques learned in CISC 352 to one of the pre-defined problem settings? Select just one problem setting to be used for all of the three techniques you choose.

Variation 2

Go through the following steps:

1. Have ChatGPT (or similar -- just get approval from Prof. Muise if it's something similar) write a small essay on "How would you apply *<insert technique>* to the problem setting of *<insert setting>*". You can change the prompt any way you'd like, including the addition of details about the problem setting.
2. Do step 1 for **four** different techniques from the list below.
3. Copy the LLMs output to your word document (text; not image).
4. Leave interleaved commentary about what the LLM got right and (more importantly) what it got wrong (including why it's wrong).
5. Write a final section, "Meta Analysis", that discusses the pros/cons of using LLMs for the task of developing ideas on how to solver certain problems (i.e., the exercise above). Write this yourself, and do not involve the LLM.

So variation 2 essentially asks you to have ChatGPT write your essay for you, and you provide the deeper critique about how it messed up. Please pay close attention to the rubric to get a better understanding of what's expected.

Problem Settings

(*will be expanded over time*)

Select **one** problem setting from the following list.

- **Among Us:** Minigames, general strategy, etc. is all fair game.

- **Airline Scheduling:** With the mega storm last Christmas, there was a cascade of flights cancelled -- thousands! How would you figure out what the planes and flight crews should do, given the uncertain nature of air travel?

- **Collaborative Artwork:** Imagine the task of programming a robot that sits across from an artist with a blank canvas. If you wish, you can assume that the low-level control is perfectly implemented for you (e.g., the ability to make a specific brush stroke).

- **Perseverance:** It takes several minutes to send/receive signals to Mars. How would you program the latest robot up there?

- **Academic Integrity:** Interpreted broadly, how might AI techniques be used to help handle (or even avoid) issues with academic integrity in a CS course?

- **Vertical Farming:** How could AI be applied to monitor, maintain, and otherwise optimize things in the vertical farming setting?

Techniques

Select your techniques from the following list.

- **Constraint Programming:** Describe what the variables, their domains, and the constraints might be.

- **Heuristic Search:** Describe what the state-space would look like, the type of search that would be used, the heuristic, etc.

- **Planning:** Describe what the fluents, initial state, goal, and actions might be.

- **Bayes Nets:** Describe the random variables, (generally) how they'd be connected, the hidden/observed/queried variables, how it could be used, etc.

- **Naive Bayes:** Describe what features would be used, what the decision would be, where the data would come from, how it would be used in the chosen setting, etc.

- **Decision Trees:** Describe what the attributes would be, their values, how you'd branch on them (if numeric), where the data would come from, etc.

- **Deep Learning:** Describe what architecture would be used, what the input/output would be, how training would be set up, where the data would come from, etc.

Evaluation

You can find the rubrics for both variations of this essay assignment [here] and [here]. They involve elements such as clarity, correct use and demonstration of the concepts for the technique, understanding of the problem setting, etc.