

Checkpoint 2 Using LLMs

Large Language Models (LLMs), like Claude, GPT, or Gemini, can be powerful tools for assisting with programming. While they don't replace the need for understanding coding concepts and problem-solving, they can make tackling complex programming tasks significantly easier.

For this assignment, we'll revisit **Problem 0: Bouncing Ball Simulation**, where we used the `vpython` library and the [GlowScript](#) interface to create a simulation of a bouncing ball. This time, you will build on your original program and take it to the next level by incorporating assistance from an LLM.

Tasks

1. **Revisit the Original Simulation:** Start with the bouncing ball simulation you created in **Problem 0**.
2. **Use LLM Assistance:** Ask an LLM (Claude, GPT, or Gemini) to modify your code or generate new code to enhance the simulation.
 - a. **Replicate Our Class Activity (January 21):** Just as we did in class, interact with the LLM by asking it to make specific improvements or additions to your code.
 - b. **Tackle New Challenges:** Focus on tasks you're unfamiliar with or concepts you haven't learned yet. For example, you could ask the LLM to add:
 - i. Air resistance to the simulation.
 - ii. Obstacles or barriers for the ball to navigate.
 - iii. Interactions between multiple bouncing balls.
 - iv. A maze for the ball(s) to travel through.
 - v. Anything you can imagine
3. **Iterate and Experiment:** Copy and paste the LLM-generated code into your programming environment, run it, and observe the results.
4. **Document the Process:**
 - a. **Prompts:** Record the prompts you used to interact with the LLM.

- b. **Responses:** Note the LLM's output for each prompt, including the code and any explanations provided.
- c. **Evaluation:**
 - i. Did the LLM-generated code work as intended?
 - ii. Were there any issues or mistakes (e.g., errors, "hallucinations," or unexpected behavior)?
 - iii. Which prompts were particularly effective?
 - iv. Which prompts led to unintended or problematic results?

By the end of this exercise, you should have a more complex and feature-rich bouncing ball simulation OR you might have a mess.

Deliverables

- Your final simulation code using a link to the Glowscrip as in Problem 0. You can also upload a file if that doesn't work.
- A detailed report documenting your interactions with the LLM, including:
 - The prompts you used.
 - The LLM's responses (summarized or included as excerpts).
 - Observations about what worked well and what didn't.
 - Any challenges or interesting outcomes from the process.