CSE870 Advanced Software Engineering Spring 2025
Homework 1

Due Wednesday, January 22, 2025
(submitted to D2L before class)

Given the recent attention, both negative and positive, regarding ChatGPT and other AI-based tools, this assignment provides an opportunity to research the potential positive/negative impacts of using AI in computing-based systems.

This assignment focuses on the need for software engineering techniques and software development processes. You are asked to write a thoughtful 1-page (single-spaced, 11-point font, 1-inch margins) critique on what can happen when rigorous software engineering techniques are NOT used in the development of safety-critical, high-assurance applications.

After reading the Therac-25 paper, write a 1-page critique that addresses the following points. Use concrete examples from the literature (with appropriate citations) to support your arguments.

1. Who was *most* at fault for the Therac-25 accidents? Why?

2. What personal experiences and/or expertise do you have that could have been applied to prevent such tragedies?

3. Describe the similarities between Therac-25 incidents and recent software-based accidents (either Boeing 737 MAX accidents OR Toyota unintended acceleration accidents). Explain the similarities and differences, both with respect to the technical aspects and the reporting process. What can be done to prevent future such accidents?

4. How could ChatGPT (and similar AI-based systems) have made the situation worse?

5. How could ChatGPT (and similar AI-based systems) have been used to prevent the accidents?

Your critique will be evaluated according to the following criteria:

- Have you presented a cohesive write up? (Do not submit short answers for each of the above points. The critique should be read as one document.)

- Have you addressed all of the technical points, using concrete examples to support your arguments?

- Does each paragraph have a thesis sentence with the paragraph body containing supporting text?

- Has the document been thoroughly proofread and typos eliminated?

- Cite examples from the literature to include in the bibliography to support your claims; use IEEE citation format. The bibliography can float to the second page.