Assignment 1

17-712: Fantastic Bugs and How to Find Them (Spring 2025)

In this assignment, you will dive into a case study of a high-profile software bug or failure. You will read up on background material, familiarize yourself with the incident and root causes, and then present a short summary to the class (5-10 minutes), aiming to lead a discussion (5-10 minutes). You can work individually or in a group of 2, along with any classmate. We have provided a list of cases to choose from, along with some preliminary resources to get you started. We **expect you to find several more sources online by searching the web[1]** in order to gain a deeper understanding of the problem, its context, its impact, and remediations. The goals of this assignment include:

1) to link software issues as programming artifacts to the real-world impact (What coding mistakes or incorrect assumptions led to the issue? Why was it bad?)
2) to think about the social implications of software failures. (Who are the stakeholders involved? E.g. Who was impacted the most? Who had to clean up the mess? Is it easy to identify who was responsible and/or liable?)
3) to prompt reasoning about software engineering practices that can protect against these kinds of issues (How could the bug have been identified and/or prevented? Could there be more bugs like this out there, and how can we find them?)

This presentation is designed to be somewhat interactive; your task is to provide the class with sufficient context and background and then to prompt a discussion around the social and engineering issues discussed above.

Presentation Due Date: January 21st, 2025 11:00am ET. You will present live to the class either on Jan 21st or Jan 23rd, depending on time availability.

Submit your presentation slides on Canvas by the due date/time for grading.

Case Study

Please choose any one case study from the list by putting your name(s) down in this spreadsheet:
https://docs.google.com/spreadsheets/d/16k2n1GHclAOdXN6gOduw66BPUwKifSI4iNcZytiCjhI/edit?gid=0#gid=0

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[1] You may use AI tools like ChatGPT if you wish, but at your own risk. You are responsible for the accuracy of the content in your presentation/discussion. When in doubt, try to find reputable sources to back any claims.

Task (6pts)

The deliverable for this assignment is a presentation on a prominent software bug/failure/vulnerability. Your presentation should meet the following specification:

- Approximately 5-10 minutes in length. The presentation will be followed by 5-10 minutes of discussion.
- [1 pt] Contain a description of the software or product the bug occurred in, and describe why it is important.
- [1 pt] Describe the nature of the bug. Describe the specific features of the code that caused the program to crash. Maybe include some high-level pseudocode that roughly describes the bug. If the source code of the bug is not publicly available, use everything you've found online to infer pseudocode or a draw diagram/chart to explain what went wrong.
- [1 pt] Describe the impact of the bug. Who was affected? What kind of harm did it cause (financial/health/privacy)? Who suffered reputational damage? Identify persons and/or organizations as appropriate.
- [3 pts] Pose three questions to the class about the impact of the bug on stakeholders and/or ways to identify and prevent this kind of bug. In particular, we are interested in questions that don't have an obvious answer and will facilitate in-class discussion. For example, "Who's fault was the bug?" Have your own answers/opinions noted at the end of the presentation, but do not show this slide in class until after the class discussion.