Assignment Sheet 1:

Introduction to Safety Requirements Engineering

Due: Friday, 2/5/2021, 23:59h

Team Name	Br00Mi99

We will assign quasi-anonymous team names to facilitate a double-blind calibrated peer review. Your **Team Name** is the first two letters of the mother of whomever you decide is Student 1, followed by the 2-digit birthyear of Student 1, followed by the first two letters of the father of Student 2, followed by the 2-digit birthyear of Student 2. **Example:**

Student 1: Cynthia, mother is Louise, Cynthia was born in 1997

Student 2: Mark, father is Robert, Mark was born in 2001

Team Name: Lo97Ro01

Rather than your mother's or father's, you may use any other first name that isn't your own, as long as you consistently use the same one throughout the semester.

Note: Please adhere to the directions given in the file "Notes regarding Assignment Sheets" available on Blackboard. If you do not adhere to these general directions, you might not receive credit for this assignment.

Task 1 (*15 Points*)

Analyzing failed software projects and analyzing accidents involving highly complex, technical systems often shows that inadequacies in requirements are among the prime reasons for the loss of life, overrun budgets, or dissatisfaction of the customer. Search the internet for examples for failed software projects or accidents involving safety-critical systems where human users or innocent bystanders were hurt and/or killed. Good sources might by the [NTSB Aviation Accident](#) or [NHTSA Crash](#) databases, or the web. To get you started, look for the London Ambulance fiasco. Your examples must clearly show that inadequacies in requirements engineering (i.e., the process how requirements were engineered or the documented requirements themselves) were at fault. Write a brief synopsis in your own words for each example and cite the source. Ideally, you should have one example each for an embedded system, an information system and for a service-oriented/cloud-based/cyber-physical system.

Your synopsis shall not exceed one page in length and must comprise at least:

- Background: Was it a failed project or an accident? What was the type of and what was its purpose? What is the nature of the failure or accident? What went wrong?
- In which way did the project fail or how were humans and/or external systems hurt, killed, damaged, or destroyed?
- In what way were the requirements or the requirements engineering process at fault?

Answer all these aspects as far as information are available. Your own research is necessary to compare different sources. Don't forget to cite appropriately!

Grading.

You will receive up to 2 points for the accuracy (and applicability) of the description of your chosen example. You will receive up to 3 points for your analysis of RE involvement:

- Zero points if you merely state that "no RE was done" or "RE was done insufficiently"
- One point for "hindsight lessons" derived from the description (e.g., "there should have been a requirement to prevent X")
- Two to three points for a detailed description in what way inadequacy in requirements or in the way RE was conducted contributed to the situation.

I will also award up to three points extra credit for every example that you find that comes from an NTSB, NHTSA, or similar official accident report.

Example 1: Cover Oregon	Score
Was it a project failure or an accident?	
X **Development project failure:** Technological and managerial issues sank this project and was unable to perform its main purpose of enrolling people into its system.	_____ / 5,00

Accident

Description of the Failure / Accident:

The project had issues with management and technological issues commonly found in many small government processes. As a health insurance marketplace for the people of Oregon, enrolling in the system is the major first step. As of 2013 the state had spent nearly 160 million dollars and could still not process online enrollments. Although paper enrollments went through, the state hired/ reassigned nearly 500 people across those applications. Into 2014 the site was still not accepting online enrollment. With millions not officially covered the state scrapped the website.

Involvement of Requirements or the Requirements Engineering Process:

Although foul play was hypothesized in legal disputes, management of the project seemed to be the cause of the failure. A hybrid system in a developmental staged system of digital and paper were not able to communicate with each other. The IT system facet was not able to keep up with seemingly poor management. Or the developers were simply not given enough time and under a crunch of deployment while things weren't working, were unable to problem solve efficiently enough.

https://archive.is/20131102090155/http://www.statesmanjournal.com/article/20131101/UPDATE/311010060/Kitzhaber-Cover-Oregon-hire-100-workers-process-paper-applications

https://archive.is/20131102090155/http://www.statesmanjournal.com/article/20131101/UPDATE/311010060/Kitzhaber-Cover-Oregon-hire-100-workers-process-paper-applications

https://web.archive.org/web/20140104020414/http://www.kgw.com/news/Cover-Oregon-director-Rocky-King-resigns-238527771.html

Example 2: Self-driving uber test vehicle Arizona	Score

Was it a project failure or an accident?

x	Development project failure	_____ / 5,00
	Accident	

Description of the Failure / Accident:

In 2018, a self driving uber test vehicle hit and killed a pedestrian who was walking their bicycle across the street. At the time of the accident, there was a safety driver in the car, but they did not respond to the situation because they were watching videos on their phone. In this situation the recognition software failed to recognize that there was a pedestrian in the middle of the road, but instead, recognized her as an object or vehicle. The vehicle had the pedestrian in it's range of vision for a long enough time The car did alert the driver, but the driver did not react to the situation. The vehicle could also not perform emergency breaking procedures. The combinations of these issues resulted in Uber to end it's testing in Arizona.

Involvement of Requirements or the Requirements Engineering Process:

Although human error is the biggest blame for the pedestrian's catastrophic death, requirements engineering must also play a role. The developers of this car must have not put enough emphasis on the ability for the vehicle to recognize obstructions and safely avoid them. The vehicle should have also been required to be able to make an emergency stop before being on a real roadway. Although this was just a test car, there were people who thought it would be safe enough to operate on public roads which in the end was bad judgement.

https://usa.streetsblog.org/2019/11/07/report-ubers-software-flaws-led-to-fatal-crash/

https://www.nytimes.com/2018/03/19/technology/uber-driverless-fatality.html

Example 3 Cyberpunk 2077	**Score**

Was it a project failure or an accident?

X	Development project failure	_____ / 5,000
	Accident	

Description of the Failure / Accident:

A highly anticipated video game created by developer CD Projekt Red was marketed throughout the 2010s to create a project that promised to define a generation. After numerous delays, the game was finally launched in late 2020. 'Cyberpunk 2077' shipped with so many glitches, bugs, and render issues that the game was virtually unplayable. Game saves would corrupt randomly, NPC's would interact with each other in very odd ways, and textures render so badly that faces or objectives were unintelligible. The game had so many issues that it was even pulled from the Playstation Store, the first game to have ever suffered that consequence. Even today, full refunds can be issued for Cyberpunk 2077.

Involvement of Requirements or the Requirements Engineering Process:

Throughout its development, there were a few warning signs that alluded to the massive failure of the game. For instance, CD Projekt Red's elicitation for Cyberpunk 2077 seemed to lack since the game's inception. Job adverts

made by the company looking for engineers to create the game seemed to have prioritized people who had skills in debugging rather than in unit testing to expose any bugs not immediately seen in code. This prevented the development of any new and innovative requirements. In addition, the company's usage facet wasn't all that efficient. CD Projekt Red began "crunching time", meaning that developers were working long hours every day of the week, for over a year. This impacts the process directly by leaving workers fatigued and more willing to sacrifice quality for completion, attempting to overlook the fine details as much as possible.

https://www.cyberpunk.net/en/news/37298/our-commitment

https://nypost.com/2021/01/13/cyberpunk-2077-developer-eyes-return-to-playstation-store/

https://www.bloomberg.com/news/articles/2021-01-16/cyberpunk-2077-what-caused-the-video-game-s-disastrous-rollout