CS 307: Software Engineering I

Homework #1

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Problem 1:

The ACM Code of Ethics and the IEEE Code of Ethics both guide professionals toward responsible conduct that benefits society, but differ in scope and details. The ACM is more comprehensive and computing-focused with detailed guidance for ethical decision-making, including computing-specific issues; on the other hand, IEEE is shorter and engineering-oriented, and it emphasizes safety, honesty, and support of colleagues. Both are written and organized in very different ways.

The similarities include prioritizing public welfare, honesty, competence, fairness, and promoting ethical leadership. Both stress accountability and adapting to modern challenges like privacy and intelligent systems. These kinds of things make both trying to fix and manage the same things, but with a different scope.

The Differences focus, for example, on the ACM provides a detailed, reflective framework tailored to computing, while IEEE offers concise, principle-based references for engineers. Also, ACM explicitly addresses leadership, compliance, and broader inclusivity, while IEEE stresses personal obligation and societal impacts of technology. This is another way to try to get to the same point differently, but not all the times the same objective.

The ACM Code of Ethics and professional conduct and the IEEE Code of Ethics both serve as foundational guidelines for professionals in computing and engineering fields, emphasizing responsible behavior to benefit society. However, they differ in structure and scope, reflecting the distinct focuses of their respective organizations. Overall, both try to achieve reinforcing that professionals must prioritize societal good.

Problem 2:

The Volkswagen emissions scandal, called as “Dieselgate,” was one of the worst scandals in the car industry history, in September 2015 the U.S Environmental Protection Agency (EPA) issued a violation of Volkswagen group for installing defeat devices in approximately 11.000.000 diesel vehicles including about 500.000 in the U.S, These devices were software programs embedded in the engine control units of models like Jetta, Golf, Passast and Audi A3 from 2009 to 2015. The software detected when vehicles were undergoing laboratory emissions tests based on factors like steering wheel position, speed, barometric pressure, and activated full emissions controls to comply with the U.S clean air standard, limiting nitrogen oxide (NOx) emissions. The issue made engineers, allegedly under pressure from management, collaborate with supplier Bosch to develop the cheating software, despite warnings that its use was illegal and not correct thinking in ethical thinking.

The scandal came out through independent testing by the International Council of Clean Transportation and West Virginia University in 2014, which revealed discrepancies between lab and road emissions, so after initial denials and failed recalls, Volkswagen admitted the deception, leading to CEO Martin Winterkorn, the stock plunging by over 30% and global recalls. The consequences included 31.3 billion in fines, settlements, and buybacks, criminal charges against executives, and health impacts with estimates of 59 premature U.S deaths and thousands more globally from excess pollution. Finally, the company shifted toward electric vehicles, cutting 30.000 jobs while adding 9.000 in new areas. These kinds of situations were mainly the problem in this scandal.

This incident highlights profound ethical lapses in software engineering, directly violating several subclauses of the ACM code of ethics, for example Avoid harm, which defines harm as unjustified negative consequences, including to health, safety and the environment, this situation caused significant environmental damage through excess NOx emissions, Also another example is be honest and trustworthy, Volkswagen misrepresented vehicle compliance to regulators, consumers and investors, this using deceptive software to falsify test results, This erodes trust in the profession and as the code requires truthful communication and avoiding deception even in assigned duties. Another example is managing personnel and resources to enhance the quality of working life, which was ignored as a culture of fear and pressure reportedly led engineers to unethical shortcuts instead of fostering ethical environments. Finally, they breached the known and respected existing rules of professional work, including all of the environmental regulations that were involved.

To avoid such issues, the situation could have been approached by embedding ethical reviews early in development, this let the software transparent in collaboration with regulators, and rather than deception, also and investing in compliant technology without cheats would align with the contribute to society and human well-being call to contribute to society. Training on ethics codes, as maintaining competence by acquiring and maintaining professional knowledge, could build competence in ethical decision-making, preventing the cascade of violations that defined Dieselgate.

References

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