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THERAC-25: Error 404 Testing not Found

THERAC-25 was a software designed to administer doses of radiation to cancer patients but failed when the technician typed the wrong command and then replaced it with the correct command before pressing enter. This caused the machine to display an error message to which the technician repeated the process, unknowingly exposing the patients to radiation the entire time. With more testing this issue may have been avoidable. That’s why as software future engineers we must ask ourselves; “How much testing is enough testing?” and “Do I feel confident in my software or do I need more time?”. Also, in the US non-software engineers are required to have a certification to ensure the engineer can produce a safe and reliable product, while there is no such certification for software engineers.

In regard to “How much testing is enough testing?”, we must consider that we as humans cannot find every single possible problem with the software, so there is no such thing as enough testing. In the case of THERAC-25, “AECL did not have the software code independently reviewed.”, and “AECL had never tested the Therac-25 with the combination of software and hardware until it was assembled at the hospital.” (Caballero). This is not good practice and in this particular case is lead to the deaths of the stakeholders. According to the ACM Code of Ethics, section 2.1, “Computing professionals should insist on and support high quality work from themselves and from colleagues. The dignity of employers, employees, colleagues, clients, users, and anyone else affected either directly or indirectly by the work should be respected throughout the process.”, this means that AECL should have paid for the testing of the software and not have rushed the engineers to release it when they were not ready (ACM 2.1). AECL’s actions lead to the deaths of stakeholders who expected the software to work the way it was advertised. Personally, in the question of “Would I use this cheaper less safe software to treat my cancer?”, the answer is simply, no. I would not use this software, because in these cases the stakeholders’ lives were shortened, and their quality of life was also worsened.

We, as software future engineers must ask ourselves, “Would we use the software we created?”, because if we would not use it then why should we try to get others to use it? Companies are always trying to make as much profit as possible and are not worried about who they hurt on their way to wealth. In 1 Corinthians 10: 23-24, it says, “All things are lawful for me, but all things are not expedient: all things are lawful for me, but all things edify not. / Let no man seek his own, but every man another's wealth.” (KJV). This is possibly the biggest issue faced by engineers in today’s society; we are worried about “How much money can we make?”, not “How many people can I help?”. This is why I feel that all engineers should have to take certifications exams that involve the knowledge of ethics and risk when engineering any product. Specifically, I feel that software engineers should have to take a certification exam, because they are responsible for the foundation of a product and that could lead to the collapse of the entire product. This can happen very easily, just like in the case of THERAC-25, the hardware released too much radiation because of the software.

In the example of THERAC-25 the engineers and the company as a whole should be held accountable for the deaths of the stakeholders. While it is not currently required, I feel that a certification for software engineers should be necessary in the future to help prevent cases like THERAC-25 from happening. However, even with the certification and everyone following the code of ethics, humans are still humans and we make mistakes, but through these processes above we can help to better ensure they do not happen as often.

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