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Ethics in Computer Testing

Ethics, as defined by *Oxford Languages*, are "moral principles that govern a person's behavior or the conducting of an activity." Everyone operates from an ethical framework, however strict or loose it may be. Therefore, businesses and companies have ethical boundaries and regulations that will mimic the same ethical code of their founders or current management. This affects who is hired, who is promoted, what and how resources and technology are utilized. This holds true for any career field which often overlap, and sometimes there are tensions between professional realms or companies, causing ethical dilemmas. Similarly, specifically in the realm of computers, as much of todays tasks are being automated or computerized, there is often a miscommunication of one sort or the other between two or more systems that results in a malfunction that sometimes have catastrophic ramifications. When making a decision or implementing certain resource or process, one must consider the potential risks and ramifications of that decision, resource, or process.

For example, there was a computerized radiation therapy machine called the Therac-25, and between June 1985 and January 1987, there were at least six incidents of accidental overdoses large enough to cause serious injury or even death (Leveson and Turner, 18). The system's software was written and tested by only one individual and wasn't properly tested. This begs the question, how is the necessary amount of testing determined? Personally, I believe it depends on the application of the software. But regardless, there should always be safeguards

(Duet 22:8) and extensive testing (ACM Council, section 3.1) done by a team of professionals. If there is low risk application, such as a video game, then the threshold for testing is much lower than if a malfunction could cause the loss of life, like the example above. Obviously, if it is a high-risk scenario, the testing should be extremely intensive and comprehensive.

The reduction of these mishaps, I think begins with training. "Normal" engineers must graduate from a four-year ABET approved university, pass multiple exams, and have years of experience before they are trusted to deliver a high quality and reliable product. I think there are benefits to requiring this for software engineers. This requirement would increase the troubleshooting skills and reliability of the systems produced by software engineers. The more rigorous qualification standards, I believe, would reduce the risks and increase the safety of the systems put in place by computer professionals.

My personal belief is that the automations and integrations of computerized systems, especially in the medical realm have greatly improved society with its efficiency, accuracy, and capability. However, I also believe that it has enabled professionals to become lazy and inattentive at times. Sometimes mistakes can't be prevented, but many of the negative experiences and big mistakes that happen are simply due to lack of attention to detail. There are two solutions to reduce the mishaps with the application of computers and computerized systems. First, extensive testing. If the testing covers almost every possible scenario, then that will reduce risks. The top priority of programmers writing the code for these systems should have the top priority of others' well-being, whether that's privacy or safety. Second, operators of said systems still must pay close attention in case something goes wrong. Having strong ethics on the front end before a system is put into use reduces the ethical dilemmas later when utilizing said system.

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