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CPE 300 - 07
Assignment #1
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<p style="text-align:center">The Ethics Behind Empty Optimizations</p>

Applicable Ethical Codes

1.3 (ACM): Be honest and trustworthy.

6.07 (IEEE-ACM): Be accurate in stating the characteristics of software on which they work, avoiding not only false claims but also claims that might reasonably be supposed to be speculative, vacuous, deceptive, misleading, or doubtful.

Facts

In a case study titled "Empty Optimizations," the project manager of the Pegasus Plumbago graphics card was unable to beat the performance of a competitor, the Number Nine card. With the future of the company hinged on the success of the Pegasus Plumbago card, the project manager set a personal goal of achieving PC Magazine Editor's Choice Award. Such an endorsement would give the product the publicity it needed to keep the company afloat. With the project deadline near, the manager became desperate to top the competition and decided to reverse engineer the competitor's product. He discovered that the competitor was using special string caching logic that directly targeted situations that would only occur in a testing environment and such techniques would not actually contribute to the overall performance of the device in everyday consumer use. As a last ditch effort to make his product stand out, the project manager ordered his team to cache the specific string that the PC Magazine used in their WinBench performance testing. The card performed too well and raised red flags with the Editor-In-Chief, who demanded an explanation of how the Pegasus product was able to perform so well.

Ethical Questions

Under the ACM and IEEE-ACM code of ethics, does PC Magazine have the responsibility to develop testing metrics for the purpose of accurately endorsing high performing products? In addition, should the actions of the project manager be considered cheating even if such techniques were not explicitly prohibited?

Discussion

The implementation of caching a specific string in order to score high on performance seems to be roughly equivalent to a student obtaining a Computer Science professor's testing suite for a programming project. The student would be then be able to design a program to pass the testing suite without actually implementing any of the algorithms or data structures specified in the project. While this could allow the student to pass the automated round of testing, the instructor should not by any means give the student credit for completing the project. If instructor were to pass such an unqualified student, he would be failing to accurately assess comprehension. In much the same way, the Pegasus card seemly did well on the performance testing but in reality would only perform as such in the specific testing environment. If the card were to receive the magazine's endorsement, then consumers would be falsely led to believe that

the Pegasus card is superior for general consumer use. Such a claim violates clause 6.07 of the IEEE-ACM code of ethics by perpetuating false claims and clause 1.3 of the ACM code of ethics by permitting deception.

PC Magazine's graphics card performance testing metric lends an excellent opportunity to be examined by Lessig's "Code is Law" ethical lens. Lessig specifies that the design decisions that are made during the development of a software product inherently enable and disable certain values. In Lessig's own example, before internet communication included graphics and audio and subsisted entirely of text, individuals that were deaf, blind, or ugly were empowered to equal status with unaffected individuals. After all, it was impossible to infer any physical traits about another individual online unless the individual decided to disclose that information. In this way, Lessig demonstrates that the code that creates computerized tests, software tools, and cyberspace regulate the behaviors and interactions that are allowed within such systems. By not prohibiting the shortcuts that the hardware manufactures were exploiting, PC Magazine's WinBench test enabled hardware manufactures to take advantage of such shortcuts and achieve unrealistic performance results.

The burden of ethical responsibility doesn't fall solely upon the shoulders of the magazine, the project manager's questionable actions warrant examination. If cheating can only occur with the breaking of an explicit rule, then the actions were justified for commercial competition. If the manager is to be accused of cheating, then we must make the assumption that the act of cheating is a violation of a set of rules that ought to exist. This question is significant because the act of cheating also has the implication of punishment. In either case, the project manager violates clause 6.07 of the IEEE-ACM code of ethics by allowing PC Magazine to process the performance scores as if they were valid. He also violates clause 1.3 of the ACM code of ethics and damages his own credibility by taking a course of action that he knew did not increase the quality of his product.

Conclusion

In response to the first stated ethical question, PC Magazine does indeed have the ethical responsibility of accurately evaluating and endorsing products. The ability to influence people is not one to be taken lightly. Since the magazine used an evaluation system that permits manufacture shortcuts, the magazine should be held responsible for maintaining the integrity of scores. As for the Pegasus Plumbago, the product should not receive the magazine's endorsement, despite scoring so well. In the best case scenario, the project manager would fully disclose the techniques that he and Number Nine corporation used in order to score highly on the tests to the Editor-In-Chief. This course of action would allow the manager to retain some degree of his integrity and permit PC Magazine to start the development of a more accurate performance metric. If the manager had not come clean and been exposed after a thorough investigation, then his own credibility would have been severely impacted.

As a final thought, when it comes to pushing the envelop in the pursuit of innovation, it is important to be able to accountable for mistakes and questionable practices, and to develop software applications that would encourage the behavior intended by the designers and prevent unfavorable behavior.

Citations

Lessig, Lawrence. "Code is Law." In *Code v2*, 1-8. New York, NY: Basic Books, 2006.

Lessig, Lawrence. "Cyberspaces." In *Code v2*, 83-97. New York, NY: Basic Books, 2006.

Wilms, G. Jan. "CERIAS - Center for Education and Research in Information Assurance and Security." *CERIAS*. Perdue University, n.d. Web. 20 Apr. 2017. <http://www.cerias.purdue.edu/site/education/post_secondary_education/past_offerings/curriculum_development/ethical_social_prof_issues/case_study_wilms.php>.