Ethics
Software Development

CSC 3350

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Background Questions

1. What is ethics?
2. What is morality?
3. What is moral conduct?
4. How to be ethical as a software developer?
5. Impacts of ethics in software.

Ethics are…

- Originating from the Greek word '*ethos*' [character/custom/disposition]
- Defined as the systematic study of morality
- Related to the code or set of principles, standards, or rules that guides the moral action of an individual within a particular social framework
- Concerned with judgement and decision related to questions in human behavioral conduct

Morals/Morality

- came from the Latin word '*moralis*', custom or character in which people do things
- refers to what we call moral code or conduct looks at how good or bad our conduct is and our standards about conduct.
- In colleges there is an ethics class rather than a morality class.
- Morality is ethics in action, but in the end two terms can be used interchangeably.

Conduct

- How a person should act responsibly in particular cases and what extent these actions should become 'right' or 'wrong'

Software Ethics Questions

1. Why do companies require high-quality software in business systems, industrial process control systems, and consumer products?
2. What ethical issues do software manufacturers face in making tradeoffs between project schedules, project costs, and software quality?
3. What are the four most common types of software product liability claims, and what actions must plaintiffs and defendants take to be successful?
4. What are the essential components of a software development methodology, and what are its benefits?

Why do companies require high-quality software in business systems, industrial process control systems, and consumer products?

- Improved efficiency to streamline their processes and operations, which can lead to improved productivity. Example is a well-designed customer relationship management (CRM) system can help businesses to track customer interactions, manage leads, and close contracts.
- Increased accuracy can help to reduce errors, which can save businesses time and money. Example is a financial accounting system that is reduced or free of errors can avoid costly mistakes.
- Better decision-making can provide insights into their data and make better decisions. Example is a business intelligence system can help analyze data and identify trends. This leads to more informed decisions about operations.
- Enhanced security protects businesses from security threats such as data breaches and cyberattacks.
- Reduced costs in several ways: improving efficiency, reducing errors, and enhancing security.
- Improved customer satisfaction by providing a better user experience. Example is an e-com platform can make it easier to shop increasing sales and loyalty.

What ethical issues do software manufacturers face in making tradeoffs between project schedules, project costs, and software quality?

- Pressure to meet deadlines is a real thing in a competitive software industry even if it means compromising quality. This can lead to bugs, security vulnerabilities, or other defects.
- Pressure to reduce costs can mean cutting corners on testing, development, or other aspects of software development and this gives unsafe or unreliable systems.
- There is a need to balance stakeholder interests, and it is difficult with different priorities. For example, customers (end users) may want high quality software, while shareholders (business owners) may want to see profits increase.
- The need to comply with regulations can add to the complexity of software development resulting in moving deadlines and increasing costs.
- Others include privacy of personal data, bias in the software towards certain racial groups (facial recognition) and job displacement (AI Chatbots).

What are the four most common types of software product liability claims, and what actions must plaintiffs and defendants take to be successful?

1. Manufacturing defects
2. Design defects
3. Failure to warn
4. Aftermarket defects

Plaintiffs must prove:

1. Software was defective
2. Defects caused injury
3. Design was negligent

Defendants must prove:

1. Software was not defective
2. Plaintiff's injury was not caused by accused defects
3. Design was not negligent

What are the essential components of a software development methodology, and what are its benefits?

- Requirements gathering and analysis
- Design
- Development
- Testing
- Deployment and maintenance

Benefits:

1. Increase of efficiency and productivity
2. Improved quality of system
3. Cost reduction
4. More flexibility in project work
5. Better communications

ACM Code of ethics

1. General principles
   - Contribute to society and human well-being
   - Avoid harm (negative consequences)
   - Be honest and trustworthy
   - Be fair and actively do not discriminate
   - Respect the work required to create software systems
   - Respect privacy
   - Honor confidentiality

ACM Code of ethics

2. Professional responsibilities
   - Strive to achieve high quality
   - Maintain high standards of professional competence, conduct, and practice
   - Know and respect existing rules pertaining to professional work
   - Accept and provide appropriate review
   - Give comprehensive and thorough evaluations of computer systems and their impacts, including analysis of possible risks.
   - Perform work only in areas of competence.
   - Foster awareness and understanding of computing and their consequences
   - Access computing and communication resources only when authorized
   - Design and implement systems that are secure

ACM Code of ethics

3. Professional leadership principles
   - Ensure the public good is of central concern
   - Articulate, encourage acceptance of, and fulfillment of social responsibilities in technical groups of computing professionals
   - Manage personnel and resources to enhance the quality of working life of systems
   - Articulate, apply, and support the principles of the Code
   - Create ways for members of the organization or group to grow as professionals
   - Use special care when modifying or retiring systems
   - Recognize and take special care of systems that become integrated into the infrastructure of society
4. Compliance with the code
   - Uphold, promote and respect the principles of the code
   - Treat violations as inconsistent with membership in the ACM

ACM Case Studies

1. https://ethics.acm.org/code-of-ethics/using-the-code/case-dark-ux-patterns/
2. https://ethics.acm.org/code-of-ethics/using-the-code/case-malicious-inputs-to-content-filters/
3. https://ethics.acm.org/code-of-ethics/using-the-code/case-automated-active-response-weaponry/
4. https://ethics.acm.org/code-of-ethics/using-the-code/case-malware-disruption/

Discuss impacts of ethics in software dev

- cost of lost assets
- security breaches
- loss of life
- exploitation of privacy

Summary

1. Software engineers have a responsibility to prioritize user safety, privacy, and well-being. This means avoiding features that might harm users, protecting their data, and ensuring transparency about how their data is used.
2. Algorithms implemented in software can perpetuate existing biases in society. Developers must be aware of potential biases in their algorithms and actively work to mitigate them to ensure fair and equitable outcomes.
3. Software development and use have environmental consequences, from energy consumption to e-waste. Developers should consider the environmental impact of their work and strive for sustainable practices throughout the development process.
4. Software developers are responsible for the consequences of their work. They should be transparent about the capabilities and limitations of their software and be accountable for any harm it may cause.

Developing software ethically is an ongoing process that requires continuous reflection and adaptation.

Attributions

1. Jane Prusakova, https://www.slideshare.net/jprusakova/questions-of-ethics-in-software-development
2. University of the East, https://www.slideshare.net/mggarces/lecture1-introduction-to-ethics
3. ACM, https://www.acm.org/code-of-ethics
4. ACM, https://www.acm.org/code-of-ethics/case-studies

End.

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