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Agile Software Engineering Skills

Ethics

Chapter 5

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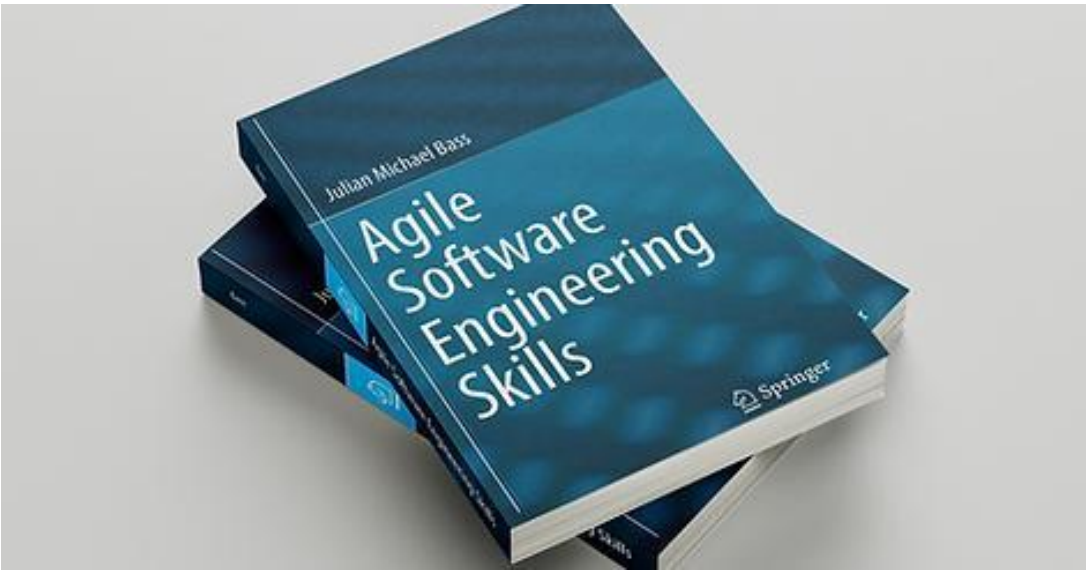

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Introduction

- Software is getting a bad name
- Corporations harvesting personal data
- Security breaches leading to personal data loss
- Technology is blamed for spreading fake news; democracy is undermined
- We need to think about our responsibilities as technologists

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Contents

- What went wrong?
- Copyright and Patents
- Professional bodies
- Activism
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What went wrong?

- Technology sector influence has grown significantly
- Hard to get sufficiently “off-grid” not to benefit from somebody's software
- Concerns grow that technologies are not really serving some stakeholders well or fairly
- “Free” online services are designed to obtain data about users, which can then be sold

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What went wrong?

- Algorithms and Inequality
  - Search engines reinforce ethnic and gender stereotypes
- Platforms and Fake Markets
  - Platforms have created new markets
    - Such as ride hailing and temporary overnight accommodation
  - Work has been commissioned but has gone unpaid.
  - Platform workers have been barred without explanation or recourse

What went wrong?

- Errors, Faults and Failures
  - When large systems fail, it attracts attention
  - IT outages have denied customers access to their bank accounts
  - Outages can attract significant publicity
  - Regulators have questioned executives
  - Senior executives have left their jobs

What went wrong?

- Criminal and Unethical Behaviour
- Six main categories of unethical behaviour on software engineering
  - Lying,
  - Computer fraud and unauthorised access,
  - Information theft,
  - Espionage,
  - Sabotage and
  - Subversion of project goals.

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What went wrong?

- Lying has a long tradition in the technology sector
  - Developers exaggerate progress
  - Project managers `sanitise' status reporting
  - Sales people advertise features yet to be implemented
- Agile methods can help by creating a culture of transparency and openness
- Time and materials contracts sell effort, rather than features

What went wrong?

- Computer fraud and unauthorised access
  - Criminal uses of software-intensive infrastructure include bank fraud and monetary theft
  - Unauthorised access to computer systems operated by public, government and military authorities
  - Perpetrators can be cyber joy-riders, corporate or governmental actors

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What went wrong?

- Criminal techniques for credit card fraud can include:
  - Cracking a server. Obtaining card details from databases
  - Phishing. Enticing victims to hand over credit card details to a fake website
  - Spear phishing. Targeting high net worth individuals to obtain card details
  - Pharming. Creating a fake web site for a well known financial services provider
  - Spyware. Malicious software that captures details from victims.

What went wrong?

- Information theft
  - Sensitive information might include client lists, employee records or development artefacts, such as source code
- Espionage
  - Gathering of confidential material from a foreign country or competitor company
- Security measures are discussed in Chapter 11

What went wrong?

- Sabotage
  - Perpetrated by insiders as a form of revenge or retribution
- Subversion of project goals
  - Stakeholders who take deliberate actions to undermine the project
  - Subversives may resist change, undermine corporate goals, exact revenge
- Best mitigated by good stakeholder analysis, quality communication and support from senior management

Copyright and Patents

- Legal protection for various forms of intellectual property
- Take reasonable precautions to preserve confidentiality
- We can be exposed to highly sensitive data in our work
- Our responsibility to keep data safe and secure

Professional Bodies

- Professional bodies support practitioners in the computing, IT and software sectors
  - Association for Computer Machinery, (ACM)
  - British Computer Society, (BCS), the Chartered Institute for IT
  - Institution for Engineering and Technology, (IET)
  - Institute for Electrical and Electronic Engineering, Computer Society (IEEE CS)

Professional Bodies

- International membership organised into geographical branches
- Specialist groups organised around technical specialisms
- Members agree to uphold certain standards of practice

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Professional Bodies

- BCS Codes of Conduct
  - “You shall: have due regard for public health, privacy, security and wellbeing of others and the environment”
- Members have a duty of care towards the wider public
- Members are also require to acquire and maintain competency
  - “You shall: only undertake to do work or provide a service that is within your professional competence”
  - “You shall: NOT claim any level of competence that you do not possess.”

Professional Bodies

- ACM Codes of Ethics
  - Includes professional responsibility when handling personal information
  - “a computing professional … should understand the rights and responsibilities associated with the collection and use of personal information”
- Professional bodies provide help desks for practitioners facing an ethical dilemma

Activism

- Practitioners have used activism to gather support strengthening ethical positions
  - Thousands of Google employees, in 2018, signed a letter ``protesting the company's involvement in a Pentagon program that uses artificial intelligence … to improve the targeting of drone strikes”
  - Google employees in 2019 signed a petition opposing provision of cloud services to US Customer and Border Protection (CPB) citing “human rights abuses”

Activism

- Delivery and ride share drivers in US have attracted publicity for campaigns to obtain sick pay and paid holidays.
- Arguably led to changes in employment law in California
  - Changing definition of an employee and platform responsibilities towards contractors

Whistle-blowing

- Act of exposing ethical wrong-doing
- Aim of halting the behaviour
- Whistle-blowers must carefully evaluate the wrongs they seek to expose
- Danger that senior management will punish whistle-blower

Unions

- Means for employees to work together to address employment-related concerns
- Offer legal support for their members
- App Drivers and Couriers Union successfully challenged Uber in the UK Supreme Court
  - Subsequently, the company announced plans to pay minimum wage, holiday pay and pensions

Professional Development

- Consistent set of skills standards desirable to improve practice and enhance the reputation of the field
- UK Engineering Council has defined standards
  - Engineering Technicians (EngTech)
  - Incorporated Engineers (IEng)
  - Chartered Engineers (CEng)
  - Information and Communications Technology Technicians (ICTTech)
- Standards are publicly available and used by professional bodies

Professional Development

- To acquire knowledge, skills and competencies
  - Identify Targets, the skills and competencies you want to learn
  - Acquire Knowledge
  - Rehearse Skills
  - Reflect
  - Repeat
- Initial professional development for Chartered Engineer
  - Masters level educational attainment
  - Sustained level of responsibility within the profession

Professional Development

- Continuing professional development (CPD) required to keep skills up-to-date
- CPD recorded for evidence of ongoing skills enhancement

Professional Development

- Skills Framework for the Information Age
  - Describes the skills and competencies required by professionals
  - Comprises seven levels
    1. Follow
    2. Assist
    3. Apply
    4. Enable
    5. Ensure, advise
    6. Initiate, influence
    7. Set strategy, inspire, mobilise

Professional Development

- Skills Framework for the Information Age (Cont.)
  - Each level defined in terms of responsibilities
    - Autonomy, influence, complexity, knowledge and business skills
  - Each skill has detailed competencies and responsibilities

Exercises

- Exercises 5.1, 5.6 and 5.7 encourage creation of a learning journal
- Exercise 5.2 Code of Ethics review
- Exercise 5.3 Intellectual property review
- Exercise 5.4 Stakeholder analysis
- Exercise 5.5 Skills Framework for the Information Age review

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Summary

- What went wrong?
  - Technology sector getting a bad reputation
  - Agile methods can help ensure transparency of status during projects
  - Security measures needed to keep private data safe
- Copyright and Patents
  - Offer legal protection for digital goods, such as the software you create

Summary

- Professional bodies
  - Support practitioners
  - Invite members to consider wider public interests
- Activism
  - Collective action to tackle unethical corporate behaviour
- Professional development
  - Acquire new skills and keep skills up-to-date