

Ethics and Case Study Intro

Chapter 1.2-1.3



Based on slides from
Software Engineering 9th ed, Sommerville.

Topics

- 1) How do ethics apply to software developers?
- 2) What case studies will be discussed in the notes?

Software engineering ethics

- Software developer's responsibility:
 -
 -
- Ethical:
 - more than upholding the law: must follow morally correct principles.



Issues of Professional Responsibility

- Confidentiality
 - Abide by NDA (Non-disclosure agreement)
 - Respect employer confidentiality w/ or w/o NDA.
- Competence
 - Accurately represent one's level of competence:..
- Intellectual Property (IP) rights
 - Understand and protect IP: patents, copyright, etc.
- Computer misuse
 - Don't misuse technical skills or other's computers (playing games at work, spreading viruses).

ACM/IEEE Code of Ethics

- Professional societies have..
 - Members agree to the code of practice when they join.
- Software engineers have significant opportunities:
 - to..
 - to enable others to do good or cause harm,
 - to influence others to do good or cause harm.

ACM Code of Ethics:

"To ensure, as much as possible, that their efforts will be used for good, software engineers must commit themselves to making software engineering a beneficial and respected profession."



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5

The ACM/IEEE Code of Ethics

Software engineers shall...

1. PUBLIC: ...act consistently with the public interest.
2. CLIENT AND EMPLOYER: ...act in a manner that is in the best interests of their client and employer consistent with the public interest.
3. PRODUCT: ...ensure that their products and related modifications meet the highest professional standards possible.
4. JUDGMENT: ...maintain integrity and independence in their professional judgement.
5. MANAGEMENT: ...subscribe to and promote an ethical approach to the management of software development and maintenance.
6. PROFESSION: ...advance the integrity and reputation of the profession consistent with the public interest.
7. COLLEAGUES: ...be fair to and supportive of their colleagues.
8. SELF: ...participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.

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1) Realistic example which violates principle; 2) The possible consequences.

6

Possible ethical dilemmas

- Software developers may face ethical dilemmas:
 - with the policies of senior management.
 - Pressure to release a safety-critical system
 - Participation in the development of military weapons systems or nuclear systems.



"A principle isn't a principle until it costs you something."
- William Bernbach

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7

Introduction to three Case Studies

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8

Three case studies

- Personal insulin pump:
 - embedded system for diabetics to maintain blood sugar.
- Mental health case patient management system (MHC-PMS):
 - maintain records for mental health patients.
- Wilderness weather station:
 - collects data about weather conditions in remote areas.

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9

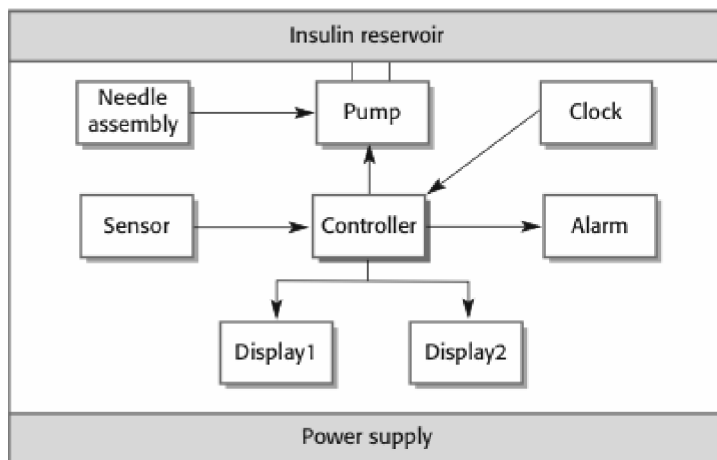
Insulin pump control system

- Features:
 - Collect data from a blood sugar sensor
 - Calculate amount of insulin required.
 -
- Safety-critical system:
 - low-blood sugar can lead to coma & death;
 - high-blood sugar can lead to eye & kidney damage.
- Some high-level Requirements:
The system...
 - shall be available to deliver insulin when required.
 - shall perform reliably and deliver the correct amount of insulin for current blood sugar level.
 - must be designed and implemented to ensure it..

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10

Insulin pump hardware architecture

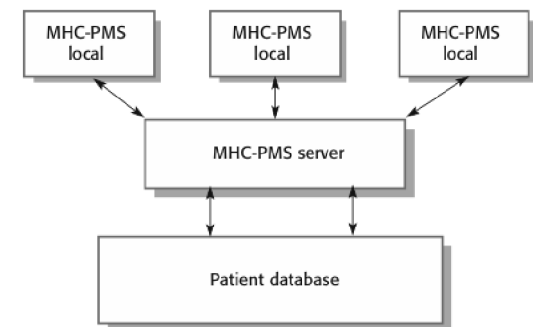


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11

Mental Health Care-Patient Management System (MHC-PMS)

- Maintains information about mental health..
- Database:
 - centralized patient information database when connected to secure network
 - free-standing when disconnected from network.



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12

MHC-PMS key features

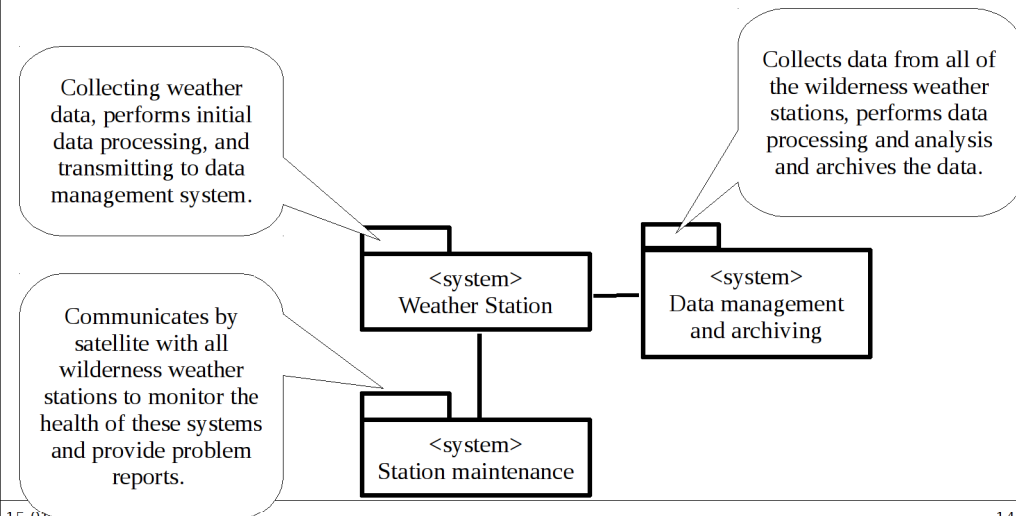
- Individual care management
 - Clinicians can..
patient history, etc.
- Patient monitoring
 - Monitor patient records..
if problems are detected.
- Monthly Admin. Reports:
 - # of patients
 - treated at each clinic
 - added/removed,
 - drugs prescribed and costs
- Privacy
 - Patient information only disclosed to ..
- Safety
 - warn medical staff about potentially suicidal or dangerous patients.
- System must be **available when needed** otherwise safety may be compromised.

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13

Wilderness Weather Station

- Deploy several hundred weather stations in..



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14

Additional software functionality

- Monitor the instruments, power and communication hardware and report faults to the management system.
- Manage the..
 - batteries charge when environmental conditions permit
 - generators shut down in potentially damaging weather, such as high wind.
- Support..
 - upgrade parts of the software and
 - backup instruments are used on system failure.

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15

Summary

- Software developers have responsibilities to the profession and society.
 - Not simply be concerned with technical issues.
- Professional societies publish codes of conduct for their members.
- Three case studies:
 - Embedded insulin pump control system
 - Mental health care patient management system
 - Wilderness weather station

15-01-09

16