Day 20

Glitches
Legacy Systems
Errors, Failures, Risks

- Most computer applications are so complex it is virtually impossible to produce programs with no errors.
- The cause of failure is often more than one factor.
- Computer professionals must study failures to learn how to avoid them.

Textbook p 362
Billing errors (4/2017)

Colorado Medicaid claims botched in transition to new payment system, state failed to pay hundreds of thousands of dollars

State has given advances to some providers awaiting payment.


Inaccurate and misinterpreted data in databases

- Large population where people may share names
- Automated processing may not be able to recognize special cases
- Overconfidence in the accuracy of data
- Errors in data entry
- Lack of accountability for errors
A married couple living on Brisbane's bayside had realized their credit card dues were being paid off automatically, but instead of reporting the suspicious mistake, they took it as a windfall and enjoyed the luxury they could afford with it, until they were jailed for having done so.

When they went back to the bank to pay off their balance, they were surprised to learn that their outstanding balance was just $375.

They told the teller it was not possible, but without realizing the details behind their reaction, the teller told them: "Computers don't lie." In turn, the couple did not say anything more.
A computer glitch led to incorrect COVID test results and short-lived panic for some Anchorage residents

By Lex Treinen, Alaska Public Media - Anchorage - November 9, 2021

A computer glitch forced American Airlines to cancel hundreds of flights, and customers are furious

American Airlines is tripling pilots' pay after a scheduling glitch left thousands of flights without pilots

By Chris Isidore, CNN Business
Updated 4:00 PM ET, Thu July 7, 2022

Investigation into EMS billing debunks 'software glitch' as cause for $6 million write-off

An internal Escambia County investigation shot down the idea that a nearly $6 million write-off of uncollected bills for Emergency Medical Services was caused by a "software glitch," and instead placed the blame on ex-employees of the county.

The report found that former EMS Chief Steve White violated a county ordinance by hiding the true cost of new EMS software from the County Commission in 2017.

May 26, 2020

YouTube says that an error caused comments critical of China’s government to auto-delete

Taylor Hatmaker @tayhatmaker / 5:12 pm EDT • May 26, 2020
America’s Electronic Voting Machines Are Scarily Easy Targets

America’s voting machines are a patchwork of systems spread across thousands of districts, with widely varying degrees of accountability. It’s a mess. One that the Department of Homeland Security has finally committed to helping clean up.

An 11-Year-Old Hacked Into a U.S. Voting System Replica in 10 Minutes This Weekend

This year, I bought two more machines to see if security had improved. To my dismay, I discovered that the newer model machines—those that were used in the 2016 election—are running Windows CE and have USB ports, along with other components, that make them make them even easier to exploit than the older ones. Our voting machines, billed as “next generation,” and still in use today, are worse than they were before—dispersed, disorganized, and susceptible to manipulation.
An Embarrassment of Glitches
A wealthy country should be able to conduct a national election with fewer problems than the United States experienced in the 2018 midterms.

Glitches, failures plague voting system

BY MICHAEL DUKE news@kingstreeonline.com  Nov 13, 2018 Updated 22 min ago

Voting Machine Hell, 2018: A Running List of Election Glitches, Malfunctions, and Screwups

Bryan Menegus 11/06/18 3:06pm  Filed to: 2018 MIDTERMS

https://www.reddit.com/r/gifs/comments/9uqycj/celebrating_democracy_in_the_usa/
Technology glitches prevent same-night release of Iowa caucus results

"This is not a hack or an intrusion," a party official says.

TIMOTHY B. LEE - 2/4/2020, 1:14 AM

Online Conspiracy Theories Flourish After Iowa Caucus Fiasco

By The Associated Press

Published Feb. 4, 2020	Updated Feb. 5, 2020, 12:18 a.m. ET
The Computer Scientist Who Prefers Paper

Barbara Simons believes there is only one safe voting technology.
What happened?

- **Real-world problems**: some scanners got dirty or knocked out of alignment. Faulty latches on carts caused luggage to fall onto the tracks between stops.
- **Problems in other systems**: The airport’s electrical system could not handle the power surges associated with the baggage system.
- **Software errors**: A software error caused the routing of carts to waiting pens when they were actually needed.
- **Reluctance to admit failure**
Reluctance to admit failure

- Abandoned systems
  - Some flaws in systems are so extreme that the systems are discarded after wasting millions, or even billions, of dollars.
  - “Hopelessly inadequate”
  - Britain’s NHS IT program: “One of the worse fiascos ever.”

Sunk cost fallacy: “a greater tendency to continue an endeavor once an investment in money, effort, or time has been made.”

Arkes, 1999
Lack of clear, well-thought-out goals and specifications

Poor management and poor communication among customers, designers, programmers, etc.

Institutional and political pressures that encourage unrealistically low bids, low budget requests, and underestimates of time requirements

Use of very new technology, with unknown reliability and problems

Refusal to recognize or admit a project is in trouble
Psychological or market triggers for problems:

**Cognitive Dissonance:** mental stress generated by the co-existence of conflicting thoughts → usually minimized by self-justification.

Insufficient market or legal incentives to do a better job

Cognitive dissonance: http://psychology.about.com/od/cognitivepsychology/f/dissonance.htm
"Outdated computer systems, programming languages or application software that are used instead of available upgraded versions."

- Reliable but inflexible
- Expensive to replace
- Little or no documentation
- Obscure to new users

Windows 3.1 is still alive, and it just killed a French airport

The IRS struggles to tackle legacy IT problems

Glitch blamed for delays now fixed, Air Canada says

The issue with a system that old is that people don’t like to do maintenance work,” explained Fiacre. “Furthermore, we are starting to lose the expertise to deal with that type of operating system. In Paris, we have only three specialists who can deal with DECOR-related issues,” said Fiacre.

“One of them is retiring next year, and we haven’t found anyone to replace him,” he added.
The Reserve Bank of India has given the nation's banks a one-year deadline to migrate ATMs away from the Microsoft XP operating system, more than five years after support for the O/S was switched off by the Redmond-based tech giant.

Fail by design: Banking's legacy of dark code

Is it modernize or die? Or modernize and die? For banks updating their computer systems with secure mobile features it can be both. Many run mainframes on legacy code that's gone dark — no one understands it anymore.
Many of the remaining computers are having their operating systems installed from scratch, the source said. A portion of the defense contractor’s systems — about 150 computers — are still running Windows XP, which stopped receiving security patches in 2014.

A source with knowledge of the incident told TechCrunch that the defense contractor paid a ransom of about $500,000 shortly after the incident.

https://techcrunch.com/2020/03/05/cpi-ransomware-defense-contractor/
Software mistakes are **NONLINEAR**: changes in output are not proportional to changes in input.

https://news.mit.edu/2010/explained-linear-0226