

# CS 3001-C: Computing, Society & Professionalism

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Week 10: Computer and Network  
Security, Computer Reliability

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# 8.1 Introduction

- Computer systems are sometimes unreliable
  - Erroneous information in databases
  - Misinterpretation of database information
  - Malfunction of embedded systems
- Effects of computer errors
  - Inconvenience
  - Bad business decisions
  - Fatalities

## **8.2 Data-Entry or Data-Retrieval Errors**

# Disfranchised Voters

- November 2000 general election
- Florida disqualified thousands of voters
- Reason: People identified as felons
- Cause: Incorrect records in voter database
- Consequence: May have affected election's outcome

# False Arrests

- Sheila Jackson Stossier mistaken for Shirley Jackson
  - Arrested and spent five days in detention
- Roberto Hernandez mistaken for another Roberto Hernandez
  - Arrested twice and spent 12 days in jail
- Terry Dean Rogan arrested after someone stole his identity
  - Arrested five times, three times at gun point

# Accuracy of NCIC Records

- March 2003: Justice Dept. announces FBI not responsible for accuracy of NCIC information
- Exempts NCIC from some provisions of Privacy Act of 1974
- Should government take responsibility for data correctness?

# Dept. of Justice Position

- Impractical for FBI to be responsible for data's accuracy
- Much information provided by other law enforcement and intelligence agencies
- Agents should be able to use discretion
- If provisions of Privacy Act strictly followed, much less information would be in NCIC
- Result: fewer arrests

# Position of Privacy Advocates

- Number of records is increasing
- More erroneous records → more false arrests
- Accuracy of NCIC records more important than ever



# **Act Utilitarian Analysis: Database of Stolen Vehicles**

## **8.3 Software and Billing Errors**

# Errors When Data Are Correct

- Assume data correctly fed into computerized system
- System may still fail if there is an error in its programming

# Comair Cancelled All Flights on Christmas Day, 2004



AP Photo/Al Behrman, File

# **Other System Malfunctions**

## **8.4 Notable Software System Failures**

# Patriot Missile

- Designed as anti-aircraft missile
- Used in 1991 Gulf War to intercept Scud missiles
- One battery failed to shoot at Scud that killed 28 soldiers
- Designed to operate only a few hours at a time
- Kept in operation > 100 hours
- Tiny truncation errors added up
- Clock error of 0.3433 seconds → tracking error of 687 meters

# Patriot Missile Failure

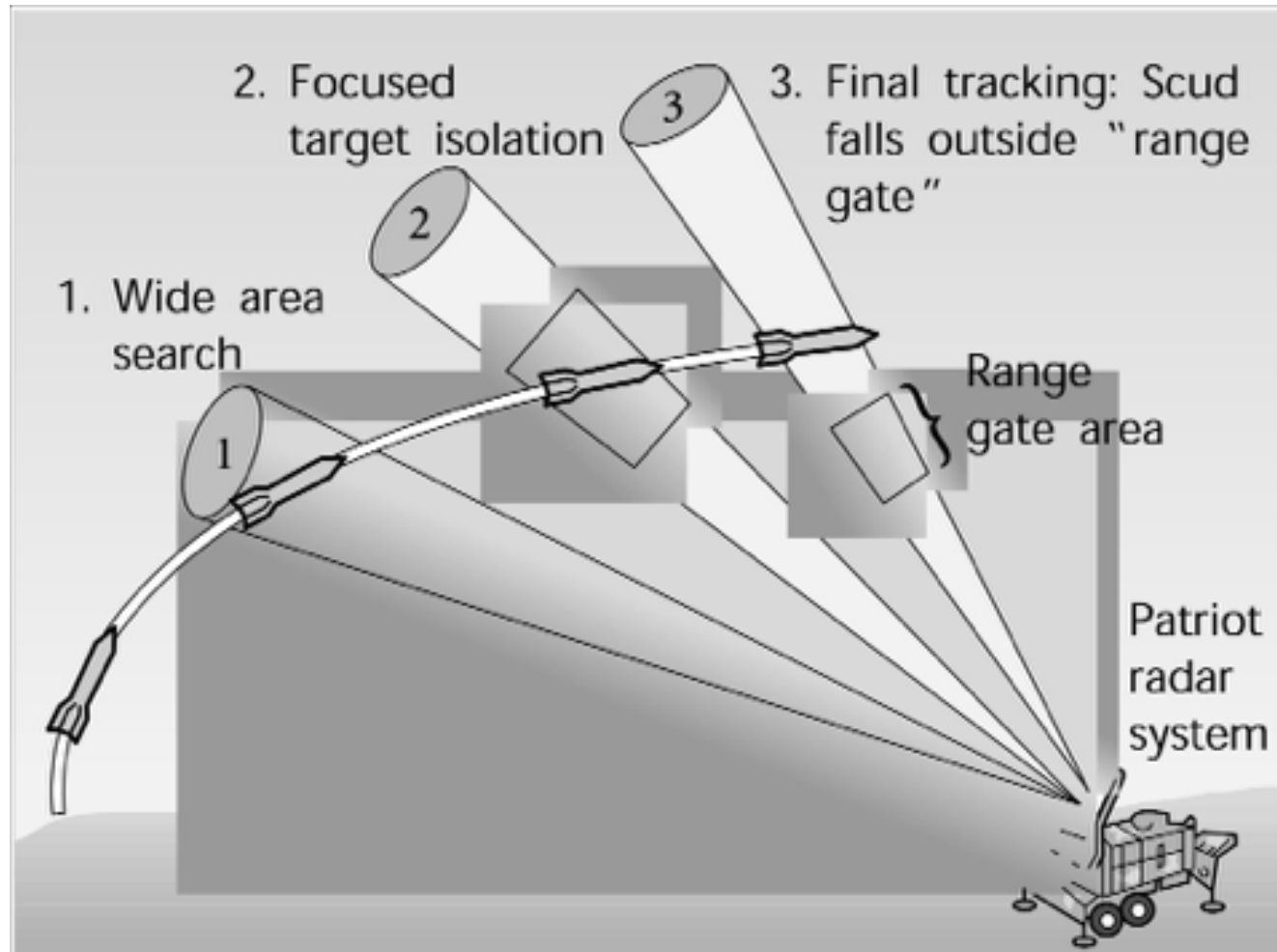


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# Tokyo Stock Exchange

- First day of trading for J-Com
- Mizuho Securities employee mistakenly enters order to sell 610,00 shares at 1 yen, instead of 1 share at 610,000 yen
- Employee overrides computer warning
- After sell order posted on exchange's display board, Mizuho tries to cancel order several times; software bug causes attempts to fail
- Mizuho loses \$225 million buying back shares

# Direct Recording Electronic Voting Machines

- After problems with 2000 election, Congress passed Help America Vote Act of 2002
- HAVA provided money to states to replace punch card voting systems
- Many states used HAVA funds to purchase direct recording electronic (DRE) voting machines
- Brazil and India have run national elections using DRE voting machines exclusively
- In November 2006 1/3 of U.S. voters used DRE voting machines

# Diebold Electronic Voting Machine



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**Class Discussion:** What could be potential problems with EVMs?

## **8.8 Software Warranties and Vendor Liability**

# Shrinkwrap Warranties

- Some say you accept software “as is”
- Some offer 90-day replacement or money-back guarantee
- None accept liability for harm caused by use of software

Are software warranties  
enforceable?

## **Case Study: Incredible Bulk**

Peter downloads a copy of the exciting new computer game Incredible Bulk for \$49.95. The game is usable, but it contains some annoying bugs. The company never releases software patches fixing the bugs.

The next year the company releases Incredible Bulk II, which also costs \$49.95 to download. According to the product description, the new release has many exciting new features. In addition, all of the annoying bugs of the original game have been fixed.

Was the company's action ethical?



**Class Discussion:** Should companies and programmers take responsibility of software malfunctions or errors?

# Moral Responsibility of Software Manufacturers

- If vendors were responsible for harmful consequences of defects
  - Companies would test software more
  - They would have to purchase liability insurance
  - Software would cost more
  - Start-ups would be affected more than big companies
  - Less innovation in software industry?
  - Software would be more reliable?
- Making vendors responsible for harmful consequences of defects may be a bad idea, but...
- Consumers should not have to pay for bug fixes