CSSE 372 Software Project Management: Software Project Failures

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Working on your Core at Rose!

I do 6 sit-ups every morning…

It may not sound like much, but there are only so many times you can hit the snooze button in the morning!
Planning

Predetermining a course of action for accomplishing organizational objectives.

- Set goals and objectives
- Develop strategies
- Determine courses of action
- Make decisions
- Set procedures & rules
- Develop programs
- Forecast future situations
- Prepare budgets
- Document project plans

Friday’s Q6
Directing

Creating an atmosphere that will assist and motivate people to achieve desired results.

- Provide leadership
- Supervise personnel
- Delegate authority
- Motivate personnel
- Coordinate activities
- Facilitate communications
- Resolve conflicts
- Manage changes
- Document directing decisions
Organizing

Arranging and relating work for accomplishment of objectives and the granting of responsibility and authority to obtain those objectives.

- Identify and group required tasks
- Select and establish organizational structures
- Create organizational positions
- Define responsibilities and authority
- Establish position qualifications
- Document organizational structures
Controlling

Measuring and correcting performance of activities toward objectives according to plan.

- Develop standards of performance
- Establish monitoring and reporting systems
- Measure results
- Initiate corrective actions
- Reward and discipline
- Document controlling methods
Staffing

Selecting and training people for positions in the organization.

- Fill organizational positions
- Assimilate newly assigned personnel
- Educate or train personnel
- Provide for general development
- Evaluate and appraise personnel
- Compensate
- Terminate assignments
- Document staffing decisions
Objectives: Fundamental Elements

Identify fundamental elements of Software Project Management

- Describe situations where software projects often go wrong
- List the basic categories of Software Related Failures
- Outline some software project failures from literature and determine why they fail
- Examine common causes of software project failures
Dilbert’s take on Project Failure...
What happens when Software Project Management is done badly?

- Think for 30 seconds…
- Turn to a neighbor and discuss it for a minute
Software Related Failures

Programming errors
- Errors such as incorrect storage size can be catastrophic

Passive failures
- Software, node, and link failures can cut-off sub-systems

Active failures
- Faulty software can interfere with other sub-systems

Byzantine failures
- Malicious agents can actively interfere with system operation

Chinook Helicopter Accident: Cause, software error
Epic Software Failures

- European Space Agency’s Ariane 5 Explosion
- Hospital Radiation Incident
- London Ambulance Service
- Denver Airport Baggage Handler
- East Coast Blackout (cascading power plant failures)
- AT&T Switch Failure -$Billion bug
- FAA’s Advanced Automation System
- NASA Mars Lander, Pathfinder, and Spirit…
European Space Agency
Ariane 5 Failure

- Ariane 4 SRI (Inertial Reference Systems) software reused on new Ariane 5

- Operand Error exception due overflow in converting 64bit FP to 16bit INT

- Launcher disintegrated after 39 sec because of high aerodynamic loads

Cause: Unknown Reuse Risk in Business Case
Medical Radiation Incident

- Machine provide graphical user interface
- Hospital workers selected options via fields
  - Tab-key & Shift-Tab combination used to move between fields
- Some hospital workers used up & down arrows to move between rows of fields
  - Moved cursor, but internally, didn’t change fields

Result: Data entered in wrong fields some patients over-radiated and did not survive
London Ambulance Service

- Computer Aided Dispatch System to automate human-intensive processes of manual dispatch
  - Call Taking (assumed to be better)
  - Receive calls, record incident details, pinpoint location

- System went live on 26th October 1992
  - Taken offline next day and reverted to semi-manual dispatching on 28th October 1992

- Increased incident errors => increased number of exceptions => increased incorrect information

Result: 20–30 people speculated to have died as a result of ambulances arriving too late
Why do Software Projects Fail?

1. Unrealistic or unarticulated project goals
2. Inaccurate estimates of needed resources
3. Badly defined system requirements
4. Poor reporting of the project's status
5. Unmanaged risks
6. Poor communication: clients, developers, & users
7. Use of immature technology
8. Inability to handle the project's complexity
9. Sloppy development practices
10. Poor project management
11. Stakeholder politics
12. Commercial pressures

Source: Robert Charette Article
Beginning the Programming Before Understanding the Problem

- Feel like they’re making progress
  - Immediate gains may be artificial

- Work gets bogged down with problems domain complexities
  - Premature decisions remove alternative designs that may be more effective

- May end up writing good software that solves the wrong problem
Project Team has Unrealistic Idea About How Much Work is Involved

- Complex problems often seem simple before they are attempted

- Optimistic/Impossible deadlines result from not thinking through the work
Defects Injected Early, but Discovered Late

- Address wrong needs
- Specify incorrect behavior
- Technically flawed Design and Implementation
- Test plans miss functionality

*The later these problems are found, the more likely they are to cause the project to fail*
Poor Programming Habits and No Accountability for Work

- Poor control of source code and other artifacts
- Write-Only Code
- Poor test cases

The team does not have a good sense of the overall health of the project
Managers trying to test quality into the software

- Assumes testers will catch all of the defects

- When testers miss defects, everyone blames them for not being perfect
What can be done to help software projects succeed?

- Think 15 seconds
- Turn to your neighbor and discuss it for a minute.
How can software projects succeed?

- Make sure all decisions are based on openly shared information
- Don’t second-guess your team members’ expertise
- Introduce software quality from the very beginning of the project
- Don’t impose an artificial hierarchy on the project team
- Remember that the fastest way through the project is to use good engineering practices
Homework and Reading Reminders

- Read “Why Some Large Computer Projects Fail" by Robert Britchner

- Complete Case Study for Tomorrow
  - Summarize on a ½ page the article addressing questions in instructions (link on schedule).
  - Turn in type-written ½ page summary in class tomorrow (Tuesday, September 4th).