



CSSE 372 Software Project Management: Software Project Failures

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ROSE-HULMAN
INSTITUTE OF TECHNOLOGY

Working on your Core at Rose!



I do 6 sit-ups every morning...

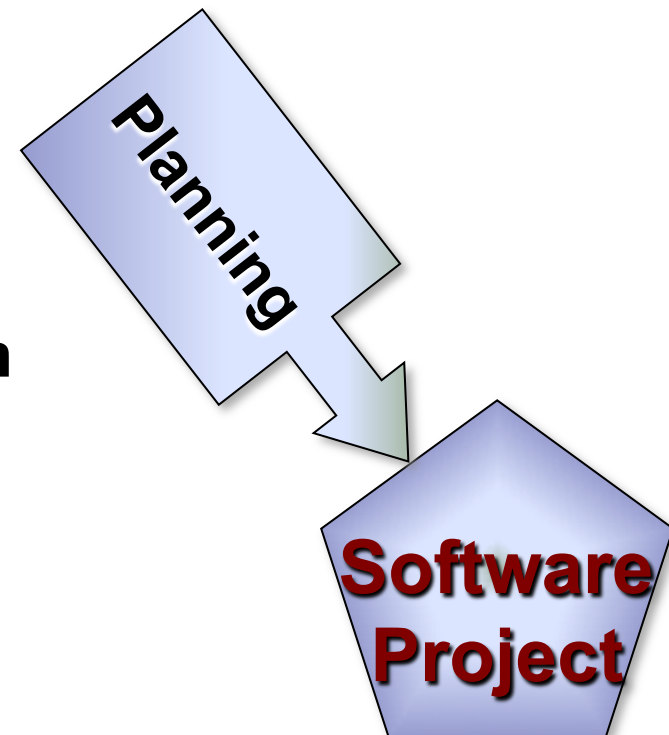
It may not sound like much,
but there are only so many
times you can hit the snooze
button in the morning!

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

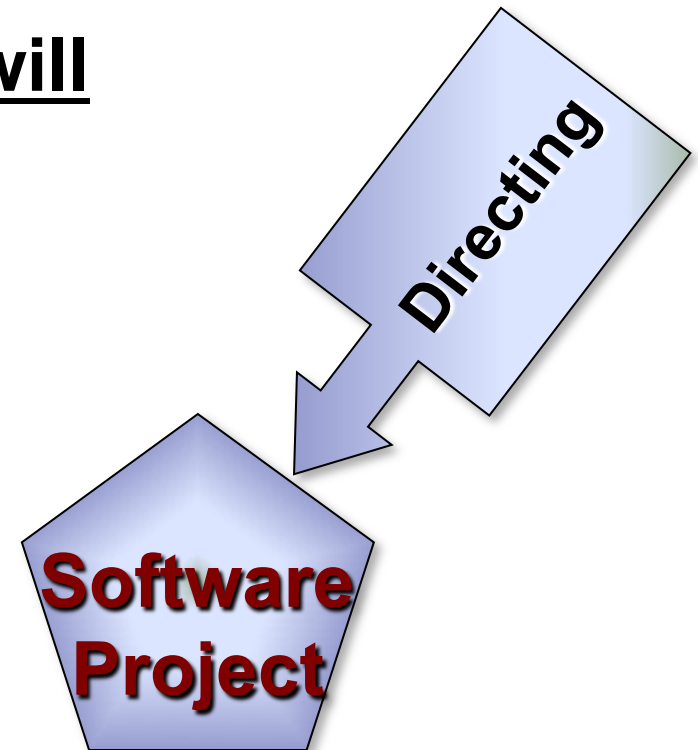
Friday's Q6



Directing

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

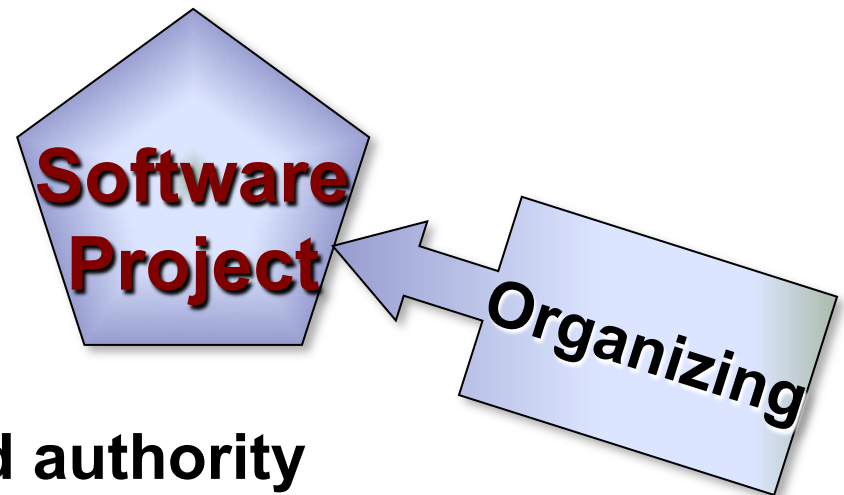
- Provide leadership
- Supervise personnel
- Delegate authority
- Motivate personnel
- Coordinate activities
- Facilitate communications
- Resolve conflicts
- Manage changes
- Document directing decisions



Organizing

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

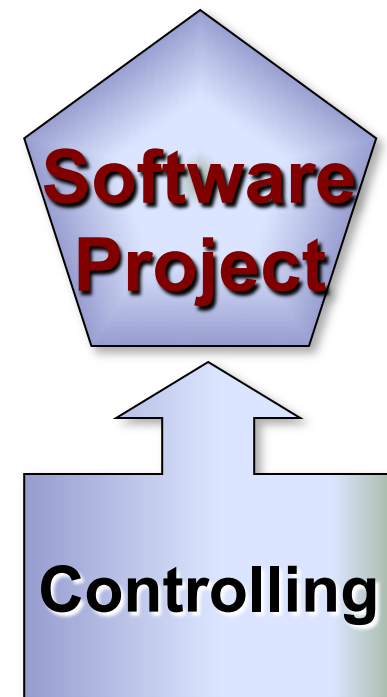
- ❑ Identify and group required tasks
- ❑ Select and establish organizational structures
- ❑ Create organizational positions
- ❑ Define responsibilities and authority
- ❑ Establish position qualifications
- ❑ Document organizational structures



Controlling

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

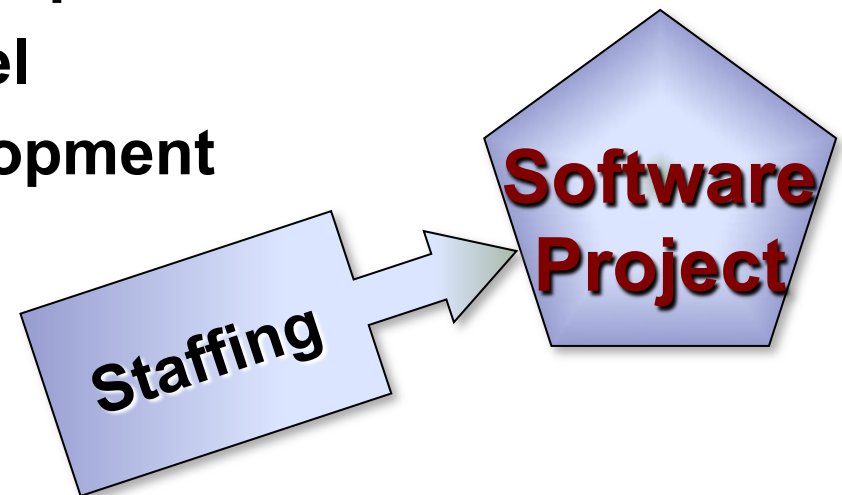
- Develop standards of performance
- Establish monitoring and reporting systems
- Measure results
- Initiate corrective actions
- Reward and discipline
- Document controlling methods



Staffing

Selecting and training people for positions in the organization.

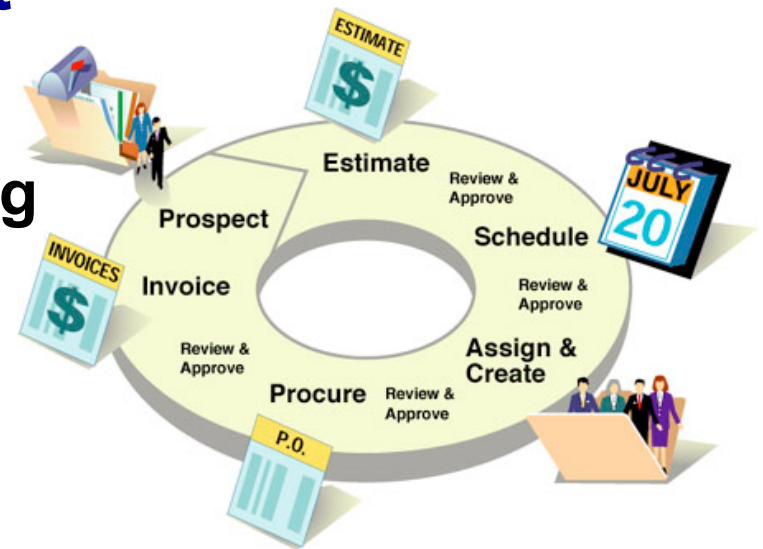
- ❑ Fill organizational positions
- ❑ Assimilate newly assigned personnel
- ❑ Educate or train personnel
- ❑ Provide for general development
- ❑ Evaluate and appraise personnel
- ❑ Compensate
- ❑ Terminate assignments
- ❑ Document staffing decisions



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**

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

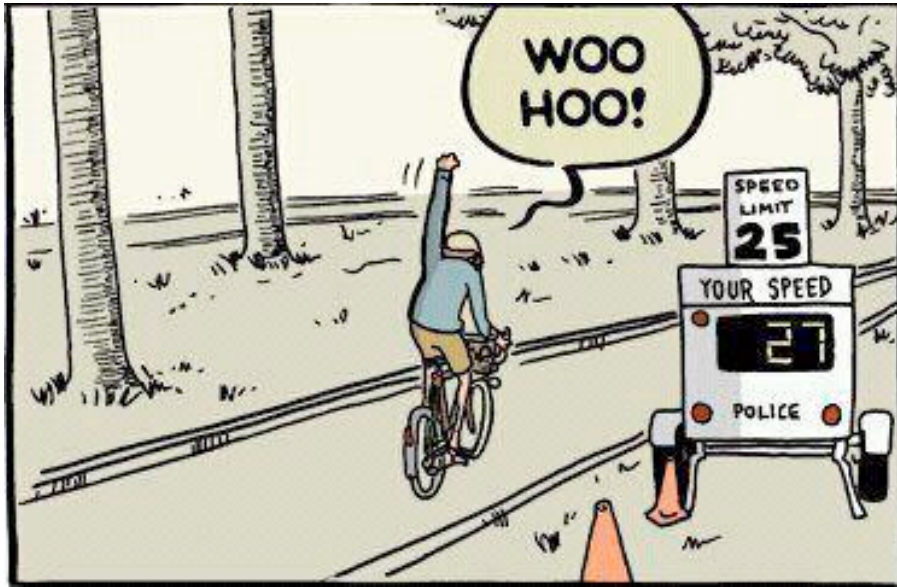
Managers trying to test quality into the software

- 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).**