# Comp8081
# Management Issues in Software Engineering

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# Agenda

- Attendance

- Review (McConnell – Chapters 3 & 4)

- Risk Management (McConnell – Chapter 5)

- Summary

- For next week

# Logistics

**Assignment 1, any questions?**

- Research, summarize and compare33
  - Agile Scrum methodology
  - one of the waterfall approaches from McConnell Ch.7
  - to each other and to McConnell's Rapid Development

- Due Feb 11th at midnight on D2L.

**Midterm Exam Format (Week 7 - Feb 22nd)**

- Short answer, based on Weeks 1 to 6.

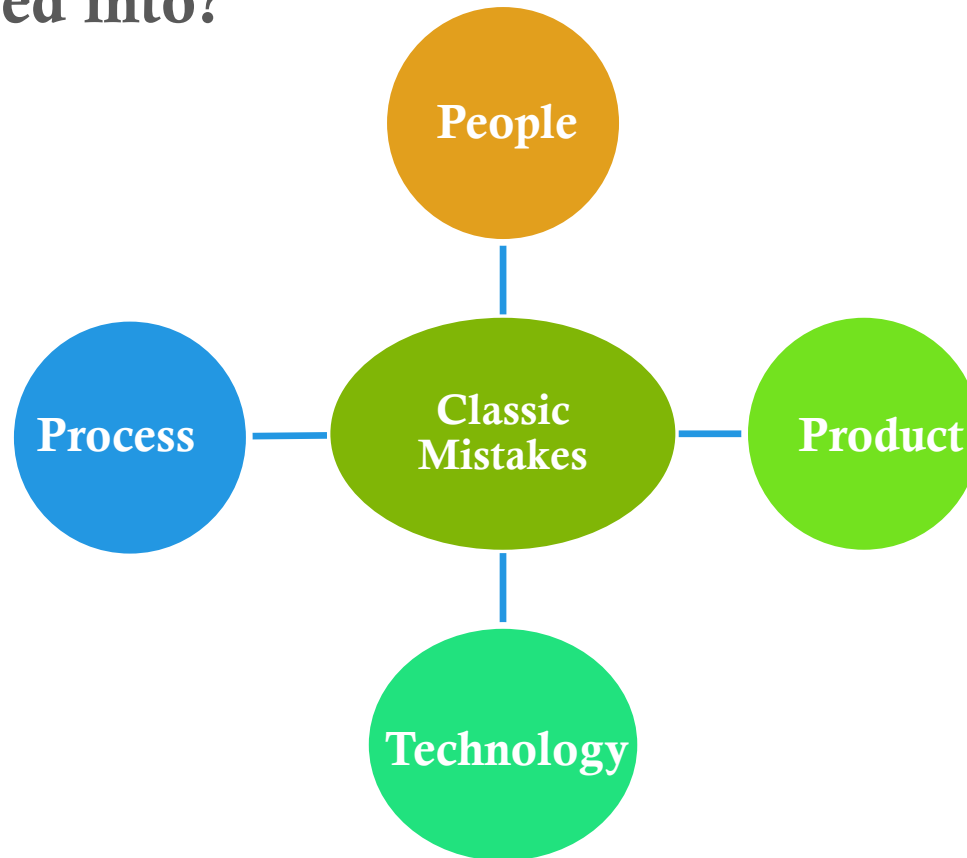- Closed book examination, no notes or other aids

# Review

McConnell, Chapters 3 & 4

# Classic Mistakes

**What are the four sub-topics that the Classic Mistakes are organized into?**

People

Process

Classic Mistakes

Product

Technology

# The 36 Original Classic Mistakes

| People-Related | Process-Related | Product-Related | Technology-Related |
|---|---|---|---|
| 1. Undermined motivation<br>2. Weak personnel<br>3. Uncontrolled problem employees<br>4. Heroics<br>5. Adding people to a late project<br>6. Noisy, crowded offices<br>7. Friction between developers and customers<br>8. Unrealistic expectations<br>9. Lack of effective project sponsorship<br>10. Lack of stakeholder buy-in<br>11. Lack of user input<br>12. Politics placed over substance<br>13. Wishful thinking | 14. Overly optimistic schedules<br>15. Insufficient risk management<br>16. Contractor failure<br>17. Insufficient planning<br>18. Abandonment of planning under pressure<br>19. Wasted time during the fuzzy front end<br>20. Shortchanged upstream activities<br>21. Inadequate design<br>22. Shortchanged quality assurance<br>23. Insufficient management controls<br>24. Premature or too frequent convergence<br>25. Omitting necessary tasks from estimates<br>26. Planning to catch up later<br>27. Code-like-hell programming | 28. Requirements gold-plating<br>29. Feature creep<br>30. Developer gold-plating<br>31. Push me, pull me negotiation<br>32. Research-oriented development | 33. Silver-bullet syndrome<br>34. Overestimated savings from new tools or methods<br>35. Switching tools in the middle of a project<br>36. Lack of automated source |

**This is the list of things we mess up again and again.**

- McConnell pg.49

# Classic Mistakes

**People**   **Process**   **Product**   **Technology**

- Your project plan implies that you will be 50% more productive in the next phase of the project

- Your query now successfully returns the data, but you want it in half the time

- The user rep at your scrum meeting sits quietly with her arms crossed tightly

- Your schedule is 2 weeks behind.  You were supposed to start QA last week, but you haven't given them a build yet.

# Development Fundamentals

**Best Possible Schedule**

Development Fundamentals

Management Fundamentals

Technical Fundamentals

Quality Assurance Fundamentals

# Development Fundamentals

◊ McConnell says the fundamentals enable:
  ◊ Effective management and control for rapid dev
  ◊ Ability to identify whether a project is succeeding

| Management Fundamentals | Technical Fundamentals | Quality Assurance Fundamentals |
|---|---|---|
| □ Estimation and scheduling | □ Requirements management | □ Testing |
| □ Planning | □ Design | □ Technical reviews |
| □ Tracking | □ Construction | ◻ Walkthroughs |
| □ Measurement | □ Software Configuration Management | ◻ Code reading |
| | | ◻ Inspections |

# Risk Management

McConnell, Chapter 5

# Four Pillars of Rapid Development

## Best Possible Schedule

- Development Fundamentals
- Risk Management
- Avoid Classic Mistakes
- Schedule-Oriented Practices

McConnell pg.9

# Risk Management

Topics

- What is a Risk?

- What is an Issue?

- What is the difference between them?

- What is the goal of Risk Management?

- What kinds of risks are we meant to be managing in software development/engineering?

- Can we, or do we even want to, eliminate all risk?

# Definitions

*(PMI, Project Management Book Of Knowledge)*

● **Risk**

AN UNCERTAIN EVENT THAT, IF IT OCCURS, HAS A POSITIVE OR NEGATIVE IMPACT ON THE PROJECT'S OBJECTIVE SUCH AS TIME, COST, SCOPE, QUALITY, ETC.

● **Issue**

A POINT OR MATTER IN QUESTION OR IN DISPUTE, OR A POINT OR MATTER THAT IS NOT SETTLED AND IS UNDER DISCUSSION OR OVER WHICH THERE ARE OPPOSING VIEWS OR DISAGREEMENT.

# Risk Management

Discuss in groups

We will debrief together

- What are some impediments to implementing good Risk Management practices?

- What risks are mitigated by the waterfall development approach?

- What risks are mitigated by the Agile development approach?

# Risk Management Introduction

## Overview

- Risk Management is to identify, address and eliminate risks

- Concerned here with risks that (could) impact *schedules*

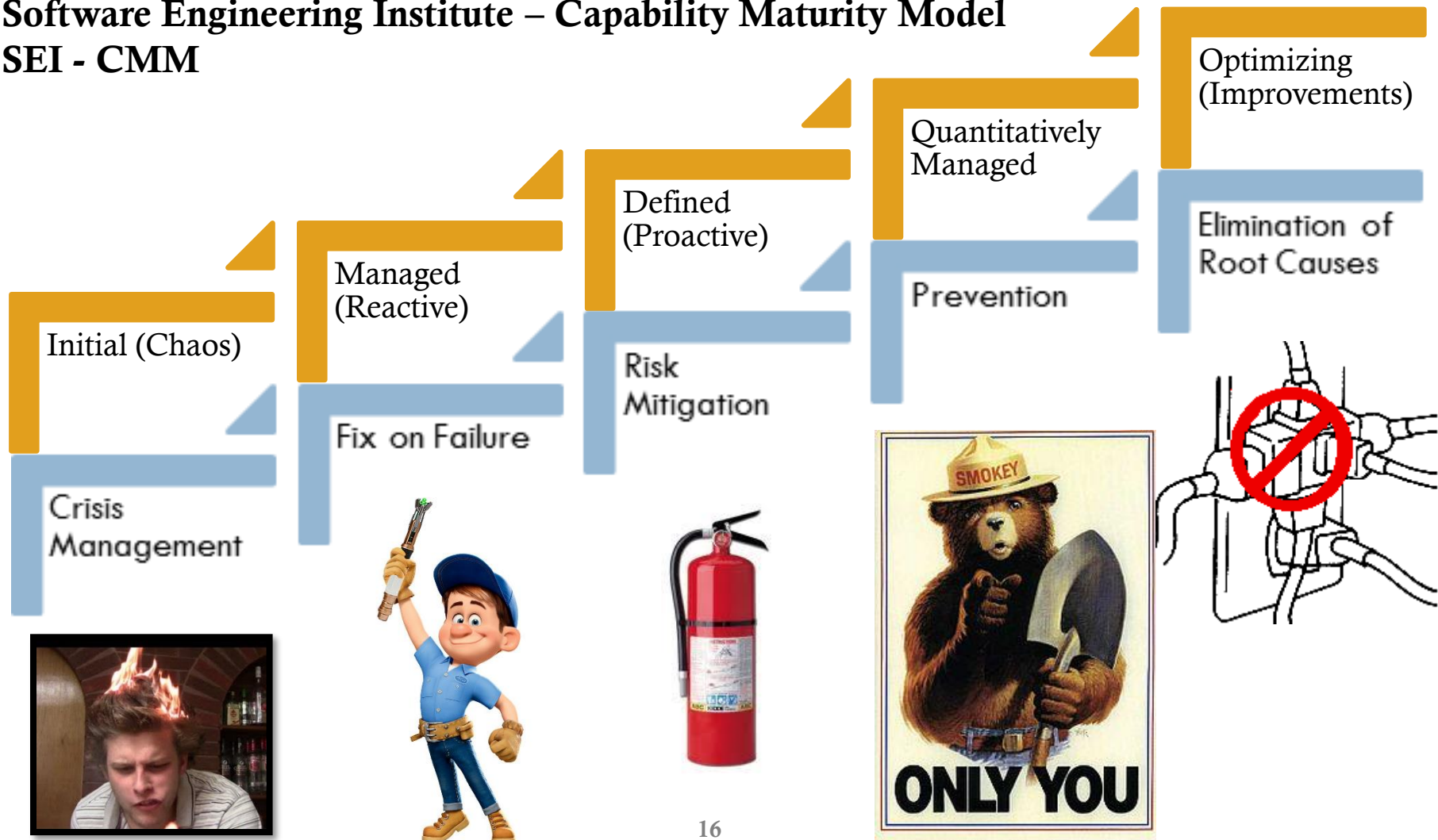- Goal is to address risks at higher levels of Risk Management – from **reactive** to **proactive**

## Responsibility

- Formal risk management is often the domain of project management

- Subject Matter Expert (SME) contributions are an important factor

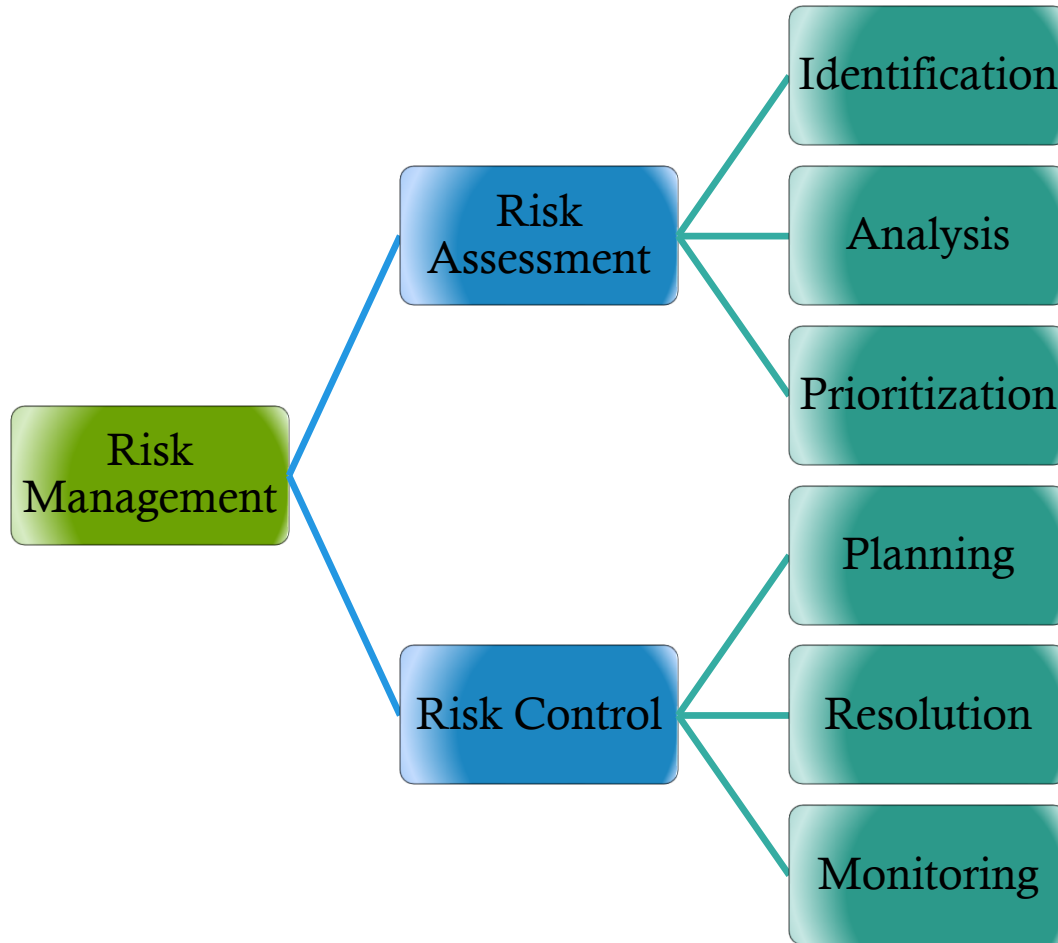- Important to understand Risk Management as part of overall project approach

Don't be the person who says, "Well, I told you so …"

# Levels of Risk Management

**Software Engineering Institute – Capability Maturity Model**
**SEI - CMM**

Initial (Chaos)

Crisis Management

Managed (Reactive)

Fix on Failure

Defined (Proactive)

Risk Mitigation

Quantitatively Managed

Prevention

Optimizing (Improvements)

Elimination of Root Causes

# Risk Management Categories

# Schedule Risk Identification

| People-Related | Process-Related | Product-Related | Technology-Related |
|---|---|---|---|
| 1. Undermined motivation | 14. Overly optimistic schedules | 28. Requirements gold-plating | 33. Silver-bullet syndrome |
| 2. Weak personnel | 15. Insufficient risk management | 29. Feature creep | 34. Overestimated savings from new tools or methods |
| 3. Uncontrolled problem employees | 16. Contractor failure | 30. Developer gold-plating | 35. Switching tools in the middle of a project |
| 4. Heroics | 17. Insufficient planning | 31. Push me, pull me negotiation | 36. Lack of automated source |
| 5. Adding people to a late project | 18. Abandonment of planning under pressure | 32. Research-oriented development | |
| 6. Noisy, crowded offices | 19. Wasted time during the fuzzy front end | | |
| 7. Friction between developers and customers | 20. Shortchanged upstream activities | | |
| 8. Unrealistic expectations | 21. Inadequate design | | |
| 9. Lack of effective project sponsorship | 22. Shortchanged quality assurance | | |
| 10. Lack of stakeholder buy-in | 23. Insufficient management controls | | |
| 11. Lack of user input | 24. Premature or too frequent convergence | | |
| 12. Politics placed over substance | 25. Omitting necessary tasks from estimates | | |
| 13. Wishful thinking | 26. Planning to catch up later | | |
| | 27. Code-like-hell programming | | |

- These are McConell's 10 most common Schedule Risks

- More schedule risks: section5.3, pgs.87 - 91

McConnell pg.86

# Risk Analysis

## Risk Analysis Techniques

- You have identified a batch of risks

- Not all risks are equal

- How do you identify which risk(s) to focus your Risk Management activities on?

## Risk Assessment Table

- Brings in a quantitative foundation

- Inputs are (mostly) subjective, but based on expert experience

- Calculation outputs exposure, not the solution

- Judgment and decision-making are required

# Risk Assessment Table

| Risk List | Probability of Loss | Size of Loss | Risk Exposure |
|---|---|---|---|
| W... | .25 | 5 | 1.25 |
| F... cu... | | | |
| O... | | | |
| Contractor failure | .3 | 12 | 3.6 |
| Inadequate design | | | 0.2 |
| Short-changed Quality Assurance | | | 6 |
| Feature creep | | | 5 |
| Developer or requirements gold-p... | | | 0.8 |
| Research-oriented development | | | |
| Silver-bullet syndrome | .1 | 5 | |

**Risk List**
- Start with the 10 most common Schedule Risks
- Then elaborate and refine into a comprehensive set of risks

**Size of Loss**
- Estimation is subjective and iterative
- Measured in time and/or money

**Probability of Loss**
- Mostly a subjective estimate
- Could be political
- Ask an SME
- Drive group convergence – Delphi/poker
- Establish a risk market

**Risk Exposure**
- Calculated
- P * S = RE

# Risk Analysis → Risk Control

- Add a buffer
  - McConnell says - add up the schedule risks and that's your buffer

- Prioritization
  - Start with the risks that generate the highest RE

- Controls
  - Top 10 list
  - interim post-mortem
  - Risk Owners & Officer

- Risk Resolution Approaches
  - Avoid
  - Transfer
  - [Buy info](#) about the risk
  - Eliminate the root cause
  - Assume/Accept the risk
  - Publicize the risk
  - Control the risk
  - Remember the risk

- PMI says:
  avoid, transfer, mitigate, accept

# Risk Tolerance

- How would you categorize BCIT's risk tolerance?

- What is your personal risk tolerance (in financial investments? when playing video games?)

- Whose opinion matters: Who do you have to consider or consult with about risk tolerance, and how you choose to approach Risk Management?

# Case Study

on D2L

23

# Case Study

Answer individually

- What are the top 3 risks that you see in the project, using McConnell's 10 most common schedule risks? How do you know?

- What RM level and RM category is this organization at?

- Which risk resolution approach (table 5.5) would you recommend for each risk?

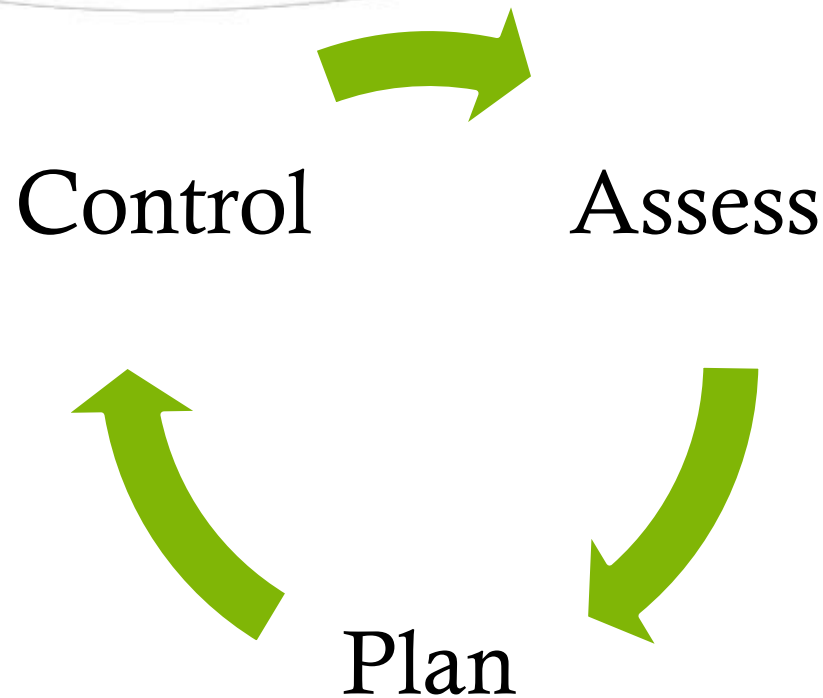- Which risk mitigation (table 5.6) is recommended?

# Risk Management Questions

Class

Debrief

- Is it possible or desirable to eliminate all risk?

- When is Risk Identification done?

- How static can you expect the Risk Exposure (RE) to be?

- Which Risk Resolution approach is the most important?

- Do you have any examples of Risk Management, good or bad from your organization or experience?

- If you are going to have a precise assessment of exactly how everything could go wrong, what do you need to have when delivering the news?

# Another Perspective - SEI

- **S**oftware **E**ngineering **I**nstitute

- For over three decades… helping government and industry organizations to acquire, develop, operate, and sustain software systems

- Federally Funded Research and Development Center (FFRDC) sponsored by the U.S. Department of Defense (DoD)

- Carnegie Mellon University, a global research university

- Mission Risk Diagnostic (MRD)

- to assess risk in interactively complex, socio-technical systems across the life cycle and supply chain

http://www.sei.cmu.edu/

# SEI Mission Risk Diagnostic

Control          Assess

Plan

Alberts, Christopher & Dorofee, Audrey. Mission Risk Diagnostic (MRD) Method Description. CMU/SEI-2012-TN-005. Software Engineering Institute, Carnegie Mellon University. 2012. http://resources.sei.cmu.edu/library/asset-view.cfm?AssetID=10075

# SEI Mission Risk Diagnostic

## Tactical Risk Analysis

- Risk is the probability that an event will lead to a negative consequence or loss

- Evaluate a system's components for potential failures

- Based on the principle of system decomposition and component analysis

## Mission Risk Analysis

- The probability of mission failure (i.e., not achieving key objectives

- Aggregates the effects of multiple conditions and events on a system's ability to achieve its mission

# Yet another perspective - PMBOK

1. **Plan Risk Management** – How to conduct risk management for a project

2. **Identify Risks** – Determining and documenting risks which may affect the project

3. **Perform Qualitative Risk Analysis** – Prioritizing risks for further analysis or action (assessing probability and impact).

4. **Perform Quantitative Risk Analysis** – Numerically analyzing the effect of identify risks on overall project objectives.

5. **Plan Risk Responses** – Developing options and action to enhance opportunities and reduce threats to project objectives.

6. **Controls Risks** – Risk response plans, tracking risks, monitoring residual risks, identifying new risks and evaluating risk process effectiveness.

# Case Study

A recent high profile project

# Overview

- HealthCare.gov is a tool to enable ~ 15% of Americans in 36 states to buy health insurance

- Health care "exchanges" opened Oct. 1st, 2013

- Coverage deadline was Dec. 15th, 2013

- Tax penalties scheduled to start Mar. 31st, 2014

Only looking at this from the aspect of the rollout of Healthcare.gov

Sources:
http://www.bbc.co.uk/news/world-us-canada-24370967
http://useconomy.about.com/od/healthcarereform/f/What-Is-Obama-Care.htm

# Schedule Impact

McKinsey report of 03/13 called out a risk of failure due to:

- "significant dependency on external parties/contractors"

- "insufficient time and scope of end-to-end testing"

Sources:
http://www.bbc.co.uk/news/world-us-canada-25011230
http://www.bbc.co.uk/news/world-us-canada-25565898

# Schedule Impact (cont.)

- **July 2013:** Businesses with over 50 workers given until 2015 to provide insurance or pay a penalty

- **Oct 1:** HealthExchanges open and are crippled by problems, causing a huge under-enrollment compared to government targets

- **Oct 23:** Deadline for individuals to avoid penalties is pushed back six weeks to March 2014

- **Nov 14:** Obama announces insurers can keep customers on existing plans for another year

- **Nov 22:** Enrolment deadline for individuals is pushed back a week in December

- **Nov 27:** Year's delay in online insurance enrolment for small businesses

- **Nov 26:** Spanish-language sign-up tool is postponed until December

# Selected Issues

- "Three years of political combat"

- Centers for Medicare and Medicaid Services (CMS) acting as integrator

- "Due to a compressed timeline, the system wasn't tested enough, especially for high volumes"

- "Consumers are giving us feedback and told us they wanted a way to compare plans without creating an account"

- January 2014 - Montreal-based CGI Federal is replaced by Accenture

http://spectrum.ieee.org/riskfactor/computing/it/the-obamacare-rollout-what-really-happened
http://obamacarefacts.com/obamacare-glitch.php
http://www.montrealgazette.com/health/Accenture+wins+Obamacare+contract+after+snafus/9380188/story.html

# Risk Identification

Which of these Risks were present in the Healthcare.gov rollout?

| Risk List | Present? |
|---|---|
| Weak personnel | |
| Friction between developers and customers | |
| Overly optimistic schedules | |
| Contractor failure | |
| Inadequate design | |
| Short-changed Quality Assurance | |
| Feature creep | |
| Developer or requirements gold-plating | |
| Research-oriented development | |
| Silver-bullet syndrome | |

# Questions

Discuss in groups

Then we will debrief together

- Which were the top 1 or 2 most critical risks in this case?

- What is the current status?

- What were the biggest impediments to implement good Risk Management practices in this case?

- Can we extrapolate anything from this project to your experience?

# Common Mistakes in Risk Management

- Risk Management performed as a mechanical process

- No involvement of team members

- Risk Owner(s) not identified

- Risks identified are not the most severe

- No stakeholder buy in on resolution strategies

- Senior Management not involved at the right time

# Summary

# Key Terminology

**Risk Management** – Processes to identify, address and eliminate risks.

**Risk** – An Uncertain event that, if it occurs, has a positive or negative impact on the project's objective such as time, cost, scope, quality, etc.
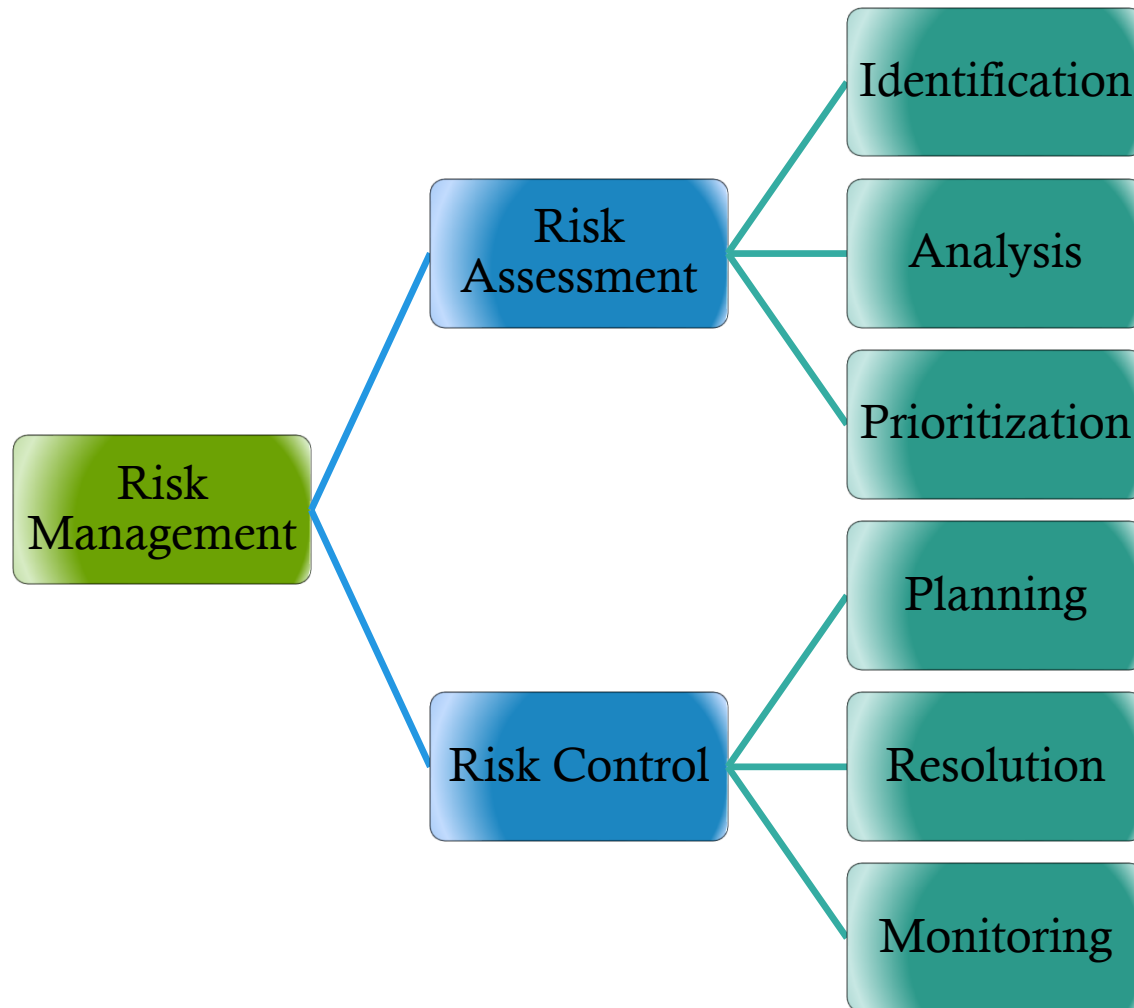
**Risk Analysis Table** – Quantitative method of identifying and assessing risks.

> **Probability of Loss (P)** – Mostly subjective estimate of the probably that a risk will will be encountered.

> **Size of Loss (S)** – The impact of a risk, typically measured in time (i.e., days) or money.

> **Risk Exposure (RE)** – Calculated, RE = P * S

# Risk Management Process

p. 84

# For Next Week (week 4)

**To Do** before next class:

- Read McConnell, chapter 6 on Core Issues in Rapid Development

# Comp8081

## end of Week 3

Donna Turner