**Process:**

* A series actions or steps taken to achieve a particular end
* In SE, a software development process is the process of dividing software development work into distinct phasesto improve design, product and project management
* Software development life cycle (SDLC) is the process of creating and maintaining software products, and models and methodologiesthat are used to develop the development and maintenance activities.

**Planning:**

* Action schema
* Schema = Precondition + action + postcondition
* Action –what you are going to do
* Precondition –conditions under which you are going to take the action (they are “sufficient” for the action)
* Postcondition–consequences of the action you take (they are “necessary” for the action)
* Plan for a process
* A sequence of action schemata each for a step of a process
* The precondition of an action is the postconditionof the previous action
* The postconditionof an action is used as the precondition of the successive action
* Elements for planning
* A set of action schemata
* A goal (as the necessary condition of the entire plan)
* The initial situation (as the sufficient condition of the entire plan)

Planning strategies: Forward chaining reasoning & backward chaining reasoning

(how to form a plan)

Tranditional Process Management

CMMI:

C: Capability of completing processes

M: Maturity

M: Models

I: Intergratio

**CMMI PHILOSOPHY**

* Key integrated process-improvement principles：
* Maintain executive suport //维持行政支持
* Pick up yourtarget carefully //拿起你的目标，仔细
* Leverage best practice (find good examples and follow) //杠杆最佳实践（找到好的例子和跟踪）
* Align process improvement with business objectives //对齐过程改进与业务目标

Reason:

Key words in process management or improvement

1. Good pracities in process management

2. Standardization

Process: 1. Goal -> Specific goal & generate goal //生成&特定

2.

**CMMI CONTENTS**

* Materials for evaluate processes //评价

• Evaluation before process improvement tells the need for improvement

• Evaluation after improvement tells the effects of the improvement

• Essential to management –guidance on managerial processes, such as planning, maintaining plans such as check progress against plans and ensure commitment from all parties to the plans

• Essential to technical development –guidance on the ways of product manufacturing, interfacing, satisfying users’ requirements, etc

• Essential to support

* Materials for improving processes //改进

• Information to help in increase organisation’s capabilities

• CMMI provides ways towards a viable and improvable infrastructure within which all parties involved understand their roles and responsibilities

• Keys words: • Standarisation, rather than case-by-case treatment • Training, empower people • Planning, resources available

**Contents in a model can be classified into three categories:**

(A CMMI model is a collection of best practices of a specific interest process area)

* Required –goal, representing a desired end state at which certain project/process control is achieved
* Expected –statement of practice, or the expected means to achieve the goals
* Informative

**Staged vs continuous**

* Staged process improvement //阶段过程改进 （成熟）

• Focusing on the “maturity” of an organisation

• Grouping process areas into sets which are corresponding to different stages or maturity levels, so that when you improved a set of process areas, your organisation become more mature at a higher level

• Pre-defined road map towards the highest maturity level

* Continuous process improvement //持续过程改进 （能力）

• Focusing on “capability” through improving individual process areas, so that an organisation becomes more capable when one or more individual area is improved, i.e. its “capability level” becomes higher

• Process areas containing generic practices that can be used to improve different areas

• The capability of an organisation can be reported in the format of ”capability level profile”

**Lecture reasons:**

The Nine Knowledge Areas of Project Management

(The Nine reasons for failure of Project Management)

Time/ Cost/ Scope/ Quality/ Risk/ Human Resources/ Communication/ Procurement/ Integration

**Risk**

What is risk? Chance of distaster or loss

* As we will see later, risk can actually be positive and negative (i.e. there could be a benefit from taking a risk)
* As we have seen in previous lectures poor planning, unrealistic time and cost estimates, poor formation of ideas, can all lead to project failure
* The items we have just mentioned are negative risks

Risk identification

* In PRINCE2 risk identification is a continuing process - it starts during the Start-up process and is continually monitored throughout the project
* Risks are recorded (at start up, and then updated) in a risk log
* The risk log is regularly updated and risks are defined as being active or closed
* PRINCE2 also advocated that a contingency budget is set up at the start of the project - any action can then be taken quickly

Risk Analysis

* Once we have identified our risks we then need to determine the likely impact (on the project) should the risk occur
* This process is known as risk analysis
* There are two main ways of performing risk analysis:
* Quantitative (numerical) analysis
* Qualitative analysis
* The two different approaches to risk analysis commonly used are:
* Quantitative risk analysis - use a mathematical formula for calculating the impact of risks (usually determined in number of days delay, or monetary cost)

(使用数学公式计算风险的影响（通常在天数延迟或货币成本中确定）。)

risk = probability x consequence

* Qualitative risk analysis //定量风险分析
* Advantages of Quantitative risk analysis
* Clear mathematical formula for calculation
* Outcomes are presented in terms understandable by senior management (time delay and extra cost)
* Firm foundation and method is well understood
* The delays and extra cost generated can be easily factored into budgets and plans

Risk response

* Risk identification and risk analysis are two important stages our our risk management strategy
* Another key stage is that of risk response - deciding what we should do in light of various risks
* Over the next few slides we will look at a number of different responses to risk:
* Risk avoidance
* Risk transfer
* Risk reduction
* Risk elimination
* Risk acceptance

**Scope Creep**

P103

Scope Creep one of the main reasons for projects to fail

* What is it?
* Possible reasons
* How to avoid Scope Creep

**WBS -** Work Breakdown Structure

P130

* The Dictionary of the WBS
* Example WBS
* Developing the WBS

**PMBOK -** Project Management Body of Knowledge

Cost estimation //成本估算

E = (B + 4M + W)/6

Where B is the best case (1/6) M is the likely case (4/6) and W is the worst case (1/6)

cost = size x effort

Here, size is often determined as the number of lines of code (in the simplest case)

Effort is the number of so-called person months required to complete the project

Most commonly seen during software development risks:

• Schedule flaws (unrealistic or unworkable)

• Requirements inflation (scope creep)

• Employee turnover

• Incomplete product specifications

• Poor productivity

Summary

• Risk is a factor that can affect all project

• By having a good risk management strategy in place we can reduce the likelihood and or impact of risks occurring

• The key stages of any risk management plan are

o risk identification

o risk analysis and prioritisation

o risk response

• Risk management is a key aspect of project management ignore risks at your peril!