Vietnam and Japan
Joint ICT HRD Program

ITSS Software Development

Chapter 11. Software Project Management

Nguyen Thi Thu Trang
trangntt-fit@mail.hut.edu.vn

Content

1. What is a project?

What is a Project?: The (business) plan to realize a sort of goal.
This is general meaning or basic definition of a project. But….?

Could the followings be projects or not?
-2010 model Electric car development.
-Accounting Business in company ABC.
-The National Library operation.
-New swimming pool construction for the University.

And, what about "Course Registration System Development for the University"

→**Project versus Day-to-day business/operation**

1. What is a project? (2)

The Characteristics of the "Project"
To provide a unique product or service.
that is to say, to define the scope of the project by itself.
that means, nobody has exactly the same experiences as the project.
To have the specified term,
that is to say, to have a definite beginning/end.
that means, the project must have appointed date of delivery.

Need for Project Management
→The project has to be controlled and managed properly and fully.
However, …

Content

1. What is a project?
2. What is project management?
3. How to manage a project
4. Scope Management in SW Dev.
5. Time Management in SW Dev.
6. Cost Management in SW Dev.

5

2. What is project management?

What is a Project Management?
: The management activities to realize project goal.

The project management is carried out,
in order to accomplish the project requirements.
using knowledge, skill, tools, methodologies.
under the responsibility of Project Manager.

2. What is project management? (2)

What points of the project should be managed by the project manager?

-Scope of the project: What scope has the project?
-Schedule and delivery date: When do we need to complete and deliver them?
-Cost: How many man-hours or cost are required?
-Quality: What kind of qualities and what level of quality are required to realized?

Content

8

3. How to manage a project?

Project Management have to be done logically and systematically.
It is also necessary to consider the past experiences as the best practice.

There are many and various project experiences in the world.
Based on the field experiences and researches, PMI* develops the "**P**roject **M**anagement **B**ody **O**f **K**nowledge(PMBOK)", which is best practice knowledge for project management.

The projects dealt with under PMBOK covers wide range. PMBOK is effective for the Software Development Project.

*: PMI: Project Management Institute

3.1. Project Lifecycle

Project Lifecycle: From the beginning to the end of the project.
Project is divided into phases/processes and planed/managed based on the phases/processes considering the related stakeholders.

In case of Application Software Development,
Project Lifecycle may corresponds approximately to **Software Development processes**, however, usually includes **Software Installation Process/ Software Acceptance Process.**

Version up or function improvement project of the software is another project.

→It is said that the scope and the end date of the project are decided when the project is initiated.

3.2. Project and Organization

A project is established in one or more than one parents organizations such as companies, universities, governmental organizations.

The project is infected if the parents organizations have the followings;

-"Project Management System"

: Collection of tools, methods, methodologies, resources, procedures for project management.

-"Project Management Office"

: Organization for intensively controlled each project.

3.2. Project and Organization (2)

Organization style of the project make differences.

-There are two typical organization style for the project.

1."Functional Organization": A conventional and hierarchical organization. Staff are grouped as functional expertise and are managed by head of the group.

→The project constructs in a cross-sectional manner. The project manager control staff through head of the group.

2. "Projectized Organization": The project manager has full authority of project management including the direction to the project staff members.

→ Usually, the project simply constructs one group. And some groups assists each project.

Organizations intermediate between Functional and Projectized are possible.→ What about the organizations for software development?

3.3. Project Management Knowledge Areas

-PMBOK provides the knowledge system beyond the application field.
The knowledge system has 9 knowledge areas, in which the management items, processes, how to deal with, input/output, tools/techniques are explained, are listed the following.

1. Project Integration Management: To integrate/control various management processes/activities for Integrated Project (explained later).
2. Scope Management: To define and control the scope, which means the works should be achieved in the project.
3. Time Management: To define and control the schedule, with a goal of timely completion of the project
4. Cost Management: To define and control the cost, with a goal of completion of the project within approved budget.

3.4. Project Management Knowledge Areas (2)

5. Quality Management: To define and control the quality, which the results of the project are required to satisfy.
6. Human Resource Management: To manage human resource of the project to participate in the project with a strong desire to work, and to promote the project effectively.
7. Communication Management: To generate, distribute and control the project information to realize timely, appropriate, certain communications in the project members and stakeholders
8. Risk Management: To identify, analyze and control the risk items of the project.
9. Procurement Management: To manage the procurement process to acquire products, services and results from outside of project team.

3.5. Project Manager

The Project manager is a person in charge of project management.
The project manager is assigned by the performing organization.

As showed in knowledge areas, the project management has various aspects such as Scope, Time, Cost, Quality, Human recourse, Communication, Risk, Procurement.

And one of the most important points of the project management is to be balanced with various aspects and to be achieved Integrated management. Project Integration Management means to achieve integrating the various aspects management in the project. The aspects have dependencies with each other.

Project Manager should be managed the project with balance and integration.

Content

16

4. Scope Management in Software Development

-Development scope of the software should be defined in **Software Requirements Analysis Process**. In this process, the agreement among stakeholders should be done.

-**Work Breakdown Structure** is an effective management tool for analyzing the deliverables produced by the project, and for estimating quantity of work for creating the deliverables.
→See next slide "Work Breakdown Structure"

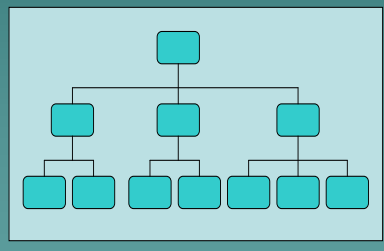
-Scope change control should be done in the project recognizing the causes of changing scope and managing them. In the case of change request from the stakeholders, analysis and management base on Work Breakdown Structure is effective.

4. Scope Management in Software Development (2)

In the Work Breakdown Structure,
To describe major deliverables based on project plan.
To divide the deliverables into manageable small deliverables, which are named "**Work Package**".
"Work Package":
It is possible to determine one individual person or team in charge of each work package and also to estimate the quantity of work to create each work package.
→That means "manageable small".

WBS – Chart Form and Tabular Form

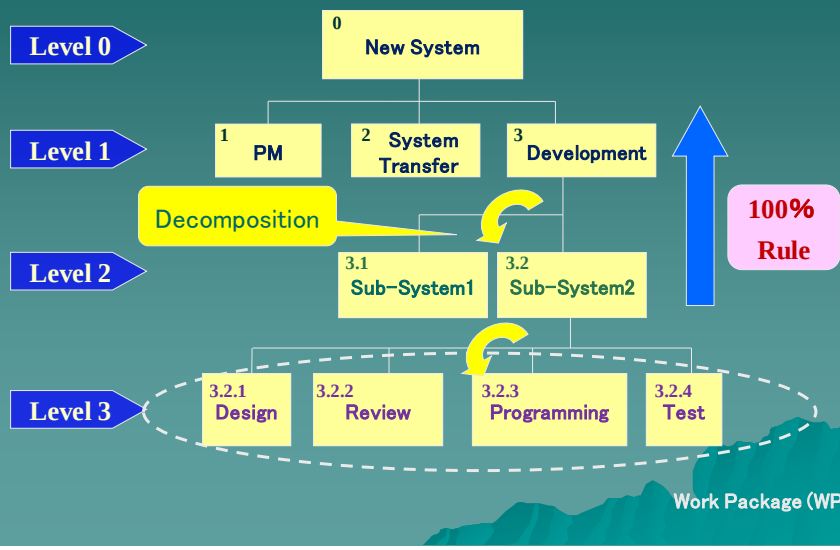
<Chart Form WBS>



<Tabular Form WBS>

1 Project Management		
	1.1 Planning	
		1.1.1 Scope Statement
		1.1.2 Activity List
		1.1.3 Resource Plan
		1.1.4 Time Estimate
		1.1.5 Cost Estimate
		1.1.6 Risk Analysis
		1.1.7 Schedule
		1.1.8 Project Management Plan
	1.2 Executing	
2 Design		

Create WBS(2)



Content

1. What is a project?
2. What is project management?
3. How to manage a project
4. Scope Management in SW Dev.
5. Time Management in SW Dev.
6. Cost Management in SW Dev.

21

5. Time Management in Software Development

-To define "**Schedule Activities**" dividing each "**Work Package**" into.
"Schedule Activity": means an individual scheduled component.

-To sequence schedule activities considering dependencies*among them.
*: **Finish-to-start(FS)** dependency: For example, Coding activity can start after the finish of Detailed Design activity.

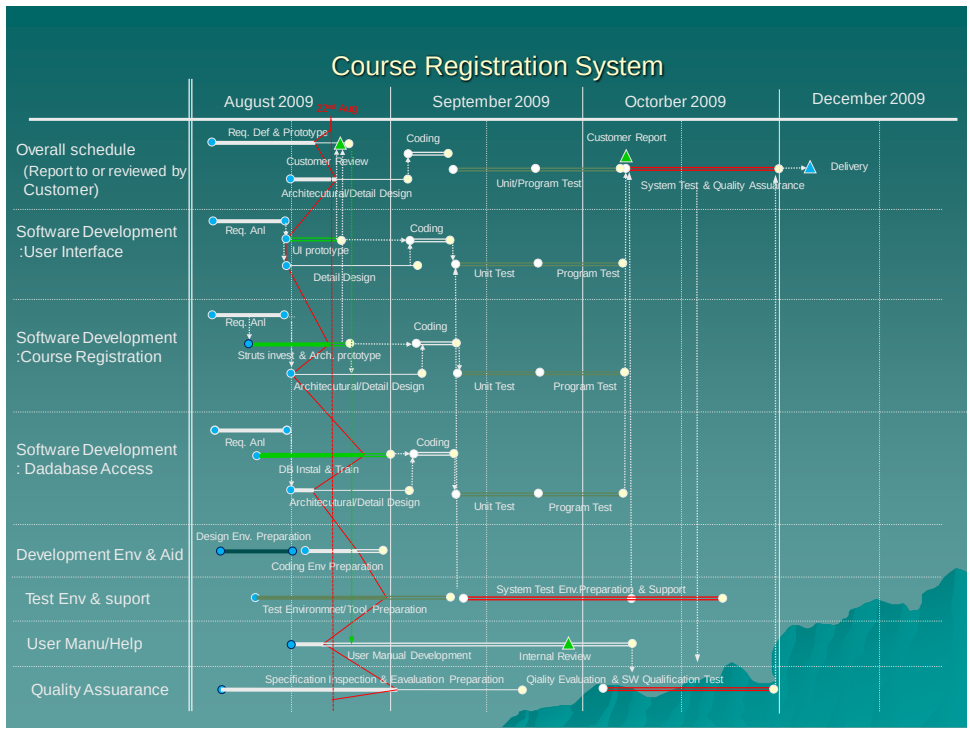
-To estimate the duration of each activity and to develop schedule considering milestones, dependencies described in previous phase, and resource requirements.
→**Gantt Chart** is an effective management tool for time schedule.

-If needed, to adjust and compress the schedule considering deliverable date and other conditions considering **critical path** and **fast tracking**.

-Schedule control should be done identifying the difference between planned and real work and the reasons of them.
→**Gantt Chart** is also an effective management tool here!

5. Time Management in Software Development (2)

- Gantt chart
  - It provides easily understandable diagrams in which the schedule of each work section is indicated with a horizontal line (bar).
  - In the chart, scheduled start and finish timing of each work section and present status the work are shown clearly.
  - Priorities of work sections are not shown.
  - Degrees in which delay in each work section affects other works are not shown.



Content

1. What is a project?
2. What is project management?
3. How to manage a project
4. Scope Management in SW Dev.
5. Time Management in SW Dev.
6. Cost Management in SW Dev.

25

6. Cost Management in Software Development

-To estimate cost for Software Development using the following techniques.

-Analogous Estimating: To estimate based on the results of past experienced similar projects by experts.

-Parametric Estimating: To estimate using the relationships between past cost data and Parameters such as developed code lines number of the software.

-Bottom-up Estimating: To estimate summating the costs of each activity.

The techniques mentioned above are used in combination.

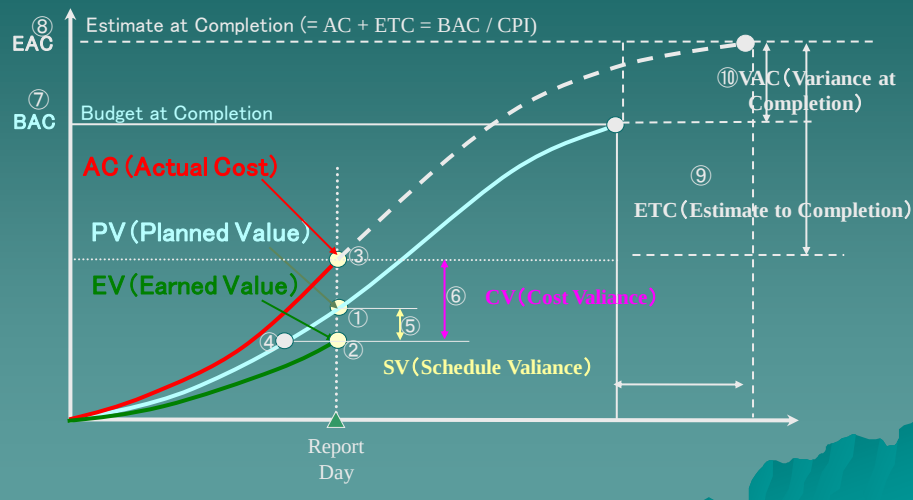
-To budget summated each activity cost and set up cost baseline considering risk/backup and environment for software development.

-To control cost Software Development using techniques such as Earned Value Management(EVM). In EVM, project performance is measured by comparing the planned value (planned cost), earned value (created value) and, Actual cost.

EVM (Earned Value Management)

- The Earned Value Management is a valuable tool in the management of all projects, software projects in particular.
- It has a focus on its percent complete position against its (100 percent) defined scope.
- It requires a master project schedule (detailed, bottoms-up performance plan, also called a Project Master Schedule (PMS)), measurement taken against one's own plan, periodic forecast of the final expected results, based on actual performance results.

5.1.6 Using Earned Value (1)



Using Earned Value (2)

①PV	Planned Value	
②EV	Earned Value	
③AC	Actual Cost	
⑤SV	Schedule Variance	EV−PV
SPI	Schedule Performance Index	EV/PV
⑥CV	Cost Variance	EV−AC
CPI	Cost Performance Index	EV/AC
⑦BAC	Budget at Completion	
⑧EAC	Estimate at Completion	
⑨ETC	Estimate to Complete	EAC−AC
⑩VAC	Variance at Completion	BAC−EAC

PV, EV, AC, SV, CV

- **Planned value (PV):** the physical work scheduled, and the authorized budget to accomplish the scheduled work
- **Earned value (EV):** the physical work performed, and the authorized budget for the work
- **Actual cost (AC):** total costs incurred in accomplishing work during a given time period
- **Schedule variance (SV):** difference between the planned cost and earned value
- **Cost variance (CV):** difference between the actual cost and earned value

Example

- In a certain 4-week project, total budget is 2,000$.
- At the end of the 3rd week, 2/3 of the scheduled work has been completed.
  - Planned value is 1,500$.
  - Earned value is 1,000$.
  - Actual cost (from cost ledger) is 1,200$.
  - Schedule variance is 1,500 – 1,000 = 500$
  - Cost variance is 1,200 – 1,000 = 200$
- If this project continues at present cost efficiency rate of 1,000/1,200 = approx. 83%, estimated cost at completion is 1,500/0.83 = approx. 1,800$.

Question?

33