INSE 6230

Total Quality Project Management

Plan of the lecture

▶ Brief course information

▶ Strategic planning and project selection

▶ Project integration management

▶ Project scope management

Case study

- This is an <u>individual</u> work. Each student prepares a different case study.
- There will be <u>**ONLY ONE**</u> case study per student! – ***change!!!***
- Select one of the <u>case study topics </u>(integration, scope, time, cost, risk, quality, procurement and human resource) and indicate it on the provided paper. The deadline for indicating your preference is January 15 – **TODAY!**
- You will need to find <u>a real project management case study </u>which is related to the assigned topic. Read and think about your case study.
- The contents of the case study should be presented in the class. <u>The presentation</u> should take max 5 minutes.
- It is required to attend the case study presentations of your colleagues. You will be required to <u>participate in the Q&A period</u>.
- <u>**For the details refer to the document called Case study.**</u>

Final project

- This is a <u>team</u> work. You need to create teams of 4-5 students.
- <u>The project proposal</u> is due on January 22nd and should include the finalized names and IDs of all the team members, the tentative title of the project and a brief description.
- Each team will submit <u>three progress reports</u> briefly proposing how they will address the issues discussed during the lectures in their projects.
- The exact requirements for each report can be found in the document called Progress Reports on the course website.
- **<u>For the exact requirements for each report refer to the document called Progress Reports</u>**
- <u>The presentation</u> of your project will take place either on April 9th or April 16th *(change!!!).* All the members have to participate. All the presentation slides have to be submitted by April 5th
- The <u>project final report</u> should be submitted on April 9th.
- **<u>For the exact requirements for the final report refer to the document called Final Project Report</u>**

Final project E-mail change!!!

▸ Final project e-mail indicated in the course utline and related documents was:

inse6230.winter2018@gmail.com

▸ New e-mail for the final projects is:

inse6230.projects@gmail.com

Course contact information

Course website: **http://users.encs.concordia.ca/~andrea/inse6230.htm**

Course material, MS Project

- **Amir-Ali Ommi –** *tutor, marker, assignments, quizzes, help with MS Project*
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Final project

- **Nuha Zamzami –** *course assistant for the final project*
  - Office: EV10.139
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Course instructor

- **Andrea Schiffauerova, *Ph.D.* –** *course material, case study*
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  - Contact: andrea@ciise.concordia.ca
  - Office hours: *Tuesdays from 14:00 to 15:00 in EV7.628* or by appointment
    !

Lecture	Date	Topic of the lecture	Due
1	January 8	Course Outline Introduction to Project Management	
2	January 15	Project Integration Management Project Scope Management	Case study topic
3	January 22	Project Time Management I.	Project proposal
4	January 29	Project Time Management II.	Progress report I. (Integration & Scope)
5	February 5	Project Cost Management	-
6	February 12	Introduction to MS Project	
-	*February 19*	*Midterm winter break*	-
7	February 26	Project Quality Management	Progress report II. (Time & Cost)
8	March 5	*Quiz 1*	-
9	March 12	Project Risk Management	-
10	March 19	Project Procurement Management Project Human Resource Management	Progress report III. (Quality & Risk)
11	March 26	*Quiz 2*	-
-	*April 2*	*University closed*	-
-	*April 5*		Project presentations
12	April 9	*Project presentations I.*	Final project reports
13	April 16	*Project presentations I.*	-

Strategic Planning and Project Selection

- **Strategic planning** involves determining long-term objectives, predicting future trends, and projecting the need for new products and services

- As part of strategic planning, organizations:
  ◦ Identify potential projects
  ◦ Use realistic methods to select which projects to work on
 ◦ Formalize project initiation by issuing a project charter

SWOT Analysis

- Analyzing **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats

- It is based on the combination of internal analysis and external research.

- It is the extent to which a firm's current strategy, strengths and weaknesses are relevant to the business environment that the company is operating in.

- **Strengths and weaknesses** are internal aspects (attributes of the *firm*), they cover *marketing, financial, manufacturing and organisational* areas.

- **Opportunities and threats** are external aspects (attributes of the *environment*), they look at the main environmental issues such as the *economic* situation, *social* changes such as the population getting older and *technological* developments including the Internet

SWOT Analysis to Help Identify Potential Projects - *Example*
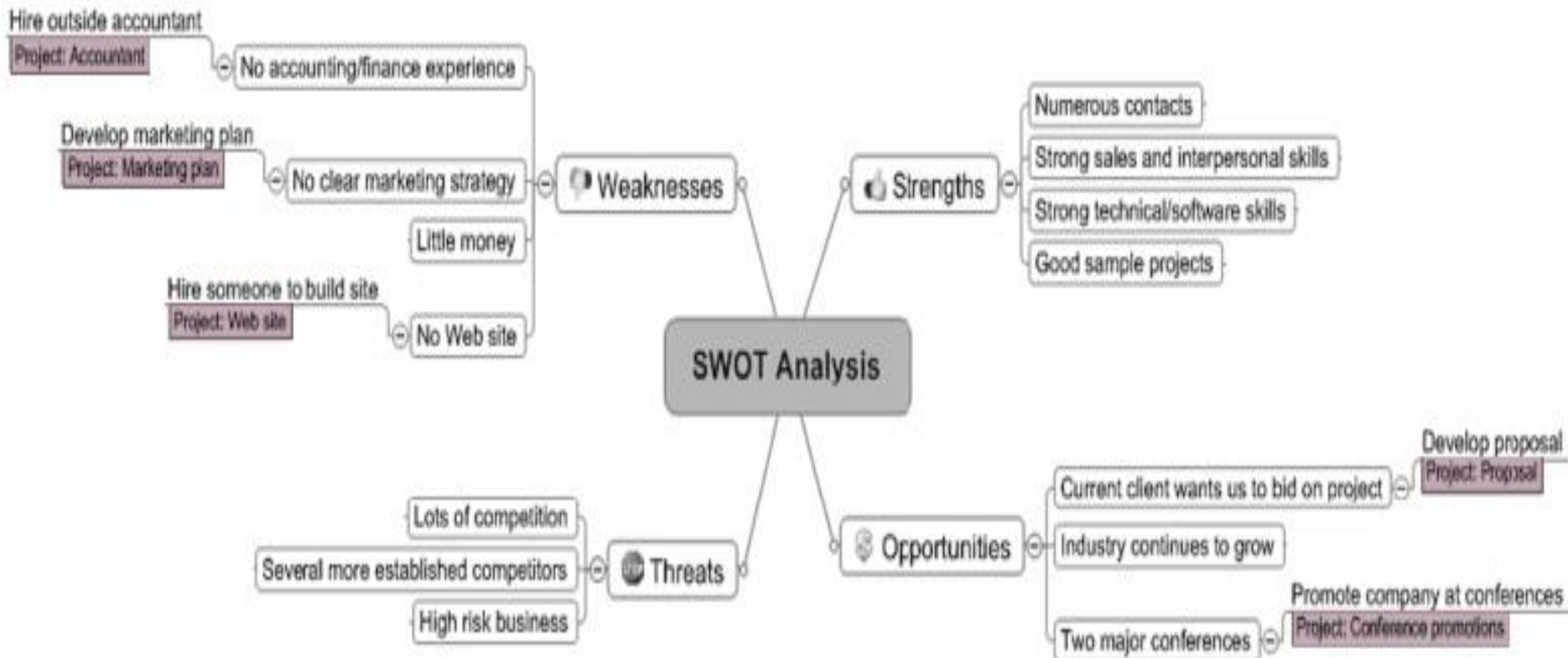
Project Selection

- The selected projects should be aligned with business strategy
- Approaches to selecting projects include:
  - Focusing on broad **organizational needs**
    - Such projects will more likely be successful
  - Implementing a **balanced scorecard**
    - Based on the tracking of defined metrics
    - Helps select projects which align with business strategy
  - Using a **weighted scoring model**
    - Selection based on many criteria
  - Performing **financial analyses**
    - Net Present Value, Return On Investment, Payback Period

Implementing a Balanced Scorecard

▶ A **balanced scorecard**:
  ◦ Is a methodology that converts an organization's value drivers, such as customer service, innovation, operational efficiency, and financial performance, to <u>a series of defined metrics</u>
  ◦ Helps select projects that align with business strategy

▶ See www.balancedscorecard.org for more information

Weighted Scoring Model

▸ A **weighted scoring model** is a tool that provides a systematic process for selecting projects based on many criteria

▸ Calculation:

- **Identify criteria** important to the project selection process
- **Assign weights** (percentages) to each criterion so they add up to 100%
- **Assign scores** to each criterion for each project (on a scale 0 to 100)
- **Multiply** the scores by the weights and get the total weighted scores

▸ The higher the weighted score the better

Weighted Scoring Model - *Example*

•Weighted score for Project 1:

  25%*90
+ 15%*70
+ 15%*50
+ 10%*25
+ 5%*20
+ 20%*50
+ 10%*20 = **56**

•**Perform what-if analysis**

	A	B	C	D	E	F
1	Criteria	Weight	Project 1	Project 2	Project 3	Project 4
2	Supports key business objectives	25%	90	90	50	20
3	Has strong internal sponsor	15%	70	90	50	20
4	Has strong customer support	15%	50	90	50	20
5	Uses realistic level of technology	10%	25	90	50	70
6	Can be implemented in one year or less	5%	20	20	50	90
7	Provides positive NPV	20%	50	70	50	50
8	Has low risk in meeting scope, time, and cost goals	10%	20	50	50	90
9	**Weighted Project Scores**	100%	56	78.5	50	41.5

Weighted Score by Project

Net Present Value Analysis

- **Time value of money:** Money has a time value because of the opportunity to earn interest or the cost of paying interest on borrowed capital.

- **Net Present Value** (NPV) analysis is a method of calculating the expected net monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present point in time

- Projects with a positive NPV should be considered if financial value is a key criterion

- The higher the NPV, the better
  - If all other factors are equal (e.g. the same life span) then the projects with higher NPV are preferred
  - However, usually the NPV analysis is not used to select projects, it is used to decide whether to invest in a project or not
    - ROI is better suited for the project selection

Net Present Value Analysis

- Calculation:
  - Determine estimated costs and benefits - **cash flow** - for the life of the project and the products it produces
  - Determine the **discount rate** (opportunity cost of capital)
  - Calculate the NPV:

$$NPV = \sum_{t=0}^{n} \frac{A_t}{(1+r)^t}$$

t…the year of the cash flow
n…last year of the cash flow
A_t...*cash flow in year t*
  A_t = *(benefits-costs) in year t*
r….discount rate

Discount factor
- multiplier for each year cash flow based on the discount rate and year

$$\frac{1}{(1+r)^t}$$

Example: r=8%

$Year\,0: \dfrac{1}{(1+0.08)^0} = 1$ **NOW**

$Year\,1: \dfrac{1}{(1+0.08)^1} = 0.93$

$Year\,2: \dfrac{1}{(1+0.08)^2} = 0.86$

$Year\,3: \dfrac{1}{(1+0.08)^3} = 0.79$

Net Present Value – *Example 1*

▸ A preliminary estimate of entire project is $140,000. For the period of 3 years after the completion, maintenance costs are expected to be $40,000 per year and total projected benefits are about $200,000 per year. Consider discount rate of 8%.

➢ NPV?

	Year 0	Year 1	Year 2	Year 3
Benefits (Revenues)	0	200,000	200,000	200,000
Costs (Expenses)	140,000	40,000	40,000	40,000
Cash flow	-140,000	160,000	160,000	160,000

$$\text{NPV} = \sum_{t=0}^{n} \frac{A_t}{(1+r)^t}$$

A_t = cash flow (benefits-costs) in year t

$$\text{NPV} = -140000 + \frac{160000}{1.08} + \frac{160000}{1.08^2} + \frac{160000}{1.08^3} = 272800$$

The project should be considered, because NPV is positive.

Net Present Value – *Example 1cont.*

‣ Calculations in Excel

Discount rate	8%				
Assume the project is completed in Year 0			Year		
	0	**1**	**2**	**3**	**Total**
Costs	140,000	40,000	40,000	40,000	
Discount factor	1	0.93	0.86	0.79	
Discounted costs	**140,000**	**37,200**	**34,400**	**31,600**	**243,200**
Benefits	0	200,000	200,000	200,000	
Discount factor	1	0.93	0.86	0.79	
Discounted benefits	0	**186,000**	**172,000**	**158,000**	**516,000**
Discounted(benefits - costs)	(140,000)	148,800	137,600	126,400	272,800 ◄—NPV

NPV = Discounted benefits – discounted costs

Net Present Value – *Example 2*

▸ Two projects below have the same total cash flow ($5,000).
➤ Which one is better?

	A	B	C	D	E	F	G
1	Discount rate	10%					
2							
3	**PROJECT 1**	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	**TOTAL**
4	Benefits	$0	$2,000	$3,000	$4,000	$5,000	$14,000
5	Costs	$5,000	$1,000	$1,000	$1,000	$1,000	$9,000
6	Cash flow	($5,000)	$1,000	$2,000	$3,000	$4,000	**$5,000**
7	NPV ────────	$2,316					
8		Formula =npv(b1,b6:f6)					
9							
10	**PROJECT 2**	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	**TOTAL**
11	Benefits	$1,000	$2,000	$4,000	$4,000	$4,000	$15,000
12	Costs	$2,000	$2,000	$2,000	$2,000	$2,000	$10,000
13	Cash flow	($1,000)	$0	$2,000	$2,000	$2,000	**$5,000**
14	NPV ────────	$3,201					
15		Formula =npv(b1,b13:f13)					
16							
17							

The same total cash flow

Return on Investment

▸ **Return on investment** (ROI) is calculated by subtracting the project costs from the benefits and then dividing by the costs

$$ROI = \frac{Total.Dicounted.Benefits - Total.Discounted.Costs}{Total.Discounted.Costs}$$

▸ ROI is a percentage
▸ ROI is sometimes used without discounting (simple ROI)
▸ The higher the ROI, the better
  ▸ Used for the project selection
▸ Many organizations have a required rate of return, *i.e.* minimum acceptable rate of return on investment for projects

Return on Investment – *Example 1*

➤ ROI?

	Year 0	Year 1	Year 2	Year 3
Revenues		200,000	200,000	200,000
Expenses	140,000	40,000	40,000	40,000

$$ROI = \frac{Total.Dicounted.Benefits - Total.Discounted.Costs}{Total.Discounted.Costs}$$

$$Disc_{benefits} = 0 + \frac{200000}{1.08} + \frac{200000}{1.08^2} + \frac{200000}{1.08^3} = 516000$$

$$Disc_{costs} = 140000 + \frac{40000}{1.08} + \frac{40000}{1.08^2} + \frac{40000}{1.08^3} = 243200$$

$$ROI = \frac{516000 - 243200}{243200} = \frac{272800}{243200} = 1.1217 = 112\%$$

Payback Analysis

- The **payback period** is the amount of time it will take to recoup, in the form of cash inflows, the total dollars invested in a project
- Payback occurs when the net cumulative discounted benefits equal the costs
- Many organizations want IT projects to have a fairly short payback period
- Payback period can be the main decision criterion for the project selection
- Calculation:
  - Calculate for each year the cumulative value of discounted cash flows (discounted benefits minus discounted costs)
  - The first year when the value becomes positive indicates the payback period

Payback Analysis – *Example 1 cont.*

► Payback period?

	Year 0	Year 1	Year 2	Year 3
Revenues		200,000	200,000	200,000
Expenses	140,000	40,000	40,000	40,000
Cash Flow	-140,000	160,000	160,000	160,000

Discounted Cash Flow:

$$Year\ 0\ : -\frac{140000}{1} = -140000$$

$$Year\ 1\ : \frac{160000}{1.08} = 148800$$

$$Year\ 2\ : \frac{160000}{1.08^2} = 137600$$

$$Year\ 3\ : \frac{160000}{1.08^3} = 126400$$

Cumulative Discounted Cash Flow:

$$Year\ 0\ : -140000$$

$$Year\ 1\ : -140000 + 148800 = 8800$$

Payback in year 1

$$Year\ 2\ : 8800 + 137600 = 146400$$

$$Year\ 3\ : 146400 + 126400 = 272800$$

Payback Analysis– *Example 1 cont.*

	0	1	2	3	Total	
Discount rate	8%					
Assume the project is completed in Year 0			Year			
	0	**1**	**2**	**3**	**Total**	
Costs	140,000	40,000	40,000	40,000		
Discount factor	1	0.93	0.86	0.79		
Discounted costs	**140,000**	**37,200**	**34,400**	**31,600**	**243,200**	
Benefits	0	200,000	200,000	200,000		
Discount factor	1	0.93	0.86	0.79		
Discounted benefits	**0**	**186,000**	**172,000**	**158,000**	**516,000**	
Discounted(benefits - costs	(140,000)	148,800	137,600	126,400	**272,800**	◄—NPV
Cumulative(benefits - costs	(140,000)	8,800	146,400	272,800		
ROI ——————►	**112%**					
	Payback In Year 1					

Payback Period – *Example 1 cont.*
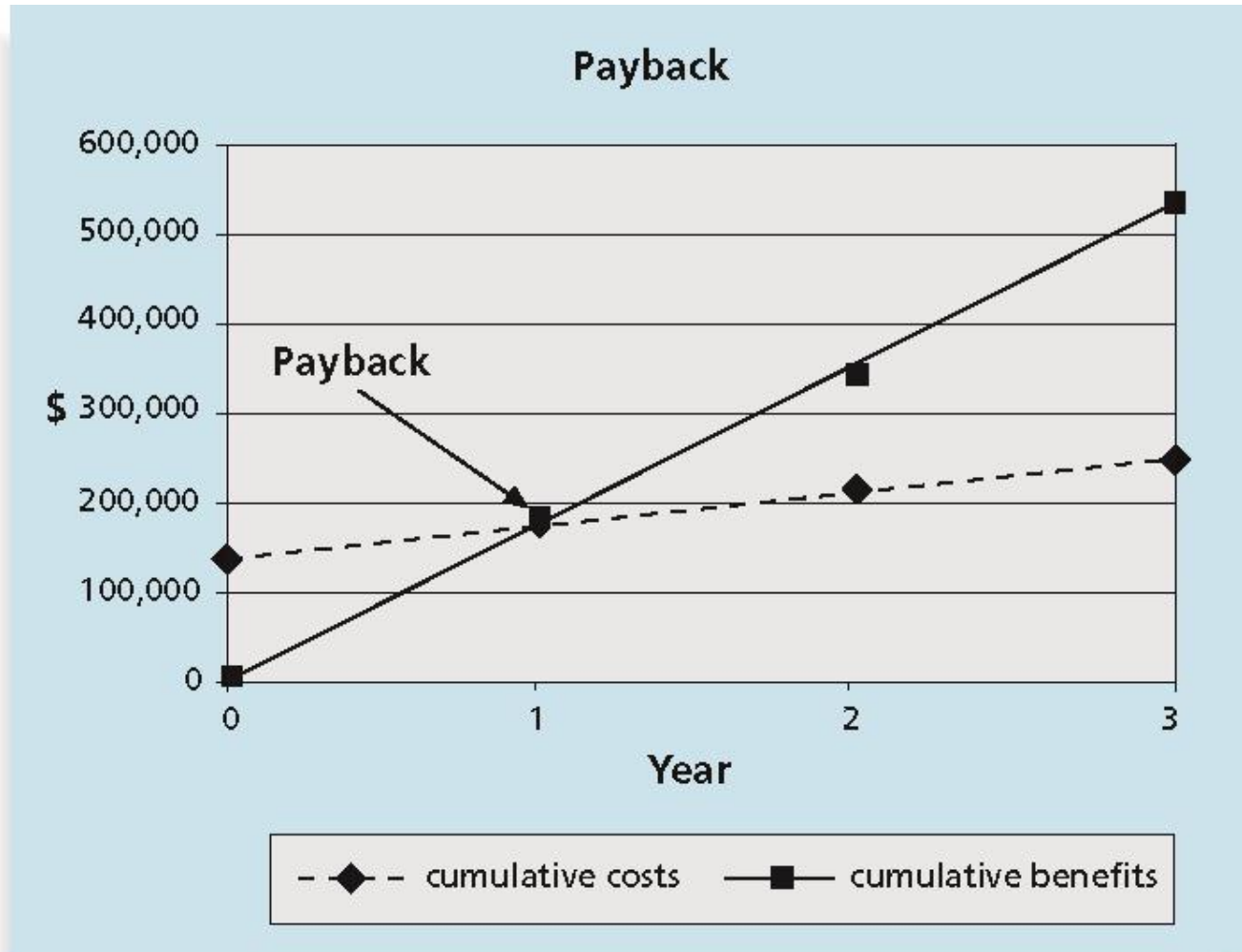
Example 3

▸ A firm considers investing in a project. In Year 0 it needs to make an investment indicated below. Based on the information for 3 years regarding expected revenues and expenses decide whether the firm should make the investment. Consider the discount rate of 8 %. What is the project's NPV and ROI?

Up-front investment 50,000			
	Year 1	Year 2	Year 3
Revenues	50,000	60,000	70,000
Expenses	25,000	25,000	25,000
Cash flow	25,000	35,000	45,000

$$NPV(A) = -50000 + \frac{25000}{1.08} + \frac{35000}{1.08^2} + \frac{45000}{1.08^3} = 387746$$

$$Disc_{costs(A)} = 50000 + \frac{25000}{1.08} + \frac{25000}{1.08^2} + \frac{25000}{1.08^3} = 114427$$

$$ROI(A) = \frac{387746}{114427} = 0.3397$$

Project Integration Management

Project Integration Management

- **Project Integration Management** involves <u>coordinating</u> all of the other project management knowledge areas throughout a project's life cycle

- Project Integration Management **processes**:
    1. Develop the project charter
    2. Develop the project management plan
    3. Direct and manage project execution
    4. Monitor and control the project work
    5. Perform integrated change control
    6. Close the project or phase

The Role of Project Integration Management
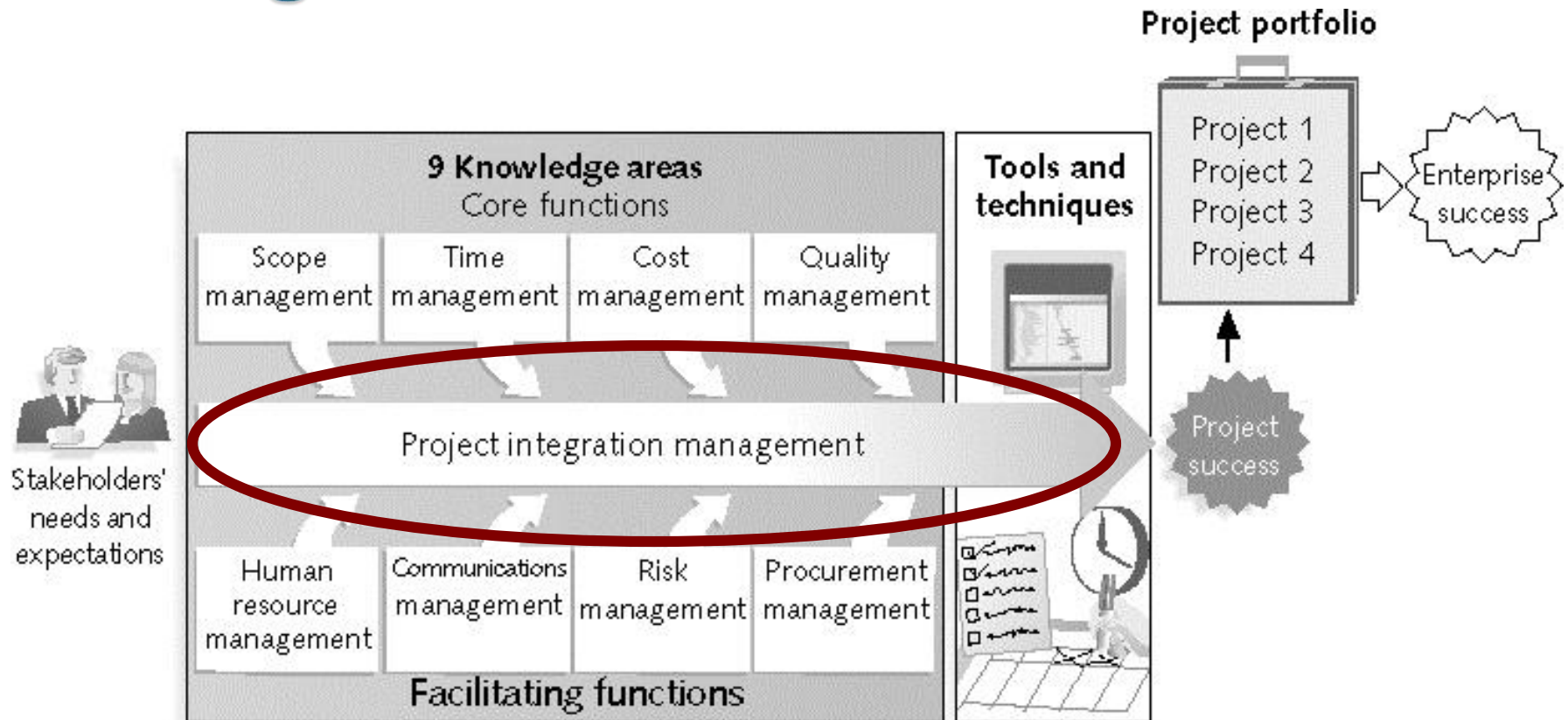
Project Integration Management Summary

Initiating
Process: **Develop project charter**
Output: Project charter

Planning
Process: **Develop project management plan**
Output: Project management plan

Executing
Process: **Direct and manage project execution**
Outputs: Deliverables, work performance information, change requests, project management plan updates, project document updates

Monitoring and Controlling
Process: **Monitor and control project work**
Outputs: Change requests, project management plan updates, project document updates
Process: **Perform integrated change control**
Outputs: Change request status updates, project management plan updates, project document updates

Closing
Process: **Close project or phase**
Outputs: Final product, service, or result transition; organizational process assets updates

Project Start ——————————————————— **Project Finish**

1. Project Charter

▸ See last lecture

2. Project Management Plan

- A **project management plan** is a document used to <u>coordinate and integrate</u> all project planning documents and help guide a project's execution and control
  - Plans created in the other knowledge areas are subsidiary parts of the overall project management plan
  - Should be flexible and tailored to the needs of the firm
- Common elements:
  - Introduction or overview of the project
  - Description of how the project is organized
  - Management and technical processes used on the project
  - Work to be done, schedule, and budget information

3. Project Execution

▸ Project execution involves <u>managing and performing the work</u> described in the project management plan

▸ The majority of time and money is usually spent on execution

▸ Coordinating planning and execution

  ◦ Project planning and execution are intertwined and inseparable activities

4. Monitoring and Controlling Project

▸ Monitoring project work includes collecting, measuring, and disseminating <u>performance</u> information

▸ A **baseline** is the approved project management plan plus approved changes

▸ **Changes are inevitable** on most projects, so it's important to develop and follow a process to monitor and control changes

　◦ In large projects, 90% of project manager time is spent on communicating and managing changes

5. Integrated Change Control

- **Integrated change control** involves identifying, evaluating and managing changes throughout the project life cycle.

- Three main objectives are:
  - Influencing the factors that create changes to ensure that changes are beneficial
  - Determining that a change has occurred
  - Managing actual changes as they occur

- **Change control system** is a formal, documented process that describes when and how official project documents and work may be changed
  - Describes who is authorized to make changes and how to make them

6. Closing Projects and Phases

▸ To close a project or phase, you must finalize all activities and <u>transfer the completed or cancelled work to the appropriate people</u>

▸ Main outputs include:
  ◦ Final product, service, or result
  ◦ Organizational process asset updates

Project Scope Management

What is Project Scope Management?

▸ **Scope** refers to _all_ the work involved in creating the *products* of the project and the *processes* used to create them

▸ A **deliverable** is a product produced as part of a project
- ◦ Product related (hardware, software, etc.)
- ◦ Process related (planning documents, meeting minutes, etc.)

▸ **Project scope management** includes the processes involved in defining and controlling what is or is not included in a project

Project Scope Management Processes

1. **Collecting requirements**: defining and documenting the <u>features and functions of the products</u> produced during the project as well as the processes used for creating them

2. **Defining scope**: reviewing the project charter, requirements documents, and organizational process assets to create <u>a scope statement</u>

3. **Creating the WBS**: <u>subdividing the major project deliverables</u> into smaller, more manageable components

4. **Verifying scope**: formalizing <u>acceptance</u> of the project deliverables

5. **Controlling scope**: <u>controlling changes</u> to project scope throughout the life of the project

Project Scope Management Summary

Planning
Process: **Collect requirements**
Outputs: Requirements documentation, requirements management plan, requirements traceability matrix
Process: **Define scope**
Outputs: Project scope statement, project document updates
Process: **Create WBS**
Outputs: WBS, WBS dictionary, scope baseline, project document update

Monitoring and Controlling
Process: **Verify scope**
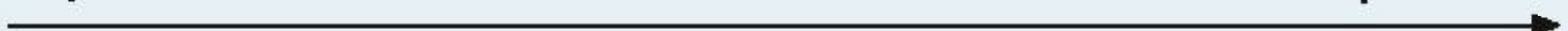Outputs: Accepted deliverables, change requests, project document updates
Process: **Control Scope**
Outputs: Work performance measurements, organizational process assets updates, change requests, project management plan updates, project document updates

**Project Start**   **Project Finish**

1. Collecting Requirements

- A **requirement** is a <u>condition or capability</u> that must be met or possessed by a system, product, service, result, or <u>component to satisfy</u> a contract, standard, specification, or other formal document
- It is important to use an **iterative approach** to defining requirements since they are often unclear early in a project
- Methods for collecting requirements: interviews, focus groups, questionnaires and surveys, observation, prototyping
- Various documentation is used
- **Requirements management plan** describes how project requirements will be analyzed, documented, and managed
- **Requirements Traceability Matrix (RTM)** is a table that lists requirements, various attributes of each requirement, and the status of the requirements to ensure that all requirements are addressed

Requirement No.	Name	Category	Source	Status
R32	Laptop memory	Hardware	Project charter and corporate laptop specifications	Complete. Laptops ordered meet require-ment by having 4GB of memory.

Requirements Traceability Matrix (RTM) - *Example*

Relative Cost to Correct a Software Requirement Defect

- Major consequence of not defining the requirements correctly **– rework!** (rework can be 50% of product cost)
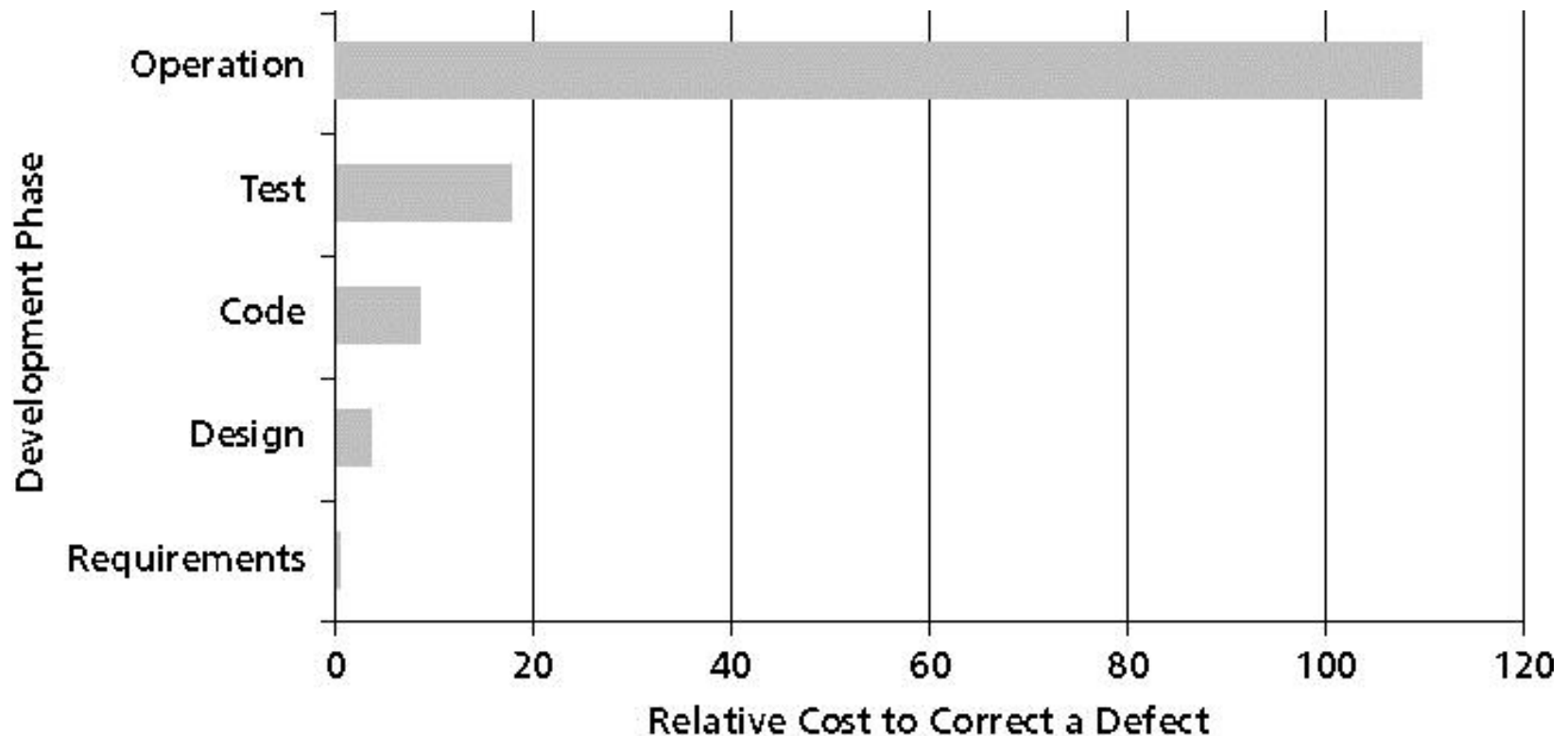
Source: Robert B. Grady, "An Economic Release Decision Model: Insights into Software Project Management." *Proceedings of the Applications of Software Measurement Conference* (Orange Park, FL: Software Quality Engineering, 1999), pp.227–239.

2. Defining Scope

▸ **Project Scope Statement** includes <u>at least </u>a
  ◦ Product scope description
  ◦ Product user acceptance criteria
  ◦ Detailed information on all project deliverables
  ◦ Often, many supporting documents are referred to (product specifications, etc.)

▸ As time progresses, the scope of a project should become more clear and specific
  ◦ The project scope statement **should be updated** and always kept up to date in order to maintain a common understanding of the project

Updates of Project Scope

Project Charter:

Upgrades may affect servers . . . (listed under Project Objectives)

Project Scope Statement, Version 1:

Servers: If additional servers are required to support this project, they must be compatible with existing servers. If it is more economical to enhance existing servers, a detailed description of enhancements must be submitted to the CIO for approval. See current server specifications provided in Attachment 6. The CEO must approve a detailed plan describing the servers and their location at least two weeks before installation.

Project Scope Statement, Version 2:

Servers: This project will require purchasing ten new servers to support Web, network, database, application, and printing functions. Virtualization will be used to maximize efficiency. Detailed descriptions of the servers are provided in a product brochure in Appendix 8 along with a plan describing where they will be located.

3. Creating the Work Breakdown Structure (WBS)

▸ A **WBS** is a deliverable-oriented grouping of the work involved in a project that defines the total scope of the project

▸ WBS is a foundation document that provides the basis for planning and managing project schedules, costs, resources, and changes

▸ **Decomposition** is subdividing project deliverables into smaller pieces

  ◦ Organized by product, by phases, by process groups

▸ In WBS, the work on the project is decomposed into **levels and tasks**

  ◦ **A work package** is a task at the lowest level of the WBS

WBS - *Examples for the same project*

- WBS organized by product
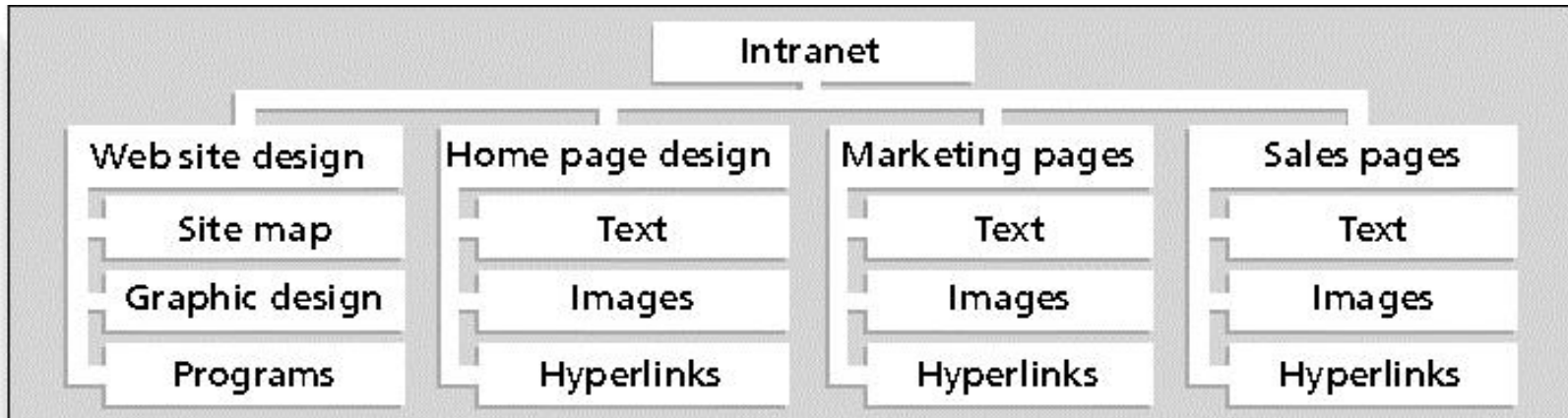
- WBS organized by phase
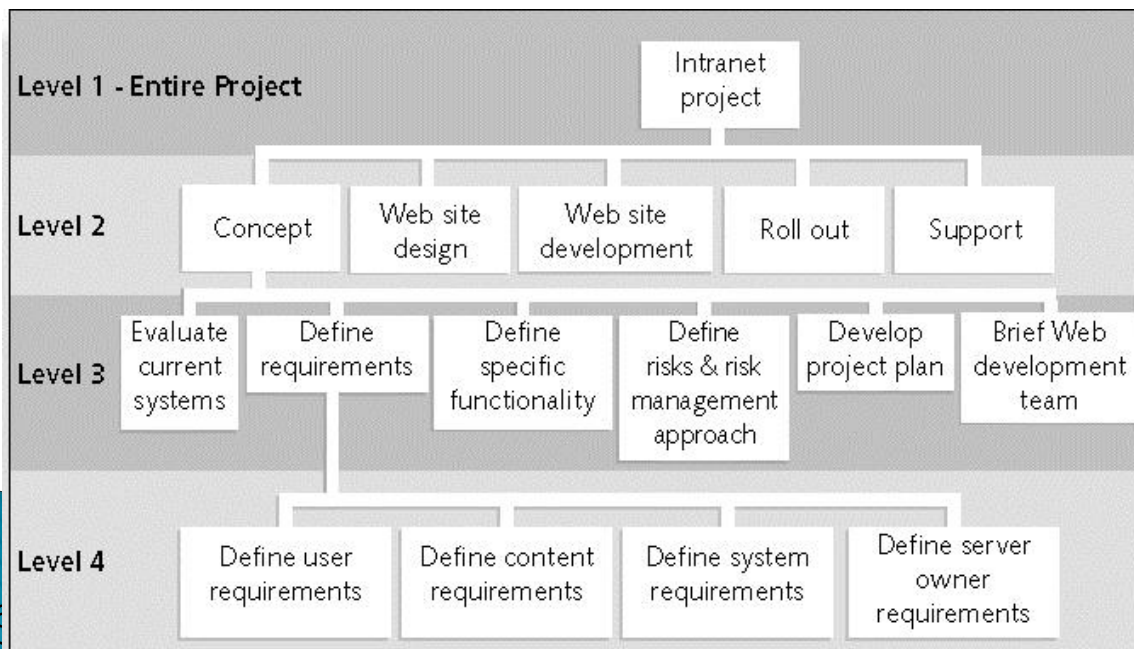
Tabular form with Microsoft Project numbering

1.0 Concept
    1.1 Evaluate current systems
    1.2 Define requirements
        1.2.1 Define user requirements
        1.2.2 Define content requirements
        1.2.3 Define system requirements
        1.2.4 Define server owner requirements
    1.3 Define specific functionality
    1.4 Define risks and risk management approach
    1.5 Develop project plan
    1.6 Brief Web development team
2.0 Web site design
3.0 Web site development
4.0 Roll out
5.0 Support

Gantt Chart - *Example for the same project*

- Based on WBS organized by phase
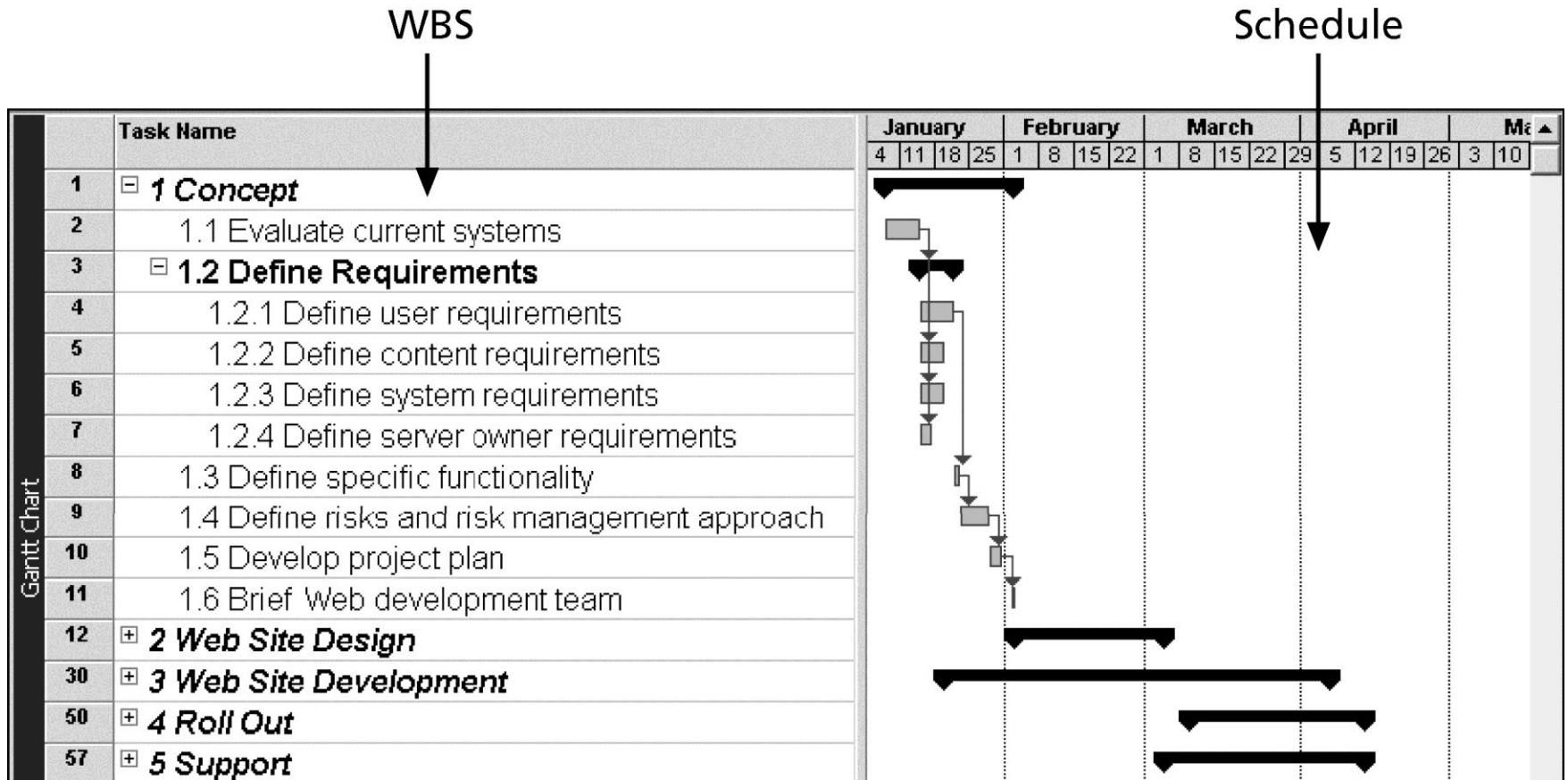
Gantt Chart - *Example for the same project*

- Based on WBS organized by process groups

WBS — Schedule

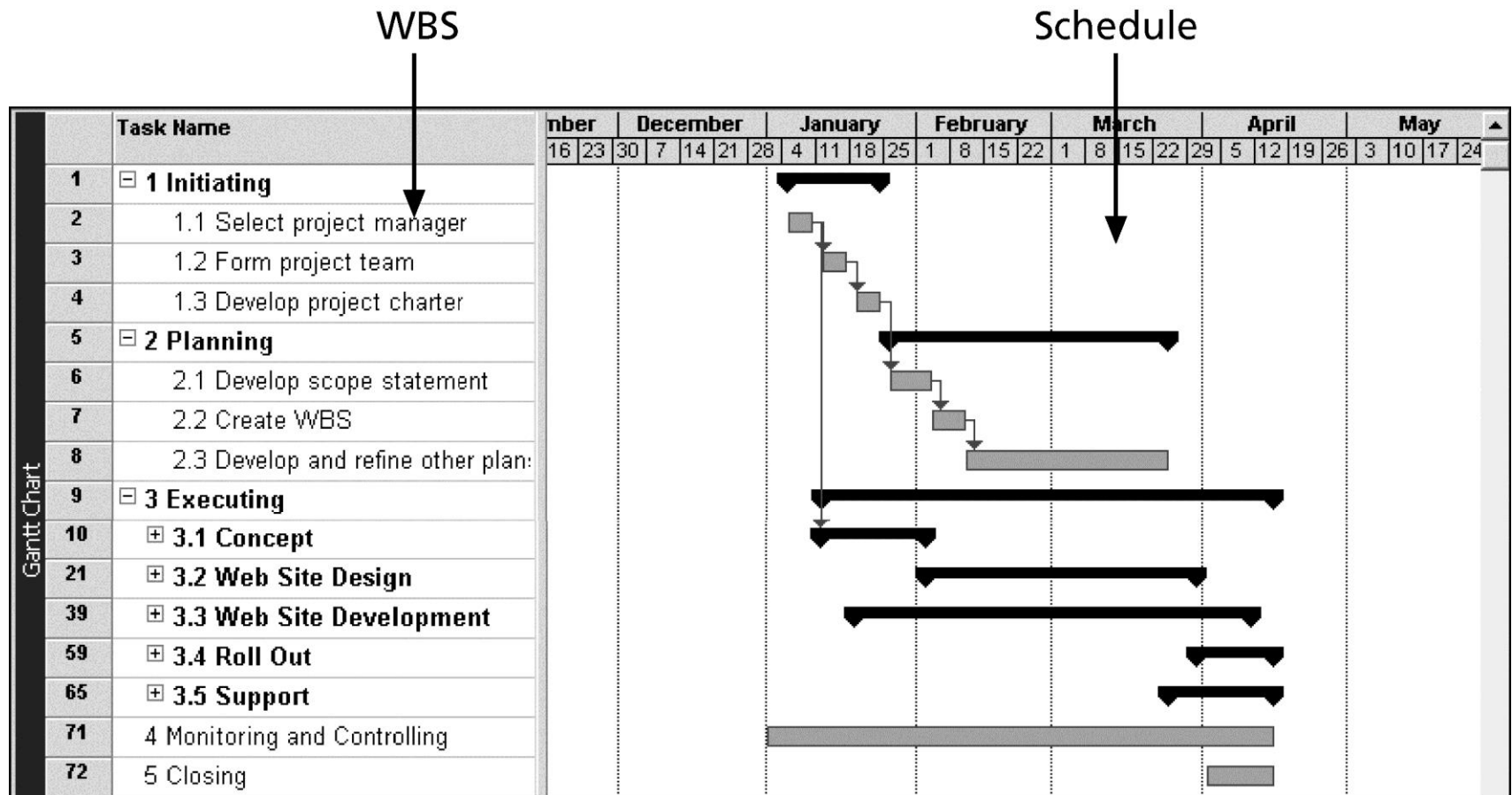| | Task Name | nber |||| December |||| January |||| February ||| March |||| April |||| May |||
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 16 | 23 | 30 | 7 | 14 | 21 | 28 | 4 | 11 | 18 | 25 | 1 | 8 | 15 | 22 | 1 | 8 | 15 | 22 | 29 | 5 | 12 | 19 | 26 | 3 | 10 | 17 | 24 |
| 1 | ⊟ 1 Initiating | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 1.1 Select project manager | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 1.2 Form project team | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 1.3 Develop project charter | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | ⊟ 2 Planning | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 2.1 Develop scope statement | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 2.2 Create WBS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 2.3 Develop and refine other plan: | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | ⊟ 3 Executing | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | ⊞ 3.1 Concept | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | ⊞ 3.2 Web Site Design | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39 | ⊞ 3.3 Web Site Development | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59 | ⊞ 3.4 Roll Out | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65 | ⊞ 3.5 Support | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71 | 4 Monitoring and Controlling | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72 | 5 Closing | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Approaches to Developing WBSs

- **Using guidelines:** some organizations provide guidelines for preparing WBSs
- The **analogy approach:** review WBSs of similar projects and tailor to your project
- The **top-down approach:** start with the largest items of the project and break them down
- The **bottom-up approach**: start with the specific tasks and roll them up
- Mind-mapping approach: **mind mapping** is a technique that uses branches radiating out from a core idea to structure thoughts and ideas

Mind-Mapping for Creating a WBS - *Example*
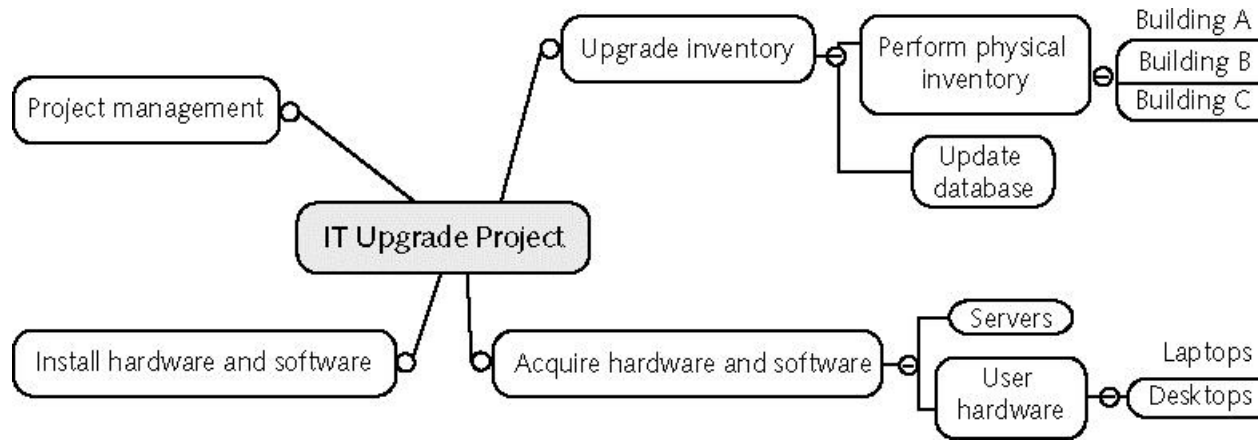
	Task Name	F	S	S	M	T	W	T	F	S	S	M	T	W	T
				August 30							September 6				
1	⊟ **Upgrade inventory**														
2	⊟ **Perform physical inventory**														
3	Building A														
4	Building B														
5	Building C														
6	Update database														
7	⊟ **Acquire hardware and software**														
8	Servers														
9	⊟ **User hardware**														
10	Laptops														
11	Deskops														
12	Install hardware and software														
13	Project management														

The WBS Dictionary and Scope Baseline

- A **WBS dictionary** is a document that describes detailed information about each WBS item
  - Many WBS tasks are vague and must be explained more so people know what to do and can estimate how long it will take and what it will cost to do the work

- A **scope baseline** is used to measure performance in meeting project scope goals
  - It is formed by:
    - The project scope statement
    - WBS
    - WBS dictionary

4. Verifying Scope

▶ **Scope verification** involves formal acceptance of the completed project scope by the stakeholders
  ◦ Acceptance is often achieved by a customer inspection and then sign-off on key deliverables

5. Controlling Scope

▶ **Scope control** involves controlling changes to the project scope throughout the life of the project
  ◦ We have to minimize scope changes, but **changes are inevitable**!
▶ Goals of scope control are to:
  ◦ Avoid or reduce incomplete and changing requirements
  ◦ Assure changes are processed according to procedures developed as part of integrated change control
  ◦ Manage changes when they occur
▶ **Variance** is the difference between planned and actual performance
▶ **Scope creep** – the tendency of project scope to keep getting bigger (uncontrolled changes may cause continuous growth in project scope)

INSE 6230

Next Lecture

▸ Project Time Management