



# Chapter 9: Project Resource Management

西北大学 信息科学与技术学院

软件工程系

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# Learning Objects

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1. Explain the *importance* of good human resource management on projects, including the current state of the global IT workforce and future implications for it
2. Define project human resource management and understand its *processes*
3. Summarize *key concepts* for managing people
4. Discuss *human resource management planning* and be able to create a human resource plan, project organizational chart, responsibility assignment matrix, and resource histogram

# Learning Objects

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5. Understand important issues involved in project *staff acquisition* and explain the concepts of resource assignments, resource loading, and resource leveling
6. Assist in *team development* with training, team-building activities, and reward systems
7. Explain and apply several *tools and techniques* to help manage a project team and summarize general advice on managing teams
8. Describe how *project management software* can assist in project human resource management

# Opening case

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- Ben是F-44飞机升级项目的负责人，在公司工作了30年，是一个非常认真和服理的人，以要求严格与苛刻著称。
- F-44项目由于升级部件没有及时送到受到损失，加拿大政府的惩罚条款非常严厉。
- Ben认为责任在IT部门，他们没有参与项目信息系统的升级工作，使项目组成员花几天甚至几周才能获得项目所需信息。
- Sarah是IT业务顾问，有与各种不同类型的人打交道的热情和能力。Ed是程序员，负责处理F-44飞机项目IT技术支持中的问题，找到解决问题的方法，对必要的软件、硬件进行升级。
- Ben与下属一起走进办公室，把书扔在桌子上开始对Sarah她们大喊。Sarah不吃那一套，与Ben面对面互相指责起来，吵得Ed睁不开眼睛！怎么办呢？



# Main Contents

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1. The importance of human resource management
2. What is project human resource management ?
3. Keys to managing people
4. Developing the human resource plan
5. Acquiring the project team
6. Developing the project team
7. Managing the project team

# 1. The importance of human resource management

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- The global IT workforce

How do you think the current IT workforce interiorly?

How do you think the current IT workforce abroad?

Many corporate executives have said, “People are our *most important asset*”

People determine the *success and failure* of organizations and projects

# 1. The importance of human resource management

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- Implications for the future of IT *human resource* management
  - i. improving benefits
  - ii. redefining work hours and incentives
  - iii. finding future workers
  - iv. perks: casual dress codes, flexible work hours, tuition assistance, on-site day care, fitness club discounts, matching contributions to retirement savings
  - v. use performance as the basis of rewards

## 2. What is project HR management ?

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**HR management** includes the processes required to *make the most effective use of the people* involved with a project, which includes all project stakeholders: sponsors, customers, project team members, support staff, suppliers, *et al.*

**HR management includes 4 processes:**

- Planning human resource management
- Acquiring the project team
- Developing the project team
- Managing the project team



### **3. Keys to managing people**

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**Psychosocial issues that affect how people work and how well they work include:**

- Motivation
- Influence and power
- Effectiveness

### 3. Keys to managing people

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#### **Motivation:**

- Intrinsic motivation
- Extrinsic motivation

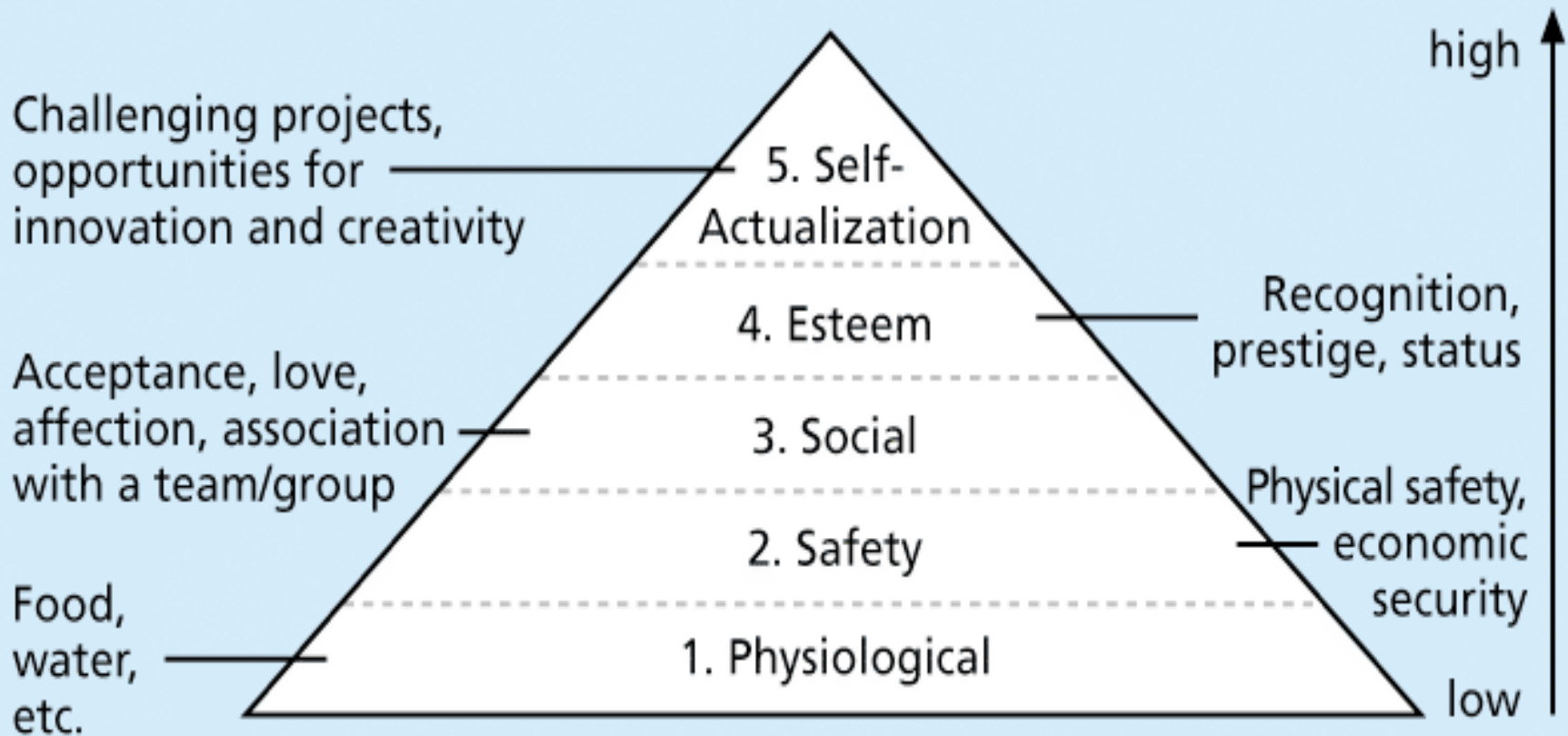
#### **Motivation theories:**

- Maslow's hierarchy of needs
- Herzberg's motivation-hygiene theory
- McMlelland's acquired-needs theory
- McGregor's theory X and theory Y

### 3. Keys to managing people

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#### Maslow's hierarchy of needs



A satisfied need is no longer a motivator

### 3. Keys to managing people

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#### Herzberg's motivation-hygiene theory

Hygiene	Motivators
Larger salaries	Achievement
More supervision	Recognition
More attractive work environment	Work itself
Computer or other required equipment	Responsibility
Health benefits	Advancement
Training	Growth

*Motivational factors: achievement, recognition, the work itself, responsibility, advancement, and growth, which produce job satisfaction*

*Hygiene factors: cause dissatisfaction if not present, but do not motivate workers to do more.*

### 3. Keys to managing people

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#### McClelland's acquired-needs theory

**Specific needs are acquired or learned over time and shaped by life experiences, including:**

- Achievement (nAch): Achievers like challenging projects with achievable goals and lots of feedback.
- Affiliation (nAff): People with high nAff desire harmonious relationships and need to feel accepted by others.
- Power: (nPow): People with a need for power desire either personal power or institutional power.

### 3. Keys to managing people

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#### McMlelland's acquired-needs theory

- Achievement
- Affiliation
- Power



*The Thematic Apperception Test(TAT) is a tool to measure the individual needs of different people using McClelland's categories. The TAT presents subjects with a series of ambiguous pictures and asks them to develop a spontaneous story for each picture assuming they will project their own needs into the story.*

### 3. Keys to managing people

\* 1. 图中的女人为何掩面?她的情绪是怎样的?



- ☐ 悲伤, 女人发现丈夫的婚外情
- ☐ 忧虑, 丈夫酒醉在床上
- ☐ 关心, 丈夫病重躺在床上, 可能即将死去

\* 2. 床上女子状态怎样?



- ☐ 身患重病
- ☐ 沉睡
- ☐ 已死去

### 3. Keys to managing people

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#### McGregor's theory X and theory Y

Douglas McGregor popularized the human relations approach to management in the 1960s

**Theory X:** assumes workers *dislike and avoid* work, so managers must use coercion, threats and various control schemes to get workers to meet objectives

**Theory Y:** assumes individuals consider work as natural as play or rest and enjoy the satisfaction of esteem and self-actualization needs

**Theory Z:** introduced in 1981 by William Ouchi and is based on the Japanese approach to motivating workers, emphasizing trust, quality, collective decision making, and cultural values



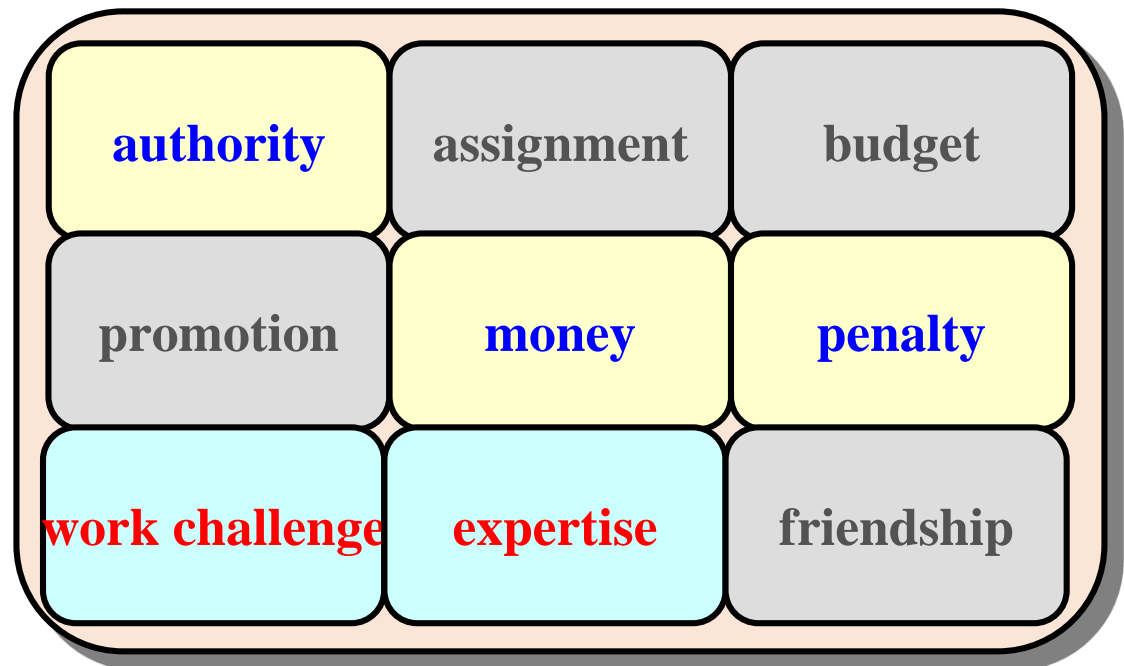
### 3. Keys to managing people

#### Thamhain and Wilemon's influence and power

- 9 Influence bases:

- i. Authority
- ii. Assignment
- iii. Budget
- iv. Promotion
- v. Money
- vi. Penalty
- vii. Work challenge
- viii. Expertise
- ix. Friendship*

*Q: Among these, which are the mostly effective to lead success/fail of project?*



## 3. Keys to managing people

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### Power

- Coercive power
- Legitimate power
- Expert power
- Reward power
- Referent power

*Keys:*

*What types of influence and power can managers use in what types of situations?*

### 3. Keys to managing people

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#### Covey and improving effectiveness

7 habits to improve effectiveness on projects:

- be proactive
- begin with the end in mind
- put first things first
- think win/win
- seek first to understand, then to be understood
- synergize
- sharpen the saw

*Make people develop independent habits,  
Help people get their own success.*



### 3. Keys to managing people

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Good project managers are **empathic listeners** - they listen with the intent to understand

Before you can communicate with others, you have to have

**Rapport** – a relation of harmony, conformity, accord, or affinity

**Mirroring** is the matching of certain behaviors of the other person, a technique to help establish rapport

*IT professionals need to develop empathic listening and other people skills to improve relationships with users and other stakeholders.*



### 3. Keys to managing people

提出人	理论名称	核心观点	总结
马斯洛	需求层次理论	生理需求→安全保障→社会群居→尊荣感→自我实现	需求是逐渐产生的
赫兹伯格	卫生因素(外在)	同事关系、工作环境、薪资、个人生活等。	环境决定一切
	激励理论(内在)	成就感和认同感、兴趣和挑战、责任感、发展前途、个人成长。	想要做事
麦克·格雷	X 理论	严格管理：人天性懒惰、等级森严、氛围紧张。	工人
	Y 理论	激励管理：人希望创造价值、氛围宽松、环境良好。	老板
维克·弗鲁姆	期望理论	达到目标或满足需要的可能性，并取得相应的报酬。	画大饼
威廉·大内	Z 理论	终生雇佣制。	终身家奴
戴维·麦克理论	成就动机理论	高成就者事业心强、喜欢挑战。 低成就者渴望稳定、安于现状。	要么不断挑战，要么安于现状

## 4. Developing the human resource plan

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**Process:** Plan HR management

**Outputs:** Human resource plan

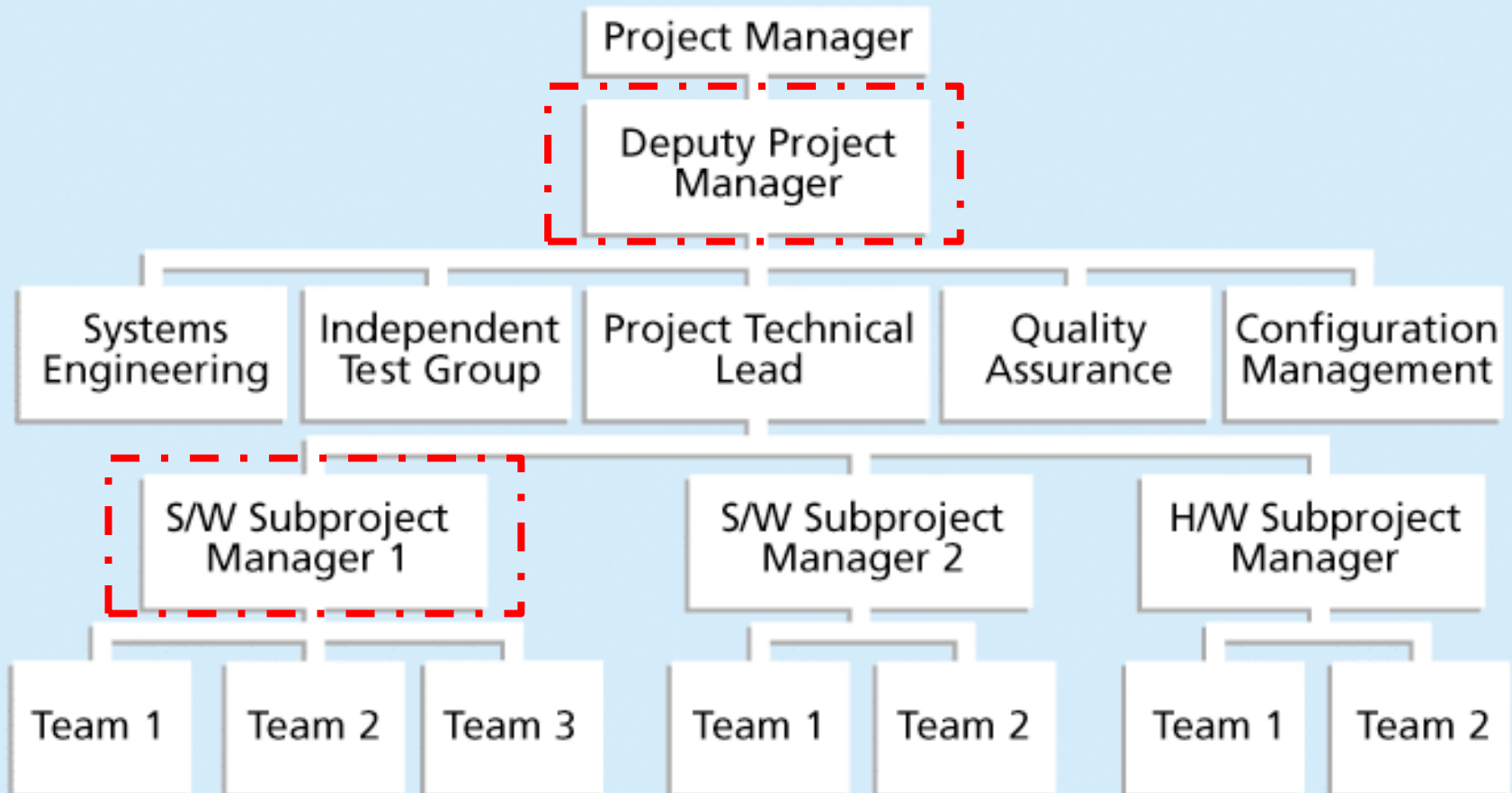
**Involves** identifying and documenting project roles, responsibilities, and reporting relationships

**Contents include**

- Project organizational charts
- Staffing management plan
- Responsibility assignment matrixes
- Resource histograms

## 4. Developing the human resource plan

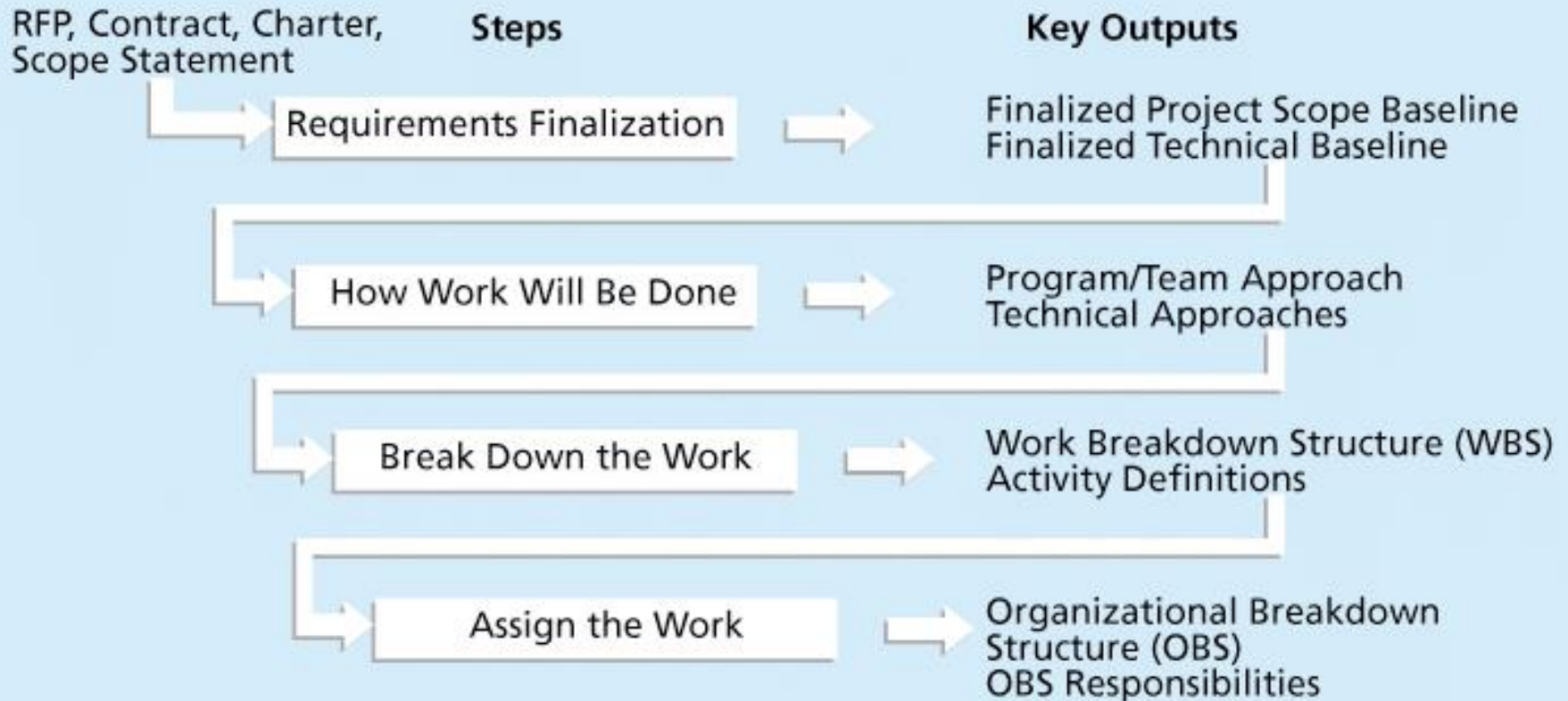
### Project organizational charts



## 4. Developing the human resource plan

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A framework for defining and assigning work that consists of 4 steps:





## 4. Developing the human resource plan

### Responsibility assignment matrices (RAM)

WBS activities →

OBS units ↓

	1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.1.6	1.1.7	1.1.8
Systems Engineering	R	R P					R	
Software Development			R P					
Hardware Development				R P				
Test Engineering	P							
Quality Assurance					R P			
Configuration Management						R P		
Integrated Logistics Support							P	
Training								R P

R = Responsible organizational unit

P = Performing organizational unit

## 4. Developing the human resource plan

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### RACI charts

	<b>Car Owner</b>	<b>Shop Owner</b>	<b>Mechanic</b>	<b>Parts Supplier</b>
Pay for parts and services	A, R	C		
Determine parts and services needed	C		A, R	C
Supply parts		C	C	A, R
Install parts	I	A	R	

**Responsibility**

**Accountability**

**Consultation**

**Informed**

## 4. Developing the human resource plan

### RACI charts

阶段/角色	项目经理	产品经理	设计师	开发人员	测试人员	运维人员
需求收集	A	R	I	C	I	I
设计	A	C	R	C	I	I
开发	A	I	I	R	C	I
测试	A	C	I	C	R	I
部署	A	I	I	C	C	R
维护	A	C	I	C	C	I

**示例：**一个开发新软件的项目，包含以下阶段：需求收集、设计、开发、测试、部署和维护。

项目经理：负责项目的整体管理和协调。产品经理：负责理解和收集用户需求，定义产品特性和功能。设计师负：责软件的用户界面设计。开发人员：负责编写代码，实现软件功能。测试人员：负责测试软件，确保符合需求并无重大缺陷。运维人员：负责软件的部署和维护。请使用这些信息创建RACI矩阵。

## 4. Developing the human resource plan

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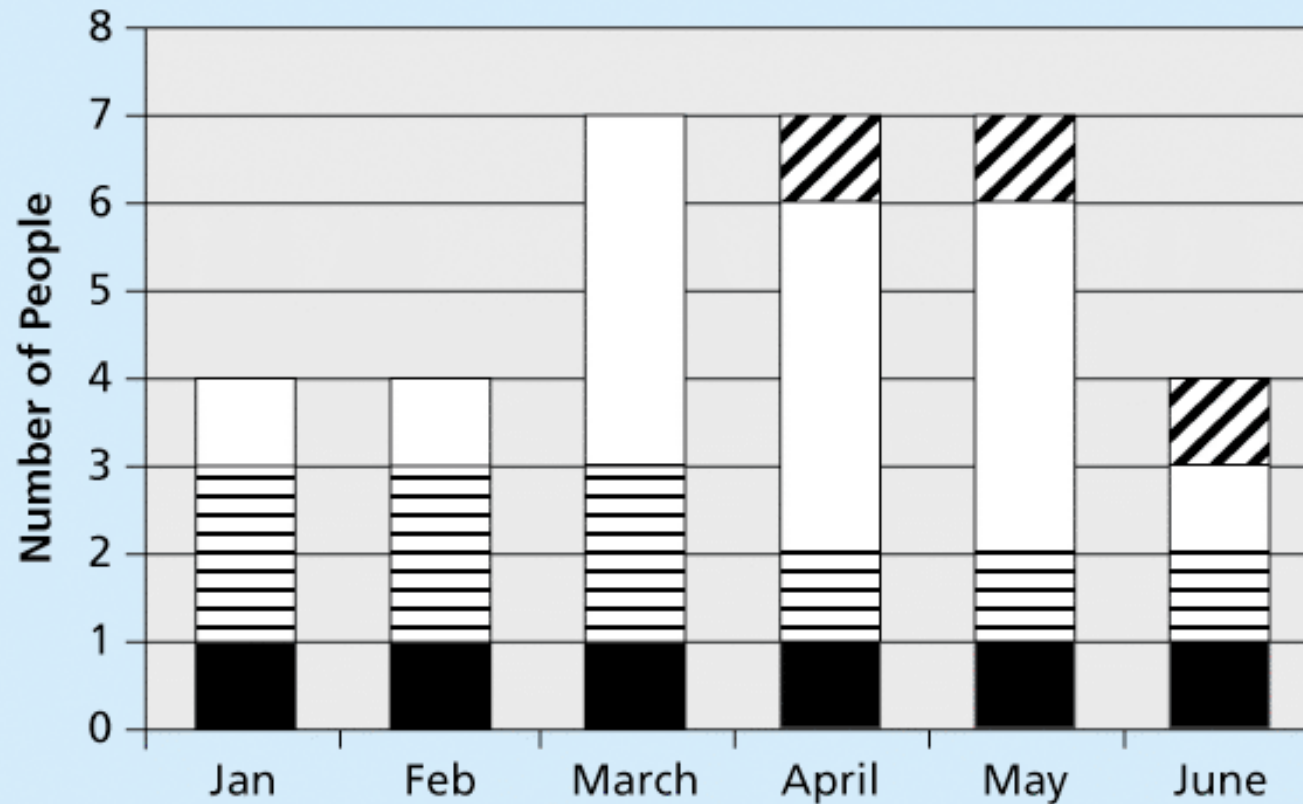
### Staffing management plans and resource histograms

**A staffing management plan** describes when and how people will be added to the project team and taken off it. The level of detail may vary based on the type of project.

The staffing management plan often includes *a resource histogram*, which is a column chart that shows the number of resources assigned to a project *over time*.

## 4. Developing the human resource plan

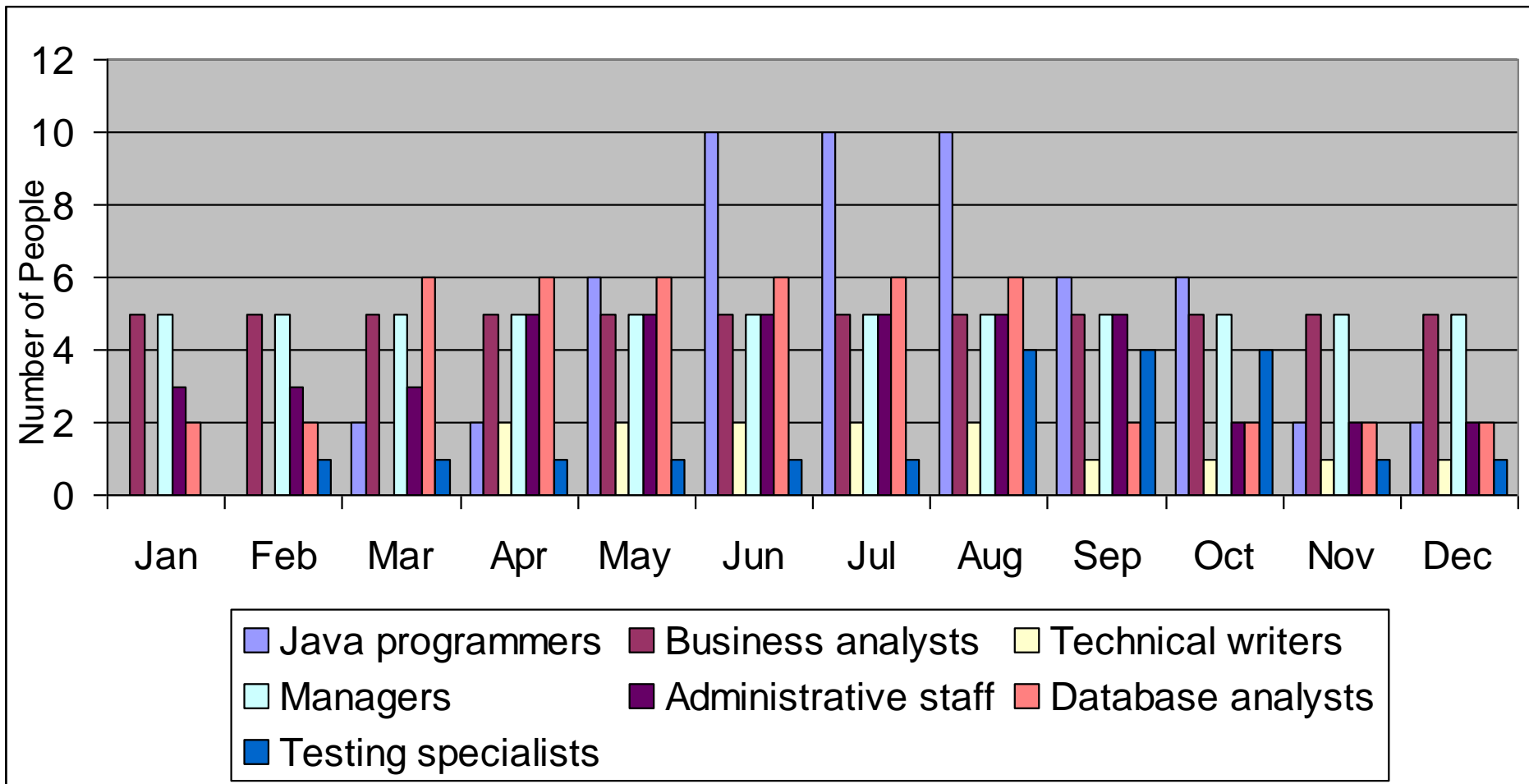
### Staffing management plans and resource histograms



■ Managers    ▨ Business analysts    □ Programmers    ▩ Technical writers

## 4. Developing the human resource plan

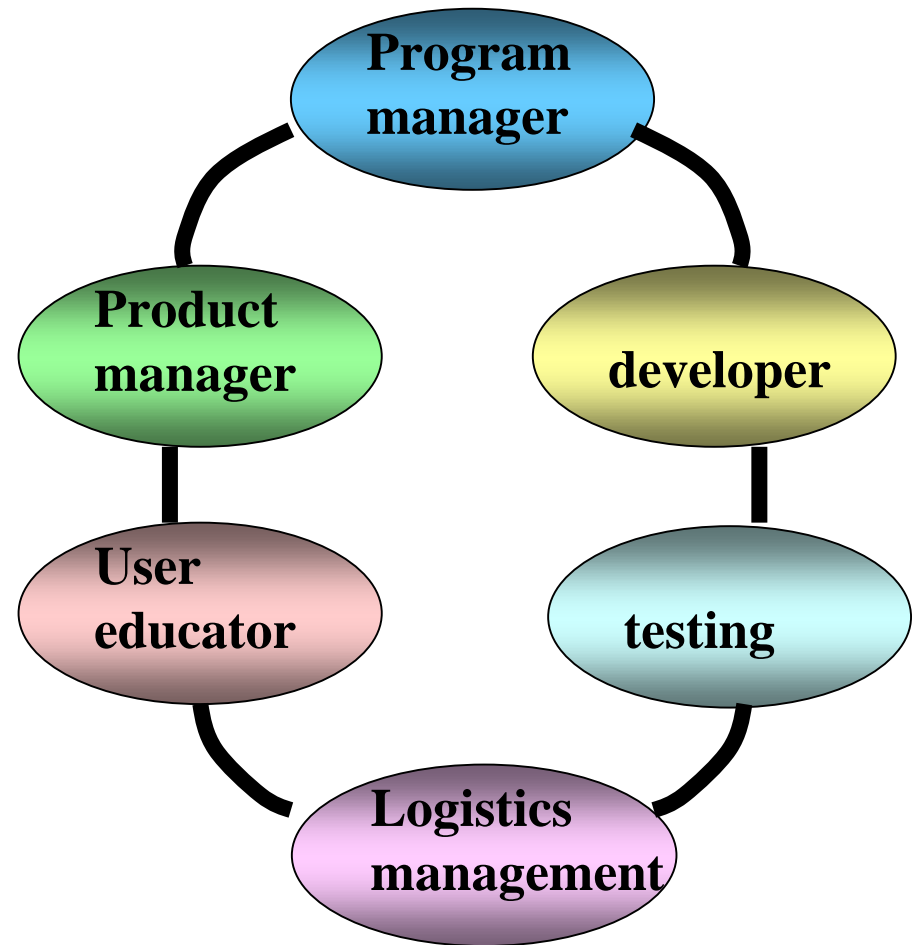
### Staffing management plans and resource histograms



## 4. Developing the human resource plan

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- team model:
  - Program manager
  - Product manager
  - Developer
  - User educator
  - Testing
  - Logistics management



## 4. Developing the human resource plan

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**Involves** identifying and documenting project roles, responsibilities, and reporting relationships

### **Contents include**

- Project organizational charts
- Staffing management plan
- Responsibility assignment matrixes
- Resource histograms

*Other Information ?*



## 5. Acquiring the project team

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**Process: Acquiring the project team**

**Outputs: Project staff assignments, resource calendars,  
project management plan updates**

**Important topics related to acquiring the project team:**

- Resource assignment
- Resource loading
- Resource leveling

*Once people are assigned to projects, two techniques are available to project managers that help them use project staff most effectively:  
resource loading & resource leveling.*

## 5. Acquiring the project team

刘邦问群臣：我为什么会取得胜利，项羽为什么会失败？

大臣高起等人说：“您派有才能的人攻占城池与战略要地，给立大功的人加官封爵，所以能成大事业。而项羽恰恰相反，将士打了胜仗，他也不给奖励，心胸狭小，容不下有才能的人，所以他才失败。”

刘邦听了点点头说：“你们说的有道理，不过我最重要的取胜法宝是善于用人。要说运筹帷幄之中，决胜千里之外，我不如张良；要说镇守国家，安抚百姓，供应军饷，不让粮道断绝，我不如萧何；要说统领百万大军，攻无不克战无不胜，我不如韩信。这三个人，都是当代的人中之杰啊。我能用他们之所长，这才是我取得天下的根本原因。

刘邦



招聘

=组建项目团队



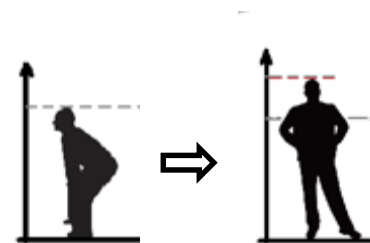
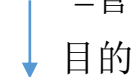
让**一群人**发挥互补效应

大臣



激励

=管理项目团队



让**一个人**发挥最大潜能

## 5. Acquiring the project team

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### Resource assignment

- The main *outputs* of this process are project staff assignments, resource availability information, and updates to the staffing management plan. Many project teams also find it useful to create a project team directory.
- An important component of *staffing plans* is maintaining a complete and accurate inventory of employees skills.
- It is also important to have good procedures in place for hiring subcontractors and recruiting new employees.
- One innovative approach to hiring and retaining IT staff is to offer existing employees incentives for helping recruit and retain personnel.

## 5. Acquiring the project team

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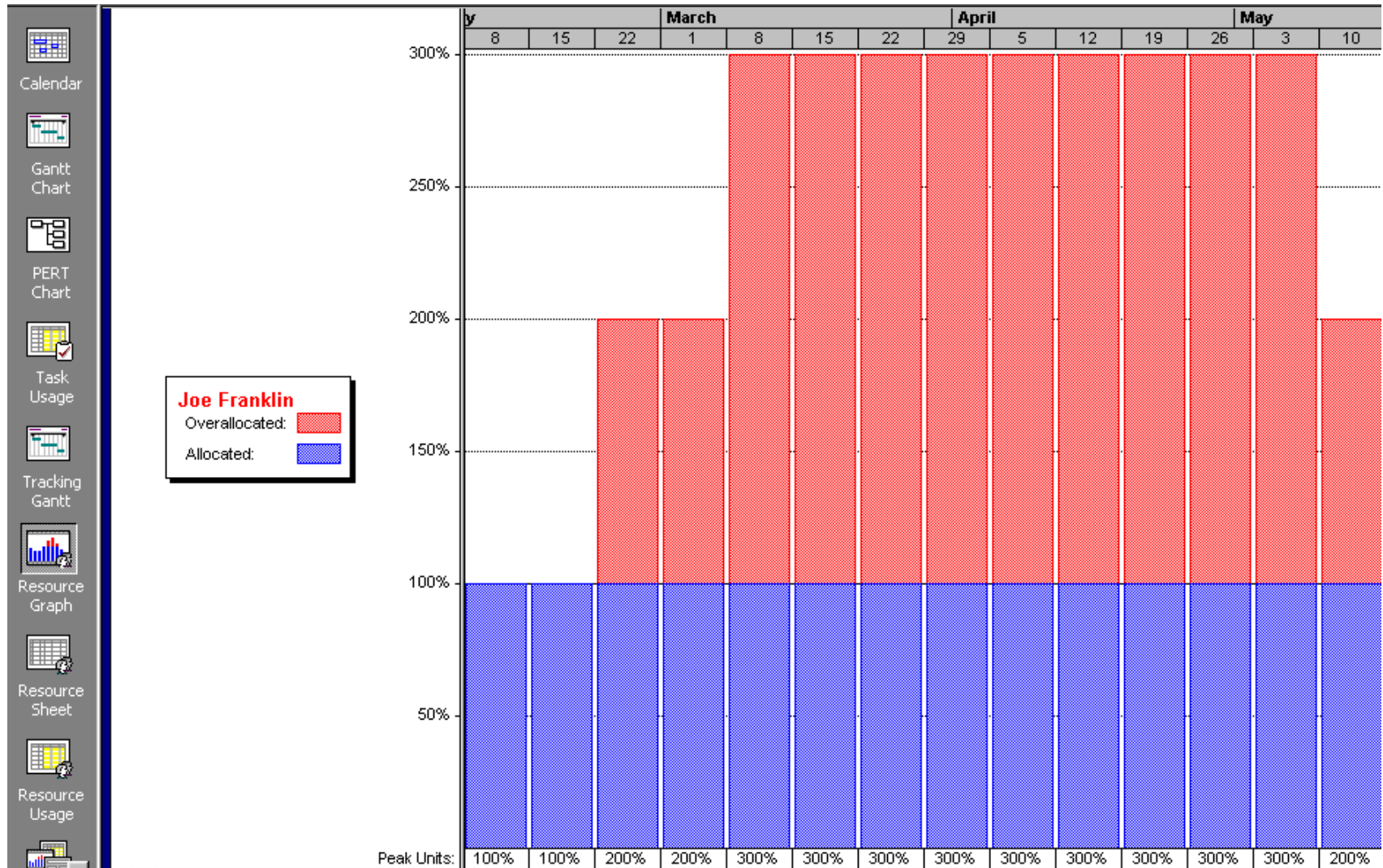
**Resource loading** refers to the amount of individual resources that an existing schedule requires during specific time periods.

**Over allocation** means that not enough resources are available to perform the assigned work during a given time period.



## 5. Acquiring the project team

### Overallocation



## 5. Acquiring the project team

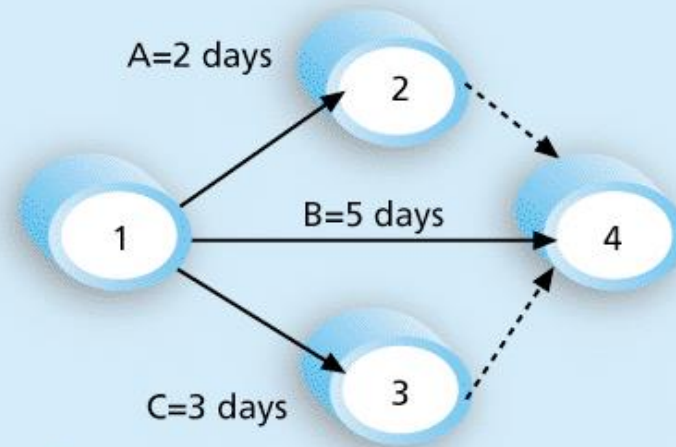
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**Resource leveling** is a technique for resolving resource conflicts by delaying tasks.

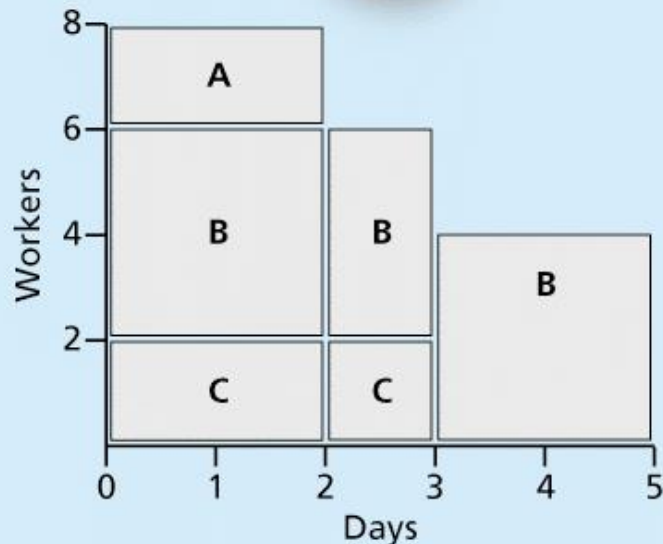
**The main purpose of** resource leveling is to create a *smoother distribution* of resource usage. Project managers examine the network diagram for areas of slack or float, and to identify resource conflicts.

**Resource leveling, therefore, aims to** minimize period-by-period variations in resource loading by shifting tasks within their slack allowances.

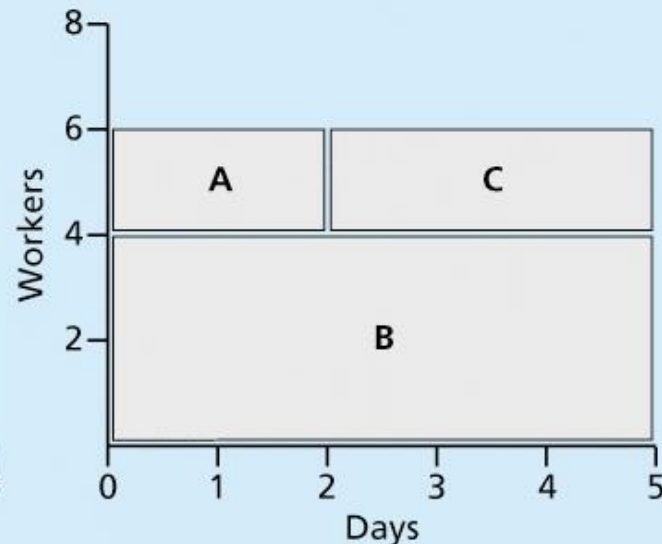
## 5. Acquiring the project team



Project network with Activities A, B, and C and durations as shown. Activity A has 3 days of slack, and Activity C has 2 days of slack. Assume Activity A has 2 workers, B has 4 workers, and C has 2 workers.



Resource usage if all activities start on day one



Resource usage if Activity C is delayed 2 days, its total slack



## 5. Acquiring the project team

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### Resource leveling

#### Benefits:

- When resources are used on a more constant basis, they require less management.
- Resource leveling may enable project managers to use a just-in-time inventory type of policy for subcontractors or other expensive resources.
- Resource leveling results in fewer problems for project personnel and accounting department.
- Resource leveling often improves morale.

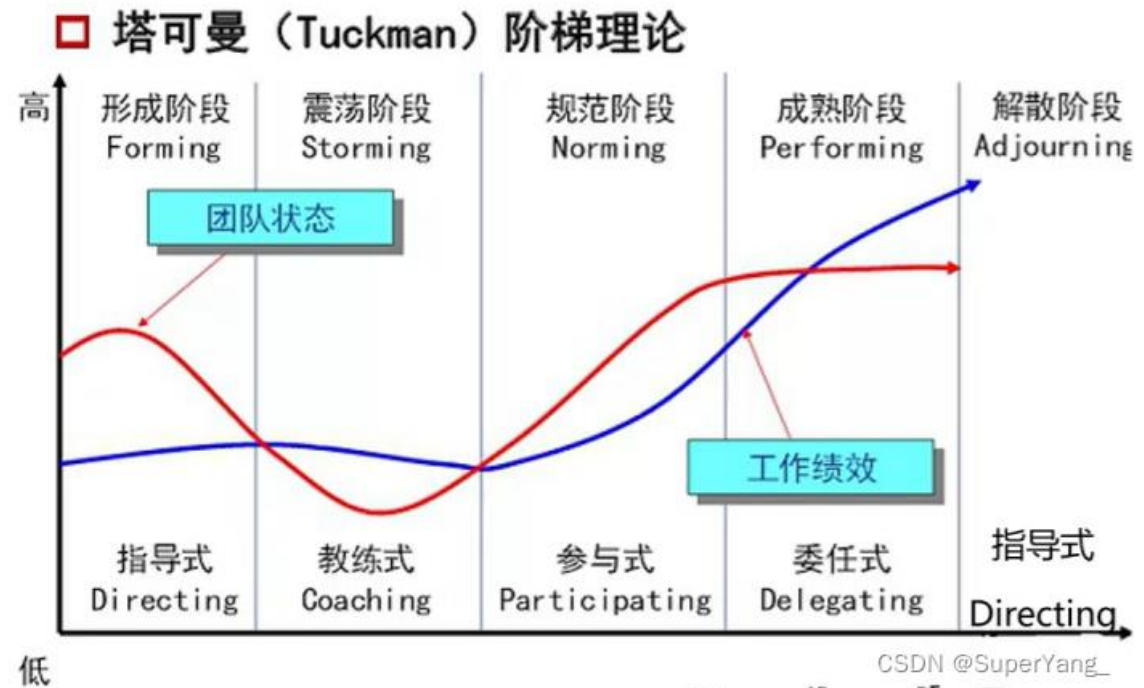


## 6. Developing the project team

**The main goal of team development** is to help people work together more effectively to improve project performance.

**The Tuckman model** describes 5 stages of team development:

- Forming
- Storming
- Norming
- Performing
- Adjourning



## 6. Developing the project team

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### Training

- Project managers often recommend that people take specific training courses to improve individual and team development.
- It is very important to provide training in a just-in-time fashion.
- Organizations have also found that it is often more economical to train current employees in particular areas than it is to hire new people who already possess those skills.
- Several organizations that have successfully implemented Six Sigma principles have taken a unique and effective approach to training.

## 6. Developing the project team

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### Team-building activities

**Two common approaches to team-building activities** include using physical challenges and psychological preference indicator tools.

- Research shows that physical challenges often help teams of strangers to work together more effectively, but it can cause already dysfunctional teams to have even more problems.
- It is important for people to understand and value each other's differences to work effectively as a team.

## **6. Developing the project team**

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### **Team-building activities**

**Three common exercises used in mental team building include:**

- The Myers-Briggs Type Indicator
- The social Styles Profile
- DISC Profile

## 6. Developing the project team

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### The Myers-Briggs Type Indicator

---A popular tool for determining personality preferences.

**4 dimensions of psychological type in the MBTI include:**

- Extrovert/Introvert (E/I)
- Sensation/Intuition (S/N)
- Thinking/Feeling (T/F)
- Judgment/Perception (J/P)



## 6. Developing the project team

一、哪一个答案最能贴切的描绘你一般的感受或行为？

序号	问题描述	选项	E	I	S	N	T	F	J	P
1	当你要外出一整天，你会 A 计划你要做什么和在什么时候做，B 说去就去	A							<input type="radio"/>	
		B								<input type="radio"/>
2	你认为自己是一个 A 较为随兴所至的人，B 较为有条理的人	A								<input type="radio"/>
		B							<input type="radio"/>	
3	假如你是一位老师，你会选教 A 以事实为主的课程，B 涉及理论的课程	A			<input type="radio"/>					
		B				<input type="radio"/>				
4	你通常 A 与人容易混熟，B 比较沉静或矜持	A	<input type="radio"/>							
		B		<input type="radio"/>						
5	一般来说，你和哪些人比较合得来？ A 富于想象力的人，B 现实的人	A				<input type="radio"/>				
		B			<input type="radio"/>					

## 6. Developing the project team

### 列举类型

类型名称	相对应英文字母简称	类型名称	相对应英文字母简称
内倾感觉思维判断	(ISTJ)	内倾感觉情感判断	(ISFJ)
内倾直觉情感判断	(INFJ)	内倾直觉思维判断	(INTJ)
内倾感觉思维知觉	(ISTP)	内倾感觉情感知觉	(ISFP)
内倾直觉情感知觉	(INFP)	内倾直觉思维知觉	(INTP)
外倾感觉思维判断	(ESTJ)	外倾感觉情感判断	(ESFJ)
外倾直觉情感判断	(ENFJ)	外倾直觉思维判断	(ENTJ)
外倾感觉思维知觉	(ESTP)	外倾感觉情感知觉	(ESFP)
外倾直觉情感知觉	(ENFP)	外倾直觉思维知觉	(ENTP)

## 6. Developing the project team

### ISTJ

首席信息系统执行官	天文学家	数据库管理	会计
房地产经纪入	侦探	行政管理	信用分析师

### ISFJ

内科医生	营养师	图书/档案管理员	室内装潢设计师
客户服务专员	记账员	特殊教育教师	酒店管理

### INFJ

特殊教育教师	建筑设计师	培训经理/培训师	职业策划咨询顾问
心理咨询师	网站编辑	作家	仲裁人

### INTJ

首席财政执行官	知识产权律师	设计工程师	精神分析师
心脏病专家	媒体策划	网络管理员	建筑师

### ISTP

信息服务业经理	计算机程序员	警官	软件开发员
律师助理	消防员	私人侦探	药剂师

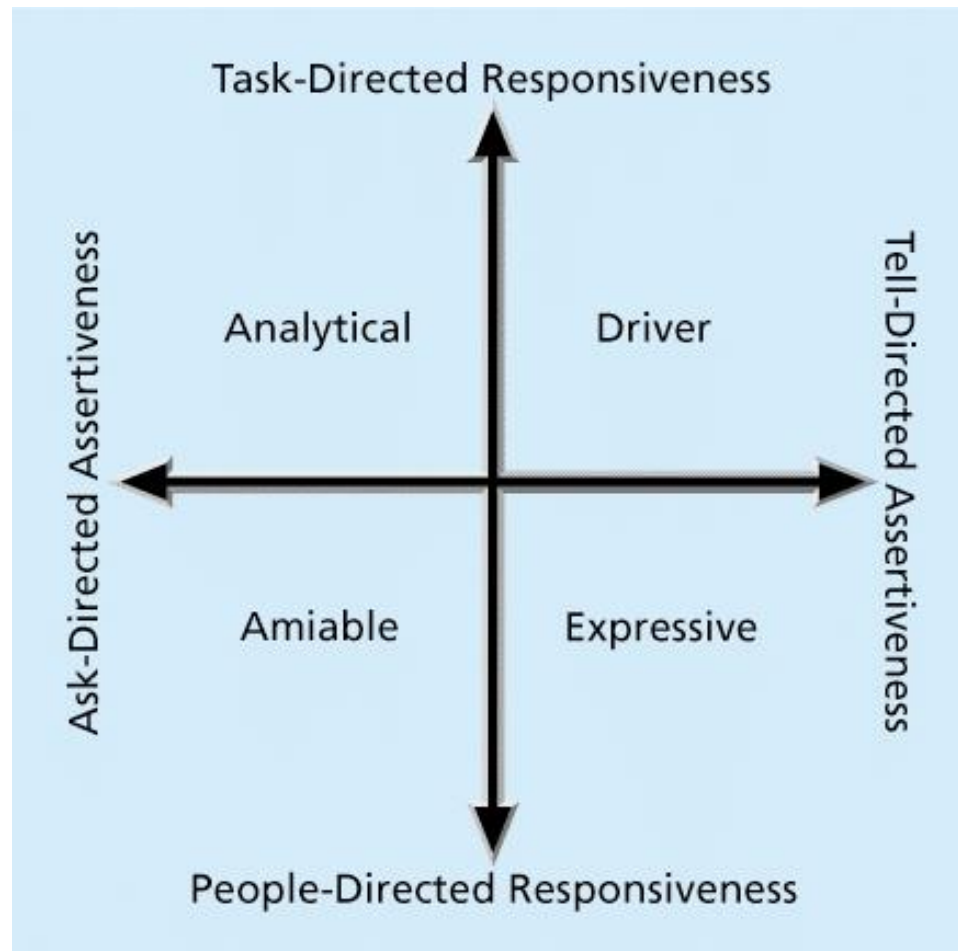


## 6. Developing the project team

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### The social Styles Profile

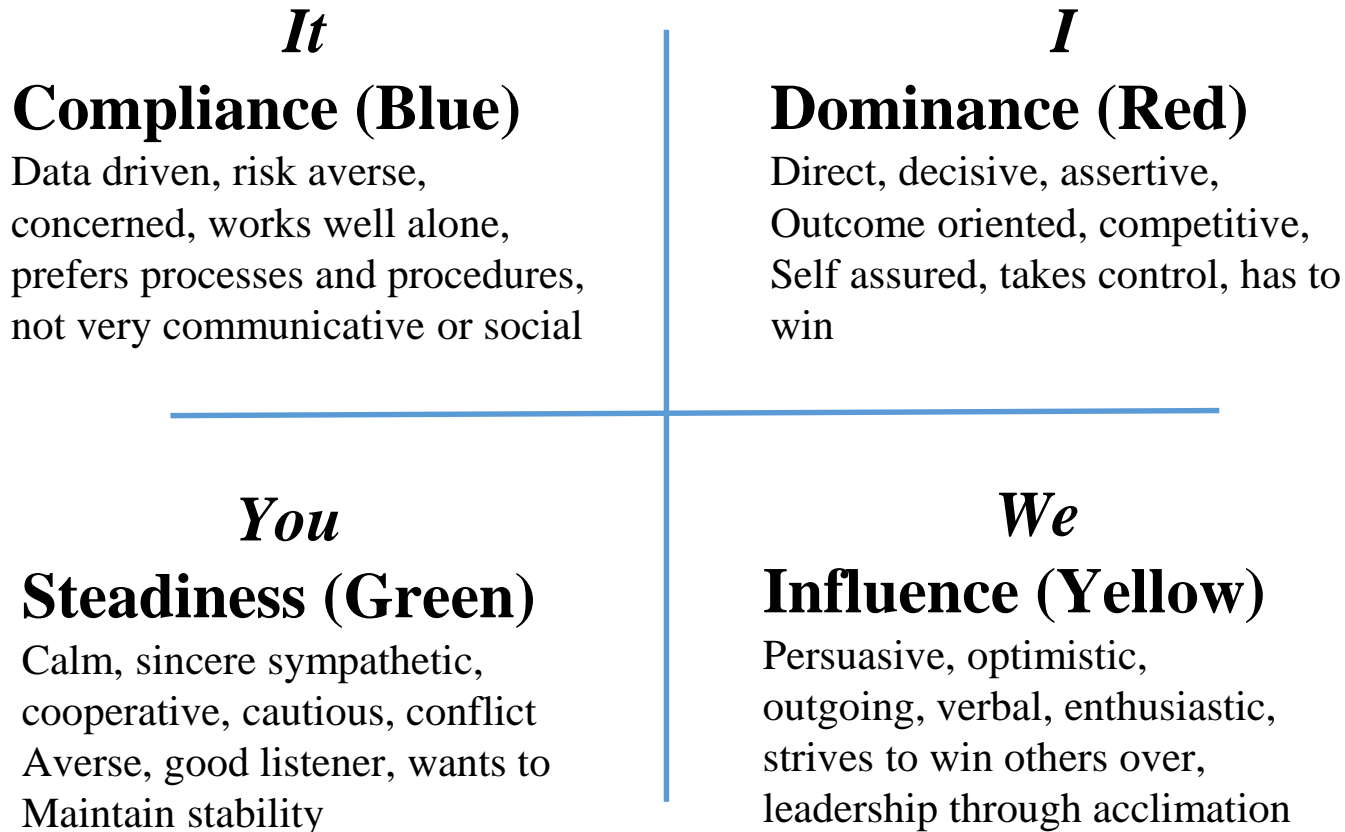
4 approximate behavioral profiles, or zones, based on their assertiveness and responsiveness:



## 6. Developing the project team

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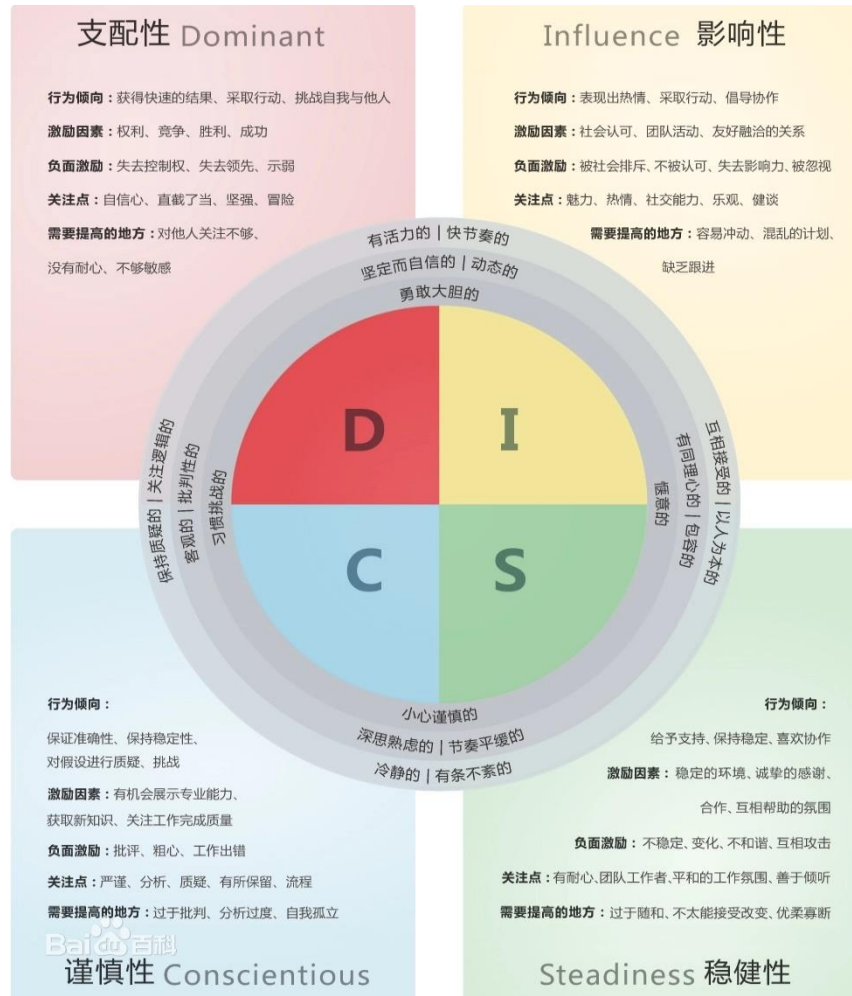
### DISC Profile



People in opposite quadrants can have problems understanding each other.

# 6. Developing the project team

## DISC Profile



## 6. Developing the project team

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### Reward and recognition systems

If management rewards teamwork, they will promote or reinforce the philosophy that people work more effectively in teams.

- Bonuses
- Trips
- Mentor

原则：

- 1) 有针对性，不能搞“平均主义”。
- 2) 保证及时性，将激励常态化。
- 3) 激励过程中注意沟通。



## **7. Managing the project team**

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**Process: Manage project team**

**Outputs: Change requests, project management plan updates,  
project documents updates,  
enterprise environmental factors updates,  
organizational process assets updates**

**Tools and techniques**

- **Observation and conversation**
- **Project performance appraisals**
- **Interpersonal skills**
- **Conflict management**

## 7. Managing the project team

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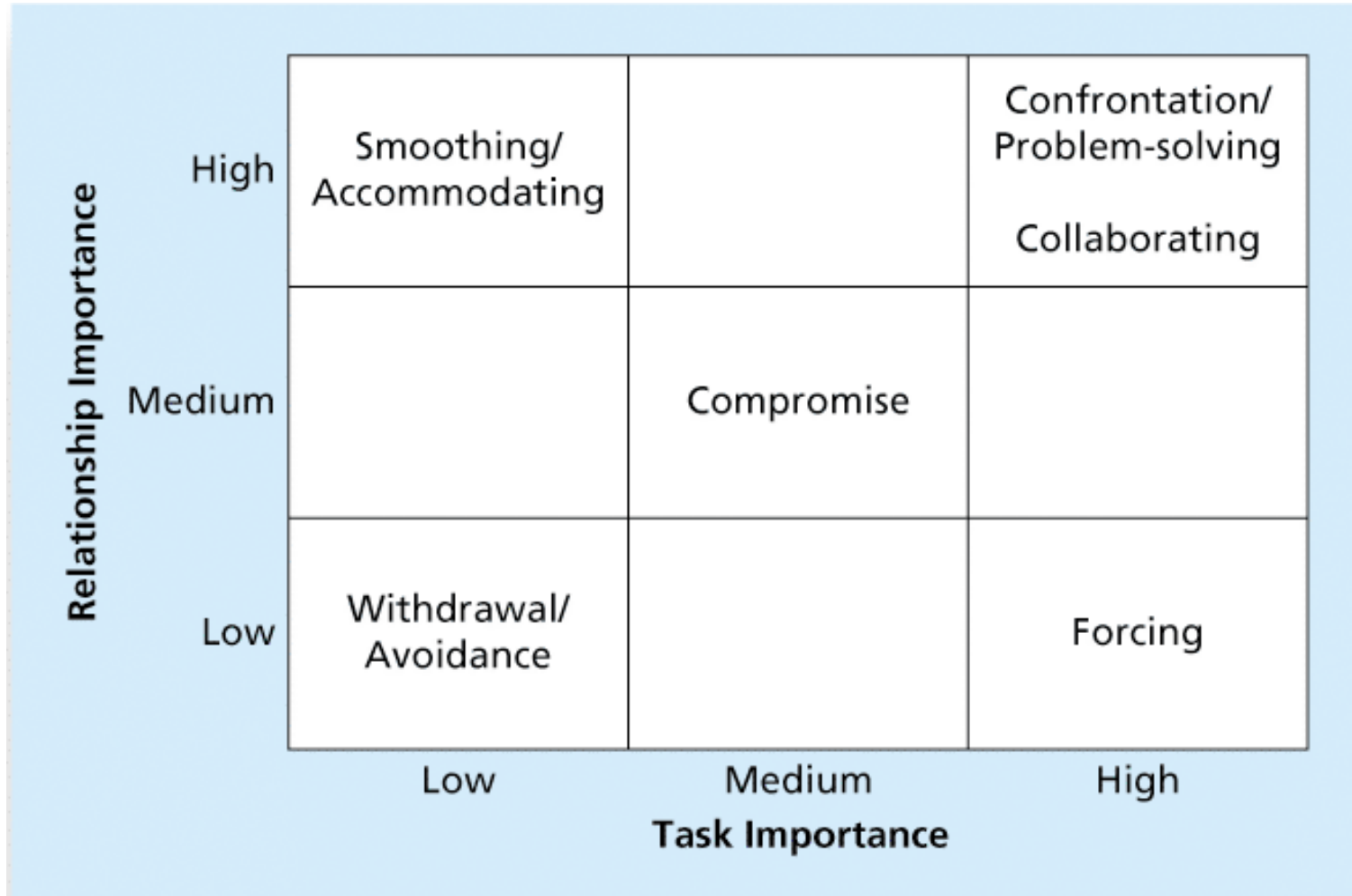
### Conflict handling modes:

1. **Confrontation:** Directly face a conflict using a problem-solving approach
2. **Compromise:** Use a give-and-take approach
3. **Smoothing:** De-emphasize areas of difference and emphasize areas of agreement
4. **Forcing:** The win-lose approach
5. **Withdrawal:** Retreat or withdraw from an actual or potential disagreement
6. **Collaborating:** Decision makers incorporate different viewpoints and insights to develop consensus and commitment

## 7. Managing the project team

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### Conflict handling modes:



## 7. Managing the project team

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### General advice on managing teams

#### 5 dysfunctions of teams are:

- Absence of trust
- Fear of conflict
- Lack of commitment
- Avoidance of accountability
- Inattention to results

*Additional suggestions are in Page 347.*





## 7. Managing the project team

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### General Advice on Teams

- Be patient and kind with your team
- Fix the problem instead of blaming people
- Establish regular, effective meetings
- Allow time for teams to go through the basic team-building stages
- Limit the size of work teams to three to seven members

## 7. Managing the project team

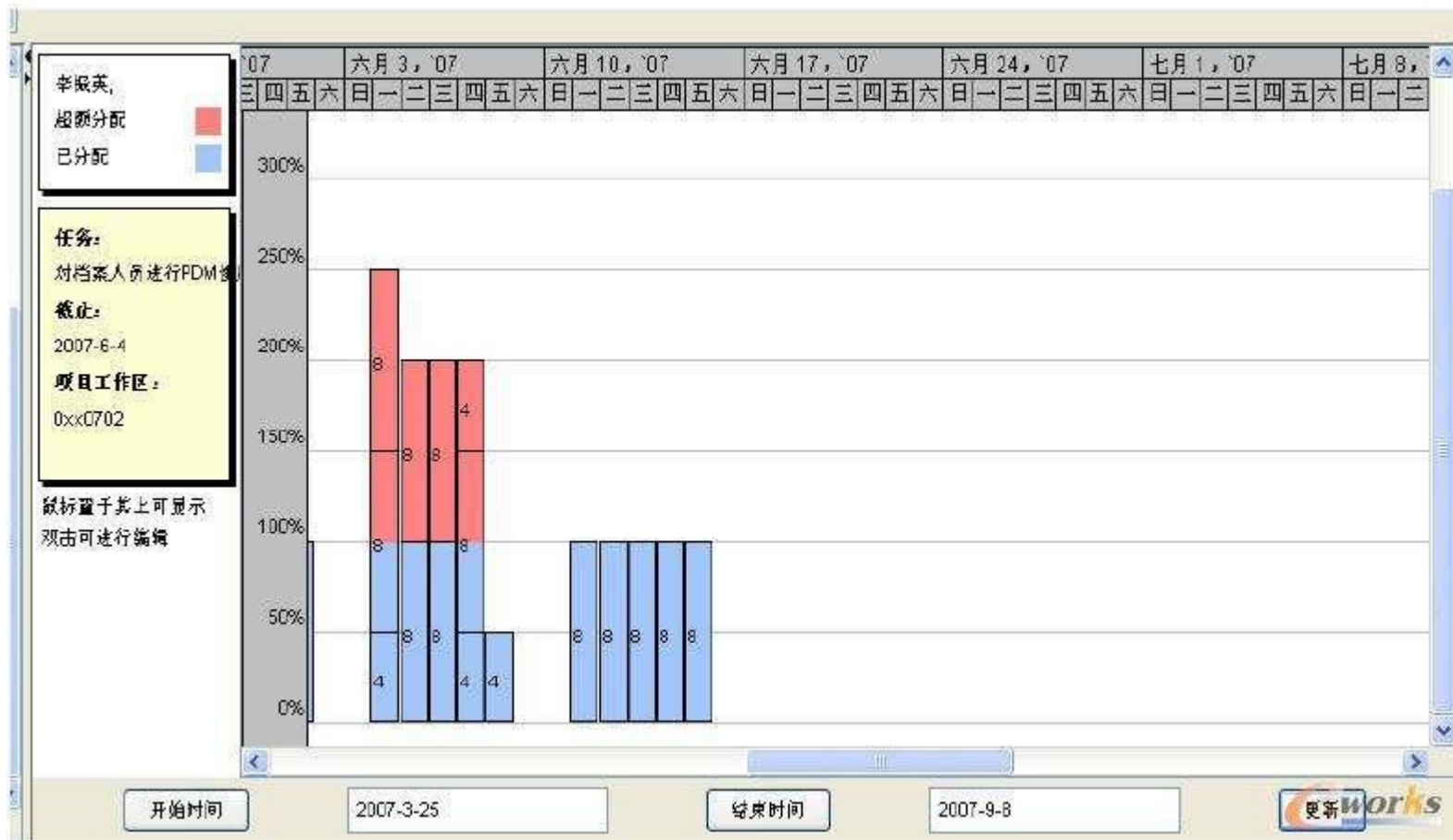
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### General Advice on Teams

- Plan some social activities to help project team members and other stakeholders get to know each other better
- Stress team identity
- Nurture team members and encourage them to help each other
- Recognize individual and team performance
- Take additional actions to work with virtual team members

## 7. Managing the project team

### Project Resource Management Involves Much More Than Using Software



# Chapter Summary

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- Project human resource management includes the processes required to make the most effective use of the people involved with a project
- Keys to managing people
- Main processes include
  - Plan human resource management
  - Acquire project team
  - Develop project team
  - Manage project team

# HOMEWORK

Create a resource histogram based on the Gantt chart.

