

COSC 310: Software Engineering

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Admin

- Slides: on website
- Labs start this week
- A1 due this Friday 3:30pm
 - Friday class: present posters and videos
- Group work in this class
 - A1 and A2
 - 4 rounds of peer evaluations (marks part of A2)
 - A3 is now individual

Why Need Teams?

Why Need Teams?

- Projects too large to be done solo
- Whole = sum of its parts?
 - Gestalt theory: e.g., compare a painting and its parts
- When is a team successful?
 - When “parts” work together

True or false?

- A product must be completed within 3 months
- A one person-year of programming is needed
- Product needs 3 months if we had 4 equally competent programmers

True or false?

- One farm hand can pick a strawberry field in 10 days
- Ten farm hands can pick the same field in 1 day

True or false?

- One elephant can produce a calf in 22 months
- 22 elephants can produce a calf in 1 month

Team Formation Model

- **Forming stage**
 - Discovery about themselves and others
 - Courtesy, confusion, caution, commonality
 - When does this typically occur?
- Storming stage
- Norming stage
- Performing stage
- Adjourning stage

Team Formation Model

- Forming stage
- Storming stage
 - Conflicts arise
 - Can lead to teamicide
 - Tension, criticism, confrontation
 - Example scenario?
- Norming stage
- Performing stage
- Adjourning stage

Team Formation Model

- Forming stage
- Storming stage
- Norming stage
 - Conflict resolution
 - Cooperation, collaboration, cohesion, commitment
 - When and how to get to this stage?
- Performing stage
- Adjourning stage

Team Formation Model

- Forming stage
- Storming stage
- Norming stage
- Performing stage
 - Productivity and focus
 - Challenge, creativity, group consciousness, consideration of members
 - Example scenario?
- Adjourning stage

Team Formation Model

- Forming stage
- Storming stage
- Norming stage
- Performing stage
- **Adjourning stage**
 - Purpose fulfilled
 - Compromise, communication, consensus, closure
 - When does this occur?

Recognizing Teamicide

- **Teamicide** = result of a group being stuck in the storming stage
- Possible causes:
 - Defensive management
 - Bureaucracy
 - Physical separation
 - Fragmentation of time (task switching lots)
 - Quality reduction
 - Phony deadlines
 - Clique control

How to overcome teamicide

- Who should be responsible?
- Possible fixes for each:
 - Defensive management
 - Bureaucracy
 - Physical separation
 - Fragmentation of time
 - Quality reduction
 - Phony deadlines
 - Clique control

How to overcome teamicide

- Who should be responsible?
- Possible fixes for each:
 - Defensive management
 - Trust employees, give them freedom to make mistakes
 - Bureaucracy
 - Physical separation
 - Fragmentation of time
 - Quality reduction
 - Phony deadlines
 - Clique control

How to overcome teamicide

- Who should be responsible?
- Possible fixes for each:
 - Defensive management
 - Bureaucracy
 - Avoid being overly concerned with procedure
 - Physical separation
 - Fragmentation of time
 - Quality reduction
 - Phony deadlines
 - Clique control

How to overcome teamicide

- Who should be responsible?
- Possible fixes for each:
 - Defensive management
 - Bureaucracy
 - Physical separation
 - Get people together, allow “cooler discussions”
 - Fragmentation of time
 - Quality reduction
 - Phony deadlines
 - Clique control

How to overcome teamicide

- Who should be responsible?
- Possible fixes for each:
 - Defensive management
 - Bureaucracy
 - Physical separation
 - Fragmentation of time
 - Limit number of projects assigned at one time
 - Quality reduction
 - Phony deadlines
 - Clique control

How to overcome teamicide

- Who should be responsible?
- Possible fixes for each:
 - Defensive management
 - Bureaucracy
 - Physical separation
 - Fragmentation of time
 - Quality reduction
 - Encourage continuous learning + professional development
 - Phony deadlines
 - Clique control

How to overcome teamicide

- Who should be responsible?
- Possible fixes for each:
 - Defensive management
 - Bureaucracy
 - Physical separation
 - Fragmentation of time
 - Quality reduction
 - Phony deadlines
 - Impose agreed upon deadlines, even if internal
 - Clique control

How to overcome teamicide

- Who should be responsible?
- Possible fixes for each:
 - Defensive management
 - Bureaucracy
 - Physical separation
 - Fragmentation of time
 - Quality reduction
 - Phony deadlines
 - Clique control
 - Encourage dynamic interaction

Team Building Activities

- Help individuals work together as a team
 - Improve understanding of each other
 - Improve how teams work together
- Which of these are team building activities?

Team Building Activities

- Help individuals work together as a team
 - Improve understanding of each other
 - Improve how teams work together
- Which of these are team building activities?
 - Team lunch or beer after work
 - Volleyball tournament
 - Indoor Climbing
 - Strategy board game
- Which are better?

Typical Project Roles

- Team lead
 - Functions as PM
 - Also does other work, e.g., programming
- Client liaison
- Secretary
- Programmer
- Test lead
- Documentation

Typical Project Roles

- Team lead
- Client liaison
 - Usually one consistent person assigned to this role
- Secretary
 - Usually one consistent person assigned to this role
- Programmer
- Test lead
- Documentation

Typical Project Roles

- Team lead
- Client liaison
- Secretary
- Programmer
 - Multiple people involved
- Test lead
 - Multiple people involved, with others testing
- Documentation

Typical Project Roles

- Team lead
- Client liaison
- Secretary
- Programmer
- Test lead
- Documentation
 - One or multiple people involved
 - What's the purpose of this task?

Managing Teams

- Team interaction is key determinant to performance
- Influential factors:
 - Composition
 - Cohesiveness
 - Communication
 - Organization

Team Composition

- Different motivation reasons
 - Task-oriented: everyone wants to do their own thing
 - Self-oriented: everyone wants to be the boss
 - Interaction-oriented: everyone wants to talk and not work

Team Composition

- Different motivation reasons
 - Task-oriented: everyone wants to do their own thing
 - Self-oriented: everyone wants to be the boss
 - Interaction-oriented: everyone wants to talk and not work
- Effective groups have all types
 - Why?

Team Composition

- Different motivation reasons
 - Task-oriented: everyone wants to do their own thing
 - Self-oriented: everyone wants to be the boss
 - Interaction-oriented: everyone wants to talk and not work
- Effective groups have all types
 - Why?
 - Software engineers tend to be task-oriented
 - Interaction-oriented types help detect/defuse tension

Team Cohesiveness

- A cohesiveness team considers the team to be more important than any individual in it
- Advantages:

Team Cohesiveness

- A cohesiveness team considers the team to be more important than any individual in it
- Advantages:
 - Develop and improve quality standards
 - Improve understanding of each other
 - Easier to learn from each other
 - **Egoless programming** – members improve on each other's work

Team Cohesiveness (cont.)

- Cohesiveness is influenced by:
 - Organizational culture
 - Individual personalities
- Can be encouraged via:

Team Cohesiveness (cont.)

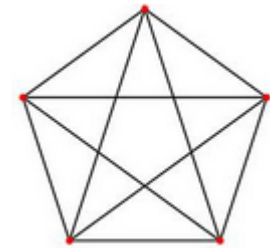
- Cohesiveness is influenced by:
 - Organizational culture
 - Individual personalities
- Can be encouraged via:
 - Team building activities
 - Group identity development (long term)
 - Open communication

Team Communication

- Number of communication channels

- Let $N = \#$ people

- # of 2-way (*mis*)communications = $N(N - 1)/2$



- Team dispersion

- Geography

- Time

Project Size	months	Staff size	Max. # of 2-way comm.
Small	<3	<3	1
Medium	3-9	3-15	3-105
Large	>9	>15	hundreds

Team Organization

- Usually informal for small teams
 - Everyone comes to consensus on decisions
 - Tasks allocated according to:
 - Ability
 - Experience
 - Interest
 - Successful if everyone is competent and cooperative

Team Organization (cont.)

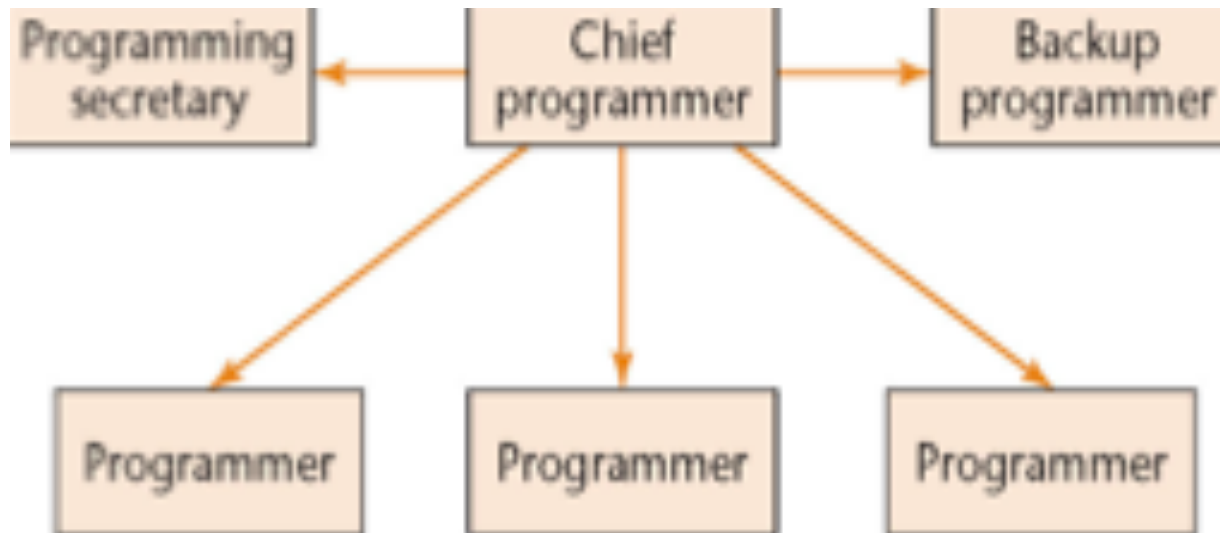
- Structures for large projects
 - Democratic
 - Chief programmer
 - Team leader and manager
 - Hierarchical

Democratic Team Approach

- Everyone is equal
- Decisions by consensus
- Practices egoless programming
 - Don't get attached to your own contribution
 - Less likely to criticize
 - More motivation to improve/find errors
- Product belongs to team
- Extremes:
hard to manage ... extremely productive

Other 3 Approaches

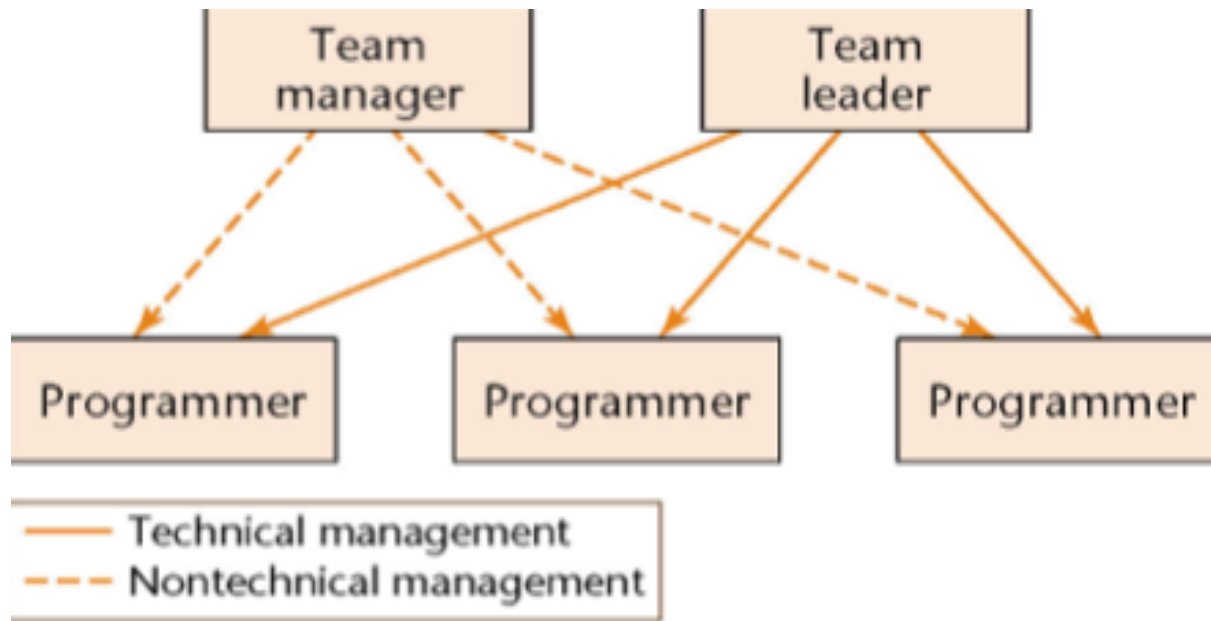
- Chief Programmer Approach



- Advantages/disadvantages?

Other 3 Approaches

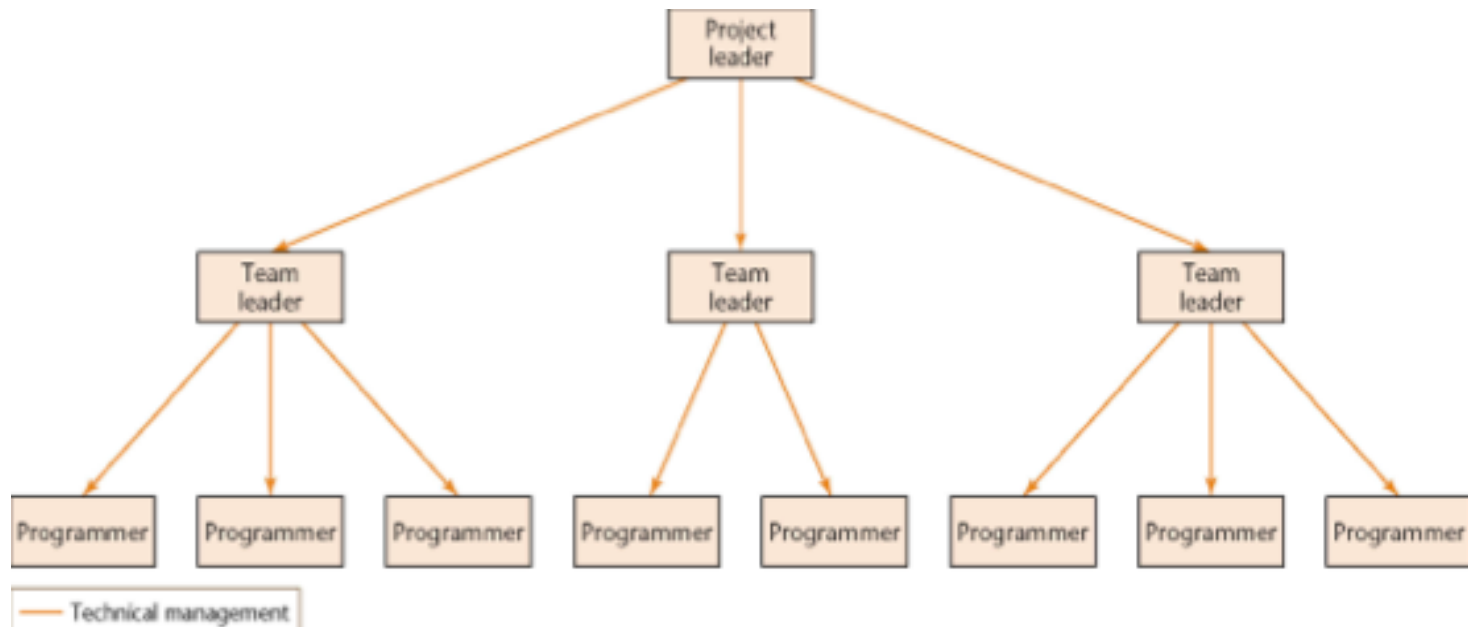
- Team Lead and Manager Approach



- Advantages/disadvantages?

Other 3 Approaches

- Hierarchical Approach



- Advantages/disadvantages?

Scenario

- You created a new startup
- Hired a group of new graduates with good programming skills
- Not necessarily your friends
- Which structure would you use?

Leadership

- Effective leadership depends on respect, not title or status
- Sometimes, more than one leader per team
 - Technical leader vs. administrator leader
 - Or leader by project type
- People follow leaders when they want to

Leading vs. Managing

- Leaders
 - Set directions
 - Do the right thing
- Managers
 - Follow a process
 - Do things in the right way
- Why is leadership important to a project or a team?

When to Lead, When to Manage

- **Leadership Style**

- **Telling**

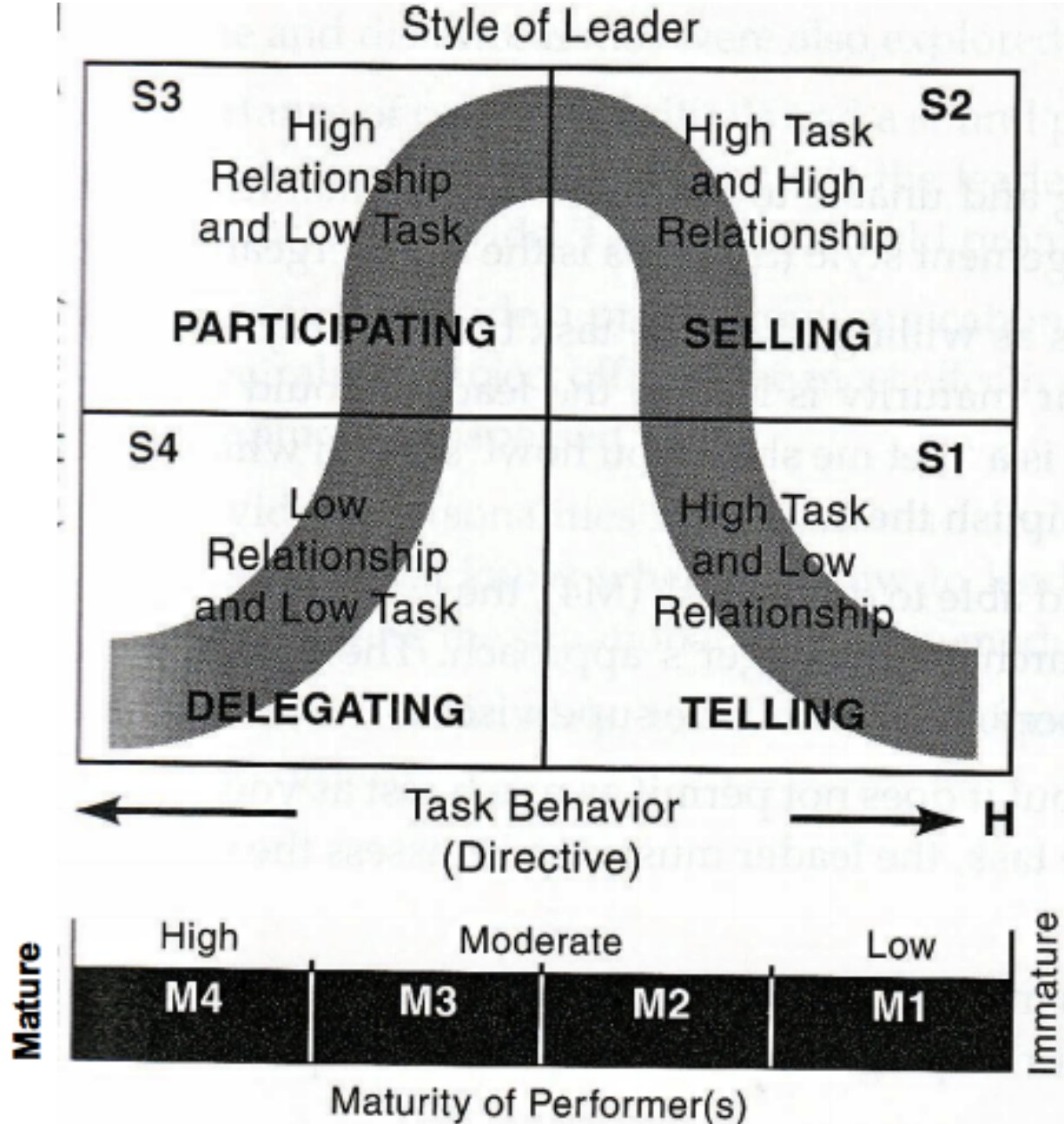
- **Selling**

- **Participating**

- **Delegating**

	Leader's Behavior	Performer's Maturity
	Give strong direction for what to do, and how to do it, with little regard for the feelings of the performers	Unwilling Unable
	Give softer direction, with a high degree of sensitivity to the feelings of the performers	Unwilling Able
	Show a high degree of concern for the feelings of the performers, and join in to help them do the task	Willing Unable
	Just give them the task, and observe from a distance	Willing Able

Leadership Cycle



RE 6-9

Situational Leadership Model

Common Interview Question

- How would you handle:
 - An employee is not performing the assigned tasks correctly.
 - As the team lead, what will you do?

Common Interview Question

- How would you handle:
 - An employee is not performing the assigned tasks correctly.
 - As the team lead, what will you do?
- Ask:
 - Performer's maturity?

Situational Leadership

- Matches leadership style to team stages
 - Forming
 - Storming
 - Norming
 - Performing
- Which style to use in each?

Situational Leadership

- Matches leadership style to team stages
 - Forming
 - Directive behaviour
 - Storming
 - Highly directive and supportive behaviour
 - Norming
 - High support, low direction
 - Performing
 - Low direction, low support
 - Coach and support as needed