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CIS 422/522  
Teamwork  
Group Dynamics

WHAT GROUP PROJECTS ARE SUPPOSED TO TEACH YOU

- COMMUNICATION
- RESPONSIBILITY
- COLLABORATION
- TEAMWORK

WHAT GROUP PROJECTS TAUGHT ME

- COMMUNICATION
- RESPONSIBILITY
- COLLABORATION
- TEAMWORK
- TRUST NO ONE

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Project Presentations

- Each team will have a total of 10 min
- Status against plan
  - What was planned? What was actually produced?
  - Brief demo of any advanced features (preloaded) if applicable
  - Did you implement what the customer wanted?
- Lessons learned: what did you learn about SE?
  - How effective was project planning?
  - Root causes of schedule delays?
  - Effectiveness of risk mitigations?
  - What will you do differently for project 2?

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Quality Requirements

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### Terminology

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- Avoid "functional" and non-functional" classification
- Behavioral Requirements – any information necessary to determine if the run-time behavior of a given implementation constitutes an acceptable system
  - All quantitative constraints on the system's run-time behavior
  - Other objective measures (safety, performance, fault-tolerance)
  - In theory all can be validated by observing the running system and measuring the results
- Developmental Quality Attributes - any constraints on the system's static construction
  - Maintainability, reusability, ease of change (mutability)
  - Measures of these qualities are necessarily relativistic (I.e., in comparison to something else)

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### Behavioral vs. Developmental

Behavioral (observable)	Developmental Qualities
<ul style="list-style-type: none"> <li>• Performance</li> <li>• Security</li> <li>• Availability</li> <li>• Reliability</li> <li>• Usability</li> </ul> <p style="font-size: x-small; margin-top: 10px;">Properties resulting from the behavior of components, connectors and interfaces that exist at run time.</p>	<ul style="list-style-type: none"> <li>• Modifiability(ease of change)</li> <li>• Portability</li> <li>• Reusability</li> <li>• Ease of integration</li> <li>• Understandability</li> <li>• Support concurrent development</li> </ul> <p style="font-size: x-small; margin-top: 10px;">Properties resulting from the structure of components, connectors and interfaces that exist at design time <i>whether or not they have any distinct run-time manifestation.</i></p>

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### Specifying Quality Requirements

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- Is it important to specify the quality requirements explicitly? Unambiguously?
  - What role would quality requirements play in customer acceptance?
  - How do quality requirements affect subsequent design?
- Are these kinds of specifications adequate?
  - "The system interface shall be easy to use."
  - "The system shall support the maximum number of simultaneous users"

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## Specifying Quality Requirements

- When using natural language, write objectively verifiable requirements when possible
  - Load handling: "The system will support 15 or more concurrent users while staying within required performance bounds."
  - Maintainability: "The following kinds of requirements changes will require changes in no more than one module of the system..."
  - Performance:
    - "System output X has a deadline of 5 ms from the input event."
    - "System output Y must be updated at a frequency of no less than 20 ms."

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## Example Timing Requirements

### 5.2. TIMING REQUIREMENTS FOR DEMAND FUNCTIONS

For all the demand functions, the rate of demand is so low that it will not constitute a significant CPU-load.

For the starred entries, the desired maximum delay is not known; the entry is the maximum delay in the current OFP, which we will use as an approximation. In one case, both the current and desired values are given. The current value would be good enough to satisfy requirements, but the desired rate would be preferred.

Function name	Maximum delay to completion
<b>IMS:</b>	
Switch AUTOCAL light on/off	*200 ms
Switch computer control on/off	*200 ms
Issue computer failure	not significant
Change scale factor	*200 ms
Switch X slewing on/off	*200 ms
Switch Y slewing on/off	*200 ms
Switch Z slewing on/off	*200 ms
Change latitude-greater-than-70-degrees	*200 ms
Switch INA light on/off	*200 ms
<b>FLR:</b>	
Enable radar cursor	200 ms
Slave or release slave	40 ms

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## Summary

- Quality requirements are typically at least as important as functional requirements
- Quality requirements drive the overall system design
- Implies that it is important that quality requirements be unambiguously specified, validated, and verified

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## Teamwork & Group Dynamics

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### What makes a great project team?

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- Together must cover all aspects of a project
- Diverse Skills
  - Intellectual: requirements, design, code, test
  - Managerial: estimation, planning, scheduling, reporting
  - People skills: communication (written, verbal), negotiation, collaboration
- Coherence
  - Shared expectations
  - Ability to construct and work toward a shared vision
- Mutual Respect and Responsibility
  - You don't *have* to like each other, but you *need* to trust and respect each other — and to earn your teammates trust and respect
  - This is an enduring part of professionalism in the real world

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### Roles and Responsibilities

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- Roles should reflect *ownership of responsibilities*
- Each role is responsible for specific activities and artifacts
  - Manager: responsible for schedule
  - Tester: responsible for test plan, unit testing
- A person in the role *owns* the corresponding artifacts
  - Does not mean he/she does all the work
  - Does mean he/she is responsible for artifact's completeness and quality
- *Project Risk*: failure to be specific about individual responsibilities and holding people accountable
  - One of the most frequently cited project problems

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### What do software developers do?

- One way to measure: how do they spend their time?
- IBM study (McCue 78):
  - 50% team interactions
  - 30% working alone
  - 20% not directly productive

*i.e., Technical excellence is not enough*

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### "Egoless" design

*(Weinberg, Psychology of Computer Programming)*

- Investing ego in group
- "Letting go" of ego investment in code, design, ideas
  - No winning or losing design debates (focus on improving the product)
  - Once contributed, ideas and artifacts belong to the group
  - Criticism is aimed at artifacts, not people
- The best designers criticize their own designs!
  - Our own assumptions are the hardest to critique
  - Corollary: A good critic is your best ally
    - The hardest lesson to learn but one of the most valuable
    - Applies to all aspects of profession and life

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### ... but we are not egoless people

- Ego investment is normal
  - be aware of it, be in control of it
- Consider the egos of others
  - Examine your own motivations: What are you attacking? Why?
  - What is motivation of the other person?
    - Are they feeling ignored? Not valued?
- Pride in accomplishment is ok, unless it interferes with accomplishment

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### Consensus Decision Making

- Consensus is not counting votes
  - Democracy is 51% agreement
  - Unanimity is 100% agreement
- Consensus is neither
  - Everyone has their say
  - Everyone accepts the decision, even if they do not prefer it
  - It is "buying in" by group as a whole, including those who disagree
- Usually *best approach for peer groups*
  - "Buy-in" is critical for coordinated effort

*Consensus takes time and work, but is worthwhile*

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### Conflict

- Can be healthy and productive
- Can destroy a team if not carefully managed
- Manage conflict constructively
  - Soothe and protect egos
    - Everyone's job, but especially the manager's job
  - Keep conflict on a technical level (not personal)
  - Reward conflict resolution
- If team really cannot reach resolution, talk to instructor

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### Being a Good Team Member

- Attributes most valued by other team members
  - Dependability
    - When you say you'll do something, you do it
    - Correctly
    - On time
  - Carrying your own weight (doing a fair share of the work)
  - People will overlook almost everything else if you do these
- Also part of your grade
  - Collect from peer evaluations, blogs, etc.
  - Can significantly raise or lower project grade

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**A Word on Managing**

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- A good manager supplies what is needed for the team to succeed. This includes (but is not limited to)
  - Resources
  - Planning and coordination
  - Pitching in when needed
  - Protection (especially from upper management)
  - Emotional support, etc.
- Good managers are are leaders not dictators (especially true for *peer* teams)
- Good managers are rare

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**Introverts & Extroverts**

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- Where does your energy come form
  - Extroverts energized by social interactions
  - Introverts energized by internal reflection
- Both have value
  - Extroverts work well in group settings especially with new people
    - May tend to "shoot from the hip"
  - Introverts tend to think more deeply about issues
    - May be reticent to share thoughts
- Important to ensure that introverts are heard
  - i.e., explicitly take turns asking for inputs
  - Provide smaller venues for discussion

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**Effective Meetings**

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### Notes on effective meetings

- Only hold meetings if necessary
  - “Necessary” means that the most cost effective way to accomplish a goal is by meeting
- Have a goal, and a plan (agenda)
  - Clear meeting objectives
  - Known to all in advance (I.e, distribute via email)
- Plan to goal:
  - Participants - Invite only the necessary people
  - Schedule
  - Intended outcome
- Prepare
  - Cost of wasted time = Time x people x hourly cost
  - Cost of individual prep time is much less

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### Notes on effective meetings (2)

- Start on time, end on time
- Write down and disseminate the results
  - Leaves an audit trail of decisions
  - Makes people feel included
  - Limits the number of (informational) invitees
- End with concrete, specific action items
  - What must be done
  - Who should do it
  - What the follow-up is

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Questions?

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