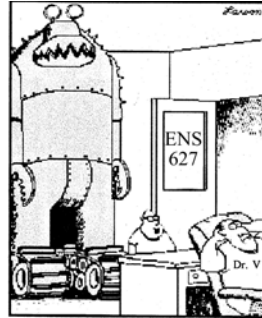


## 20. Teams

- Teams
- Design process



"My project's ready for grading, Dr. Big Nose... Hey! ... I'm talking to you, squid brain!"

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20.1

## What is a team?

"A team is a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they are mutually accountable."

(Katzenbach, J.R. & Smith, D.K. (1993). *The Wisdom of Teams: Creating the High-performance Organization*. Boston: Harvard Business School.)

Decker, Philip, J. (1996) "Characteristics of an Effective Team," (Powerpoint)  
[http://www.cluh.edu/bpa/hadm/HADM\\_5731/ppi\\_presentations/29teams](http://www.cluh.edu/bpa/hadm/HADM_5731/ppi_presentations/29teams)

Breslow, L. (1998). *Teaching Teamwork Skills, Part 2. Teach Talk, X, 5.*  
<http://web.mit.edu/ill/published/teamwork2.htm>. 13 May 2003.

Building Blocks for Teams, (Website), Penn State University, <http://tl.itl.psu.edu/suggestions/teams/student/index.html>

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20.2

## Stages of Team Development

- **Forming**
    - The stage where team members are just becoming acquainted—the “honeymoon”
  - **Storming**
    - Conflict begins as team members negotiate work assignments, discuss what to do
  - **Norming**
    - Team members learn to work together—pride begins to develop
  - **Performing**
    - Team settles down and most of the work gets done
- Internal fragmentation: on average, each file wastes a half a block  
To handle wear-leveling  
if the work gets done  
allocate from other end  
What if bad block?

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20.3

## Team Leader Role

- **Responsibilities:**
  - Calling meetings including finding a mutually agreeable time and place
  - Setting a meeting agenda (more on this later)
  - Facilitating the meeting (more later)
  - Monitoring progress against the plan
  - Identifying problem areas that need action
- **Some rules:**
  - The leader is not “the boss”
  - The team needs to agree on decisions and directions
  - Compromise is essential

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20.4

## Gantt chart

- Sensor
- Motor
- Mechanicals
- Network
- Power
- Control
- Debugging

*Break project into little tasks  
Give yourself some milestones to show success*

ID	Task/Name	Start	Finish	Duration	January											
					20	21	22	23	24	25	26	27	28	29		
1	Organize Team & Team Members	1/21/2004	1/21/2004	1d												
2	Identify Alternative Project Topics (Web Site)	1/22/2004	1/23/2004	2d												
3	Call Team Meeting to Discuss Topics	1/22/2004	1/23/2004	2d												
4	Submit Team Topic (Web Pages)	1/23/2004	1/23/2004	1d												
5	Team Topic Due	1/28/2004	1/28/2004	0d												

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20.5

## Holding Effective Meetings— Tips for Success

- Before the meeting
  - Name someone to be the facilitator
  - Create an agenda and send it to all team members
- Set a time limit for the meeting
- During the meeting, if issues emerge that are not on the agenda, the facilitator should:
  - Ask the team if this should be discussed now, or
  - Table the issues for the end of the meeting
- During the meeting:
  - Keep a list of decisions and actions items
  - Keep to the time commitment
  - Create an agenda for next meeting and agree on time and place
- After the meeting:
  - Send out a brief summary
  - List of action items
  - Those responsible for those actions

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20.6

## Brainstorming

- Select someone to be the recorder
- Invite everyone to give their ideas and input
- Write down all ideas without criticism or discussion
- After complete list is generated, return for discussion/analysis
- Carefully select the best approach or idea from the list

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20.7

## Brainstorming-Hints for success

- Avoid being judgmental of others' ideas
- Try to look at all sides of an idea.
- Listen attentively and treat your teammates' opinions with respect
- Try to encourage the widest range of new ideas
- Everyone should participate
- Don't stop the idea session too soon
- Try to remove your ego from the discussions.
- Don't take the rejection of your ideas personally.

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20.8

## Group Communication

- Listen attentively and respect your teammates
- Ask questions
- Give constructive feedback:
  - Present your ideas forcefully, but keep an open mind.
  - Restate the original idea to be sure it's understood
  - Critique the idea, not the person
  - Be courteous
  - Be aware of body language and tone
- Meetings don't need to be a death march
  - Use humor effectively
  - Laugh with someone, do not laugh at someone

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20.9

## Team Problems

- **Frustration** over the size of the project
  - Members think of an individual endeavor rather than a group endeavor
  - Break the project up into tasks
  - Engage all group members
  - Set realistic dates for each task



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20.10

## Team Problems: Conflict

- **Internal conflict** – An team member is experiencing a personal conflict that is interfering with his or her ability to perform
- **Individual conflict with another team member** - One team member is in conflict with another
- **Individual conflict with the entire team** - One team member is experiencing conflict with the entire team
- **Conflict between several team members** - The entire team is experiencing conflict with several other team members

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20.11

## Conflict Resolution

- Acknowledge that the conflict exists.
- Gain common ground.
  - Seek to understand all angles: Let each person state his or her view briefly.
  - Have neutral team members reflect on areas of agreement or disagreement.
  - Explore areas of disagreement for specific issues.
  - Have opponents suggest modifications to their points of view as well as others.
  - If consensus is blocked, ask opponents if they can accept the team's decision.
- Attack the issue, not each other.
- Develop an action plan.

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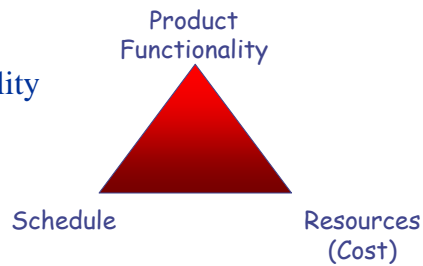
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20.12

## Design Process

We can only optimize two of the following

- Schedule
- Resources
- **Functionality**



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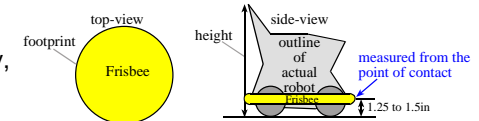
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20.13

## 1) Analysis phase

**requirements** parameters that the system must satisfy

- Lab 7 rules
- specifications** describing how the system should work
- Frisbee
- tracks
- one 8.4V battery,
- existing motors
- 3 minute race



**constraints** limitations, within which the system must operate

- the kit+\$50
- play nice with other robots
- interfaces with other instruments and test equipment,
- development schedule.

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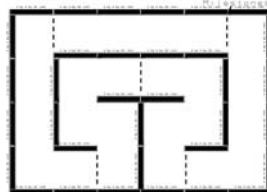
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20.14

## 2) High-level design phase (project proposal)

**build conceptual models**

- *data flow graph*
- *block diagrams*
- fundamental equations**
- exploit abstraction
- search for existing components
- try different control algorithms

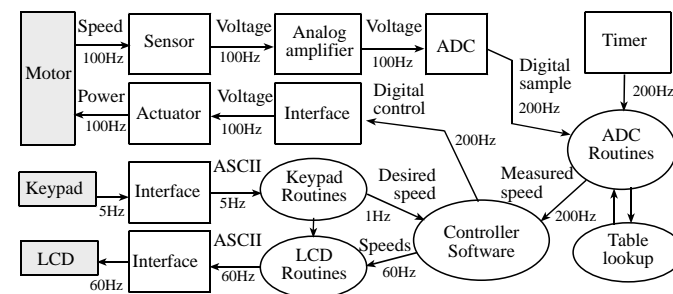


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## Data flow graph



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20.16

### 3) Engineering design phase

hierarchical structure

- Call-graphs
- Data structures
- Flow charts

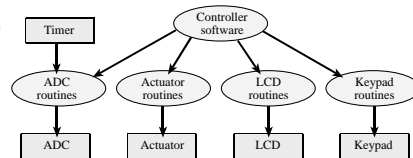
basic I/O interfaces

overall software scheme

direct correlation between hardware/software systems and conceptual models

built mock-ups of the mechanical parts (connectors, chassis, cables etc.)

mock-ups user software interface

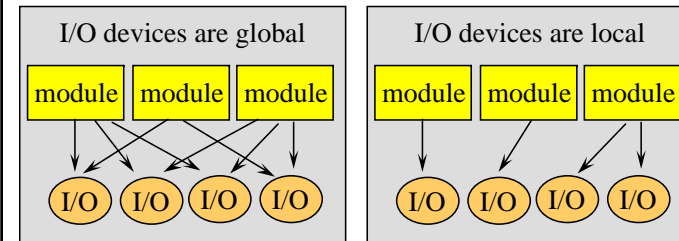


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20.17

### Call graph



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20.18

### 4) Implementation phase

- Concurrent implementation
- Initially implement using simulation
- Divide into modules

### 5) Testing phase

- Design for test
- Concurrent testing
- Control and observability (use OLED SDC)

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20.19

### An Effective Team Checklist

- Define a common goal for the project.
- List tasks to be completed.
- Assign responsibility for all tasks.
- Develop a timeline and stick to it.
- Develop and post a Gantt chart for the plan
- Document key decisions and actions from all team meetings.
- Send reminders when deadlines approach.
- Send confirmation when tasks are completed.
- Collectively review the project output for quality

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20.20