
You will need paper and a pen or pencil
and 1 to 2 partners (today's "team";
introduce yourselves as needed).

Successful Team Programming

Based on presentation by
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My Background

- Professional computer scientist (engineer, manager) c.1966 - 2002
- Worked for small computer businesses, government contractors, Hewlett-Packard Company, Colorado State University
- At one time or another worked (engineer or manager) on a very large range of CS topics (including operating systems, drivers, compilers, graphics, artificial intelligence, database, applications programs, ...)
- **EVERY** single project involved teams
 - from small teams of 2 to 8 engineers plus support (management, marketing, sales, test, delivery)
 - to very large teams, in broadly geographically dispersed sites: California, Colorado, New York, Florida, India, China, ...
 - providing products and support for customers (who are a very special part of a team) around the country and the world.

Skill Requirements

- According to CSU's career center, what are the most important skills that computer science employers are looking for?
 - #0: Computer Science Technical Abilities
 - #1: Communication
 - #2: Teamwork
 - and beyond: (flexibility, judgement, dependability, creativity, ...)
- Why these skills?
 - Working in teams is essential to business success
 - As a hiring manager, every prospective employee interviewing for a position was interviewed for their "soft" skills as well as their technical abilities.
 - Yearly evaluations, raises, promotions, and job assignments were based on these skills

What makes team skills so important?

- Each of you (individually) write down as many ideas as you can think of.
- How many did you think of?
- Now compare notes with your colleague(s).
- Are your lists identical?

- What are some of the ideas your “team” came up with?

What makes team skills so important?

- More creativity
 - Improved quality (including functionality, usability, reliability, performance, and supportability) of final products
 - Better engineering
 - Better documentation
 - Better ability to support and improve
 - Faster time to market
 - The possibility of creating far more innovative and complex products than can be built by an individual.
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What makes team skills so important?

- And working successfully in teams can be enormously satisfying and fun and can help you learn all kinds of new skills and information.

What are your goals related to class projects / homework?

- Each of you (individually) write down as many of your goals as you can think of in about a minute.
- Now compare notes with your colleague(s). Were your lists identical?
- Are there goals you didn't think of that appeal to you? Are there goals on a colleague's list that you don't relate to?
- What are some of the ideas your team came up with? Grades? Deadlines (finish early, late, just in time?) What else?

What kinds of things might go wrong
in a team project?

Any ideas? Call them out.

Things that might go wrong

Some skills and tactics

- Communication, including
 - Listening/negotiating
 - Feedback formula
- Flexibility
- Shared goals and plans
- Get help if you need it

Communicate, Communicate, Communicate!

- Figure out how each member prefers to communicate:
 - email, vmail, meetings, ...
 - Agree as a team ...
- If encounter problems, speak up as soon as possible
 - Easier to adjust plans earlier than day before project due!
- Communicate status regularly – what's going well, what is not
- Ask questions
- Raise (and discuss) issues promptly, bluntly, and directly:

Steven Covey on Negotiation

- Listen first and listen well. Be able to present the other person's point of view better than they can themselves.
 - Once you have presented it, if you still disagree do so.
 - Look for places to bridge and combine. If the project only needed one person it wouldn't be a team project.
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And give feedback

The Feedback Formula

1. When you do [behavior] I feel [feelings].
 2. For a conversation include: Can you tell me what is going on from your point of view?
 3. (if appropriate) What I wish you would do in the future is ...
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Feedback example

- “When you miss a meeting and don’t let me know I feel frustrated, angry, and as if you feel my time is not important. What I wish you would do instead is to call or write me early so we can re-schedule.”
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Try it

- Each of you think of some easy and positive behavior you have seen in your colleague (listening, offering useful ideas).
 - One of you use the feedback formula while the other listens.
 - Example: “When you listen to my ideas and offer your own I feel appreciated and I learn new things.”
 - Listener, say “Thank you.” or “Thank you for telling me.”
 - Switch roles
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When giving feedback:

- ... talk only about their observable behavior, not your opinion of their feelings, motives, intentions;
 - describe in clear and specific terms their observable behavior ...
 - ... and the impact on you of this behavior (your feelings).
 - “I feel unimportant to you”, not “that you think I am unimportant”
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When To Give Feedback?

- As soon as possible.
 - No bad habits have been formed
 - No extra baggage inside of me
 - If I tell someone something bothers me the first time it happens and just as soon as possible after I see it happen, I will be mild and they will not wonder why I didn't say something before.
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Be Flexible

- It's a given that there will be surprises when working on a software engineering project
 - Tasks may take less time than originally anticipated or may take more time
 - Designs may need to be reworked
 - Requirements may change
- Be willing to
 - help wherever needed
 - ask for help when necessary
 - Accept help as needed
- There will be tasks that no one wants to do, but they still must be done! Be willing to do them with a positive attitude.
- Know when to lead and when to follow
- Know when to accept decisions, just because it is not what you would have done, does not mean it is wrong

Some other resources for addressing problems

- Sangmi
- Elaine
- ...

A Good Project MUST have clear Requirements and Plan

- Clearly define (at least one planning meeting right away!):
 - Project goals and requirements
 - Each person's strengths, personal goals, and tastes
 - Take into account interests and desired growth areas
 - Evaluate time required and time available
 - Agree on milestones and deadlines

Requirements and Plan

- Next you must clearly define who does what, including
 - Project goals and requirements
 - Agreed-upon milestones and deadlines
- Be sure to put all agreements in **writing!**

Know your Team Mates

- Everyone starts at a different point
 - What previous experience does each person have?
- Each person brings unique strengths & weaknesses to the team
 - Creativity, design, testing, leadership
 - The most successful teams are those that have a diverse set of skills and those skills are valued and leveraged by each team member
- People have individual interests/goals in addition to group goals
 - Opportunity to lead? Learn a new skill?
- Understand cultural background
 - Actions, words must be understood from the context of an individual's culture
- If possible, get to know your team mates outside of project
 - Do you share common interests?
 - What else is going on in their lives?
 - Team Building

Successful Project Teams

- Take time and effort to build
- Require
 - Knowing your teammates
 - Defining roles and responsibilities
 - Flexibility
 - Communications
- Can be one of the most rewarding aspects of a software engineering career!

Thank you for your attention and
willingness to participate!

Any questions?

What are likely problems?

- Illness / emergencies
 - Un-met commitments (including not showing up to meetings or replying to emails)
 - One person refuses to do any work
 - One person insists on doing all the work
 - One person does all the talking
 - One person insists on everything being done his or her way
 - Being too busy
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Interview Questions

- Give an example of a team project that was not successful.
 - Why?
 - What did you learn from the experience?
- Give an example of a team project that was successful.
 - What characteristics made the project successful?