Pair Programming

CSE 142, Summer 2003
Computer Programming 1

http://www.cs.washington.edu/education/courses/142/03su/

Readings and References

- Reading

  » *All I Really Need to Know About Pair Programming I Learned in Kindergarten*, Laurie A. Williams and Robert R. Kessler, Communications of the ACM 43:5 (May 2000)

Readings and References

- Other References
  - » Cool gadgets and some people who make them
    - http://mars.jpl.nasa.gov/mer/
    - http://www.jpl.nasa.gov/news/profiles/profiles_index.cfm
    - http://www.aceuplink.com/robotics/space/opportunitymer/
  - » *Mastering the Art of Creative Collaboration*, Hargrove 1998
  - » UW Office of Undergraduate Education
    - http://www.washington.edu/oue/
  - » Loronix Video Solutions from Verint Systems, Inc.
   - http://www.loronix.com/

Programming Can Be Frustrating…

… but it can also be very satisfying

- Building things that work is fun!
  - » Programming is a tool for building things
- The functions that a program can do are virtually unlimited
  - » capabilities are growing every day
  - » the computing power on your desktop far exceeds that which got us to the moon
  - » and that which is now going to Mars …
    - 20 MHz PPC, 128 MB of DRAM, 3 MB of EEPROM
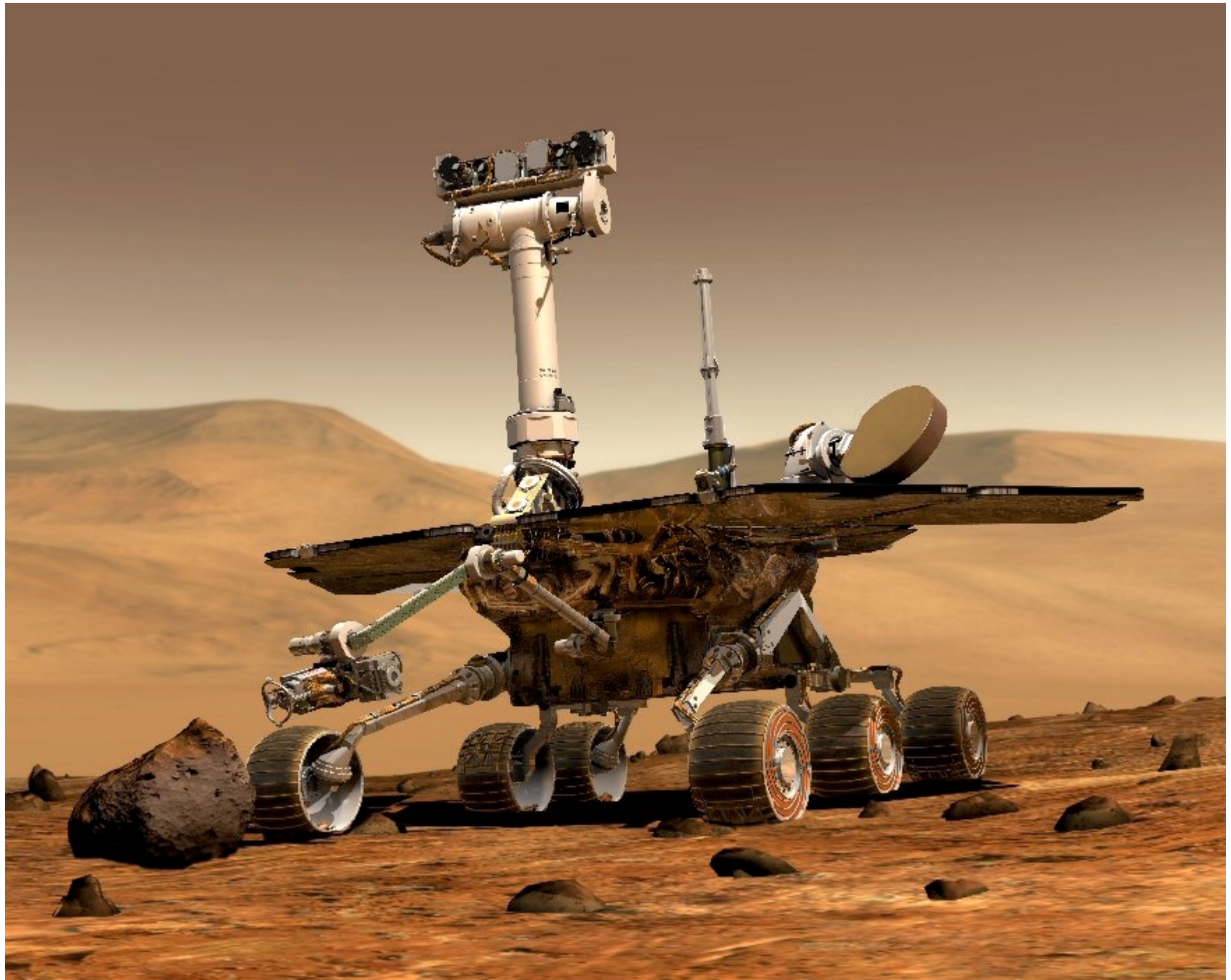
Teams combine the skills of many different people

JPL's Bionic Woman
Dr. Ayanna Howard

Local girl Dr. Ayanna Howard can thank the Bionic Woman, her all-time favorite TV series, for inspiring her to get where she is today. The 30-year-old robotics research engineer is now JPL's own bionic woman. She is currently a member of the Telerobotics Research and Applications Group at JPL and the principal investigator of the Safe Rover Navigation Task

Dr. Ayanna Howard with the Safe Navigation Rover

NASA releases video made by Cornell undergraduate Dan Maas to dramatize plans for two-rover space mission in 2003

ITHACA, N.Y. -- When NASA today announced its intention to send two rover exploration vehicles to Mars on its previously announced 2003 space shot, it introduced the ambitious venture with a two-minute, computer-generated video that dramatizes the mission with startling clarity and accuracy.

The video is the work of Dan Maas, a 19-year-old undergraduate at Cornell University enrolled in the university's College Scholar program for independent, interdisciplinary study.

An image of the Rover from the Dan Maas video, with the collapsed lander

Mobility engineers Christopher Voorhees (left) and Brian Harrington test the rover's suspension and wheel capability on staggered ramps in JPL's Spacecraft Assembly Facility.

Pair Programming

- ## Observation

  - » two people can be more effective together than alone

- ## Idea

  - » work with a partner on the programming projects

  - » program together, don't split up the work

- ## Sit at one computer together to program

  - » One is the driver, one is the navigator

Driver and Navigator

- Driver is the one with the keyboard
  - » actually types the code
- Navigator watches over the driver's shoulder
  - » Stay engaged
  - » Contribute ideas
  - » Look things up – books, documentation, …
  - » Catch typos/bugs, but do it politely
- Shared responsibility for success of the project
- Switch roles frequently - 15/20 minutes

Successful Pair Programming

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Successful Pair Programming

- Mutual respect
  - » Both partners have something to contribute, even if backgrounds are different
  - » Not "you goofed" or "I goofed" – always "we goofed" (but more often, "we got it right")
- Share everything
  - » You and your partner produce a single piece of work
- Switch often - No "professional drivers"

Always learning

- There is always more you can learn, no matter how much you know
    - » more details of the language and operating system
    - » more information about the application domain
    - » a broader view of design and how to go about it
    - » a new approach to debugging problems in code
    - » new efficiency tips in the development environment
    - » new approaches to working together in a team
    - » etc, etc

Working with others is hard

- Don't be surprised if there are rough spots

- Learn how to resolve problems and benefit from doing so

- Leave your fragile ego at the door
  - » "my way or the highway" - you can shout people down but you're not learning anything
  - » helpful comments are overlooked because you think they are criticism

Collaboration

- Collaborative people are those who identify a possibility and recognize that their own view, perspective, or talent is not enough to make it a reality.

- Collaborative people see others not as creatures who force them to compromise, but as colleagues who can help them *amplify* their talents and skills.

Hargrove, 1998

Yes, but what about "cheating"?

- The real world is full of opportunities to work with others

  » it is hard to do well

  » it takes responsibility and honesty

- Your colleagues quickly learn whether you bring anything to the collaboration or not

- This is a chance to work together and learn how to do it well

Expectations

- Better overall quality
  - » Navigator helps driver catch bugs before they become part of the code
- Faster time to finish
  - » Better focus when working together
  - » Can be intense, take breaks as needed
- Collective teaching and learning
  - » Someone to talk to – less likely to get stuck
  - » Both partners will learn things from each other