

Having Fun With Computer Science

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Teaching Challenges

- Developing stronger problem-solving skills in our students
- Facilitating concrete understanding of abstract concepts
- Making it **interesting** and **fun**

Problem-Solving Skills

- Assign logic problems – pairs or small group
- Great resources (thank you, Judy Hromcik!)
 - The Puzzling Adventures of Doctor Ecco by Dennis Shasha (ISBN: 0-486-29615-6)
 - Great Critical Thinking Puzzles by Michael A. Dispezio (ISBN 0-8069-9725-7)
 - Creative Thinking Puzzlers by John H. Doolittle (ISBN 0-89455-828-5)
 - Crossing the River with Dogs by Ken Johnson, Ted Herr, and Judy Kysh (ISBN 1-931914-14-1)
 - Click and Clack - <http://www.cartalk.com/content/puzzler/>

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The Puzzling Adventures of Doctor Ecco

- A rich man wants to build a 1000 meter tower as quickly as possible out of 1 meter high blocks that interlock on top and on bottom.
- It takes 1 week to place from 1 to 99 interlocked blocks onto another stack of blocks. When the number of blocks in a stack reaches 100 or more, it takes 2 weeks to place a stack of blocks onto another stack of blocks.
- The rich man has unlimited resources. What is the least number of weeks it will take to build the tower 1000 meters high?
- Use Lego or MegaBlocks for illustration

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The Puzzling Adventures of Doctor Ecco

- You have been given the job of cutting a rectangular cake into 16 equal pieces using only 4 straight line cuts with a knife.
- Is it possible? If so, explain how you can achieve this goal.

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Other Ideas

- Using a Hershey bar, how many breaks will it take to break your chocolate bar into 12 equal pieces? N pieces? Justify your answer.

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Toys!

- Mr. Potato Head – inheritance
 - Darth Tater
 - Transformer Optimash Prime
- Pez Dispenser – stack
- Baby's stack – recursion, stack
- Baby's snap-together beads – queues
- Barrel of Monkeys – linked lists, passing/returning a container

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Searching

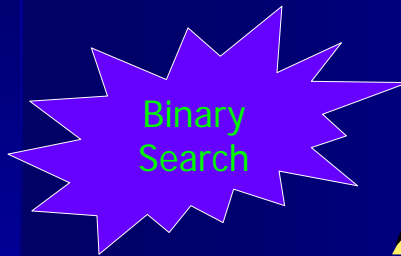
- How would you search through a shuffled deck for the Queen of Hearts?



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Searching

- How do you look up a number in a phone book...



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Sort by Increasing Size



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Sort Alphabetically

Insertion
Sort

Boston

Wings

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Algorithm Animations

- Practice the algorithms using the interactive algorithm animations
 - <http://nova.umuc.edu/~jarc/idsv/>
 - <http://math.hws.edu/TMCM/java/xSortLab/>
 - <http://www.cs.ubc.ca/~harrison/Java/sorting-demo.html>
 - <http://www.inf.ethz.ch/personal/staerk/algorithms/SortAnimation.html>
- Check out ahead of time – some are different than the one you may teach

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Magnetic Manipulatives

- Magnetic-backed organizers – variables
- Create arrays, linked list nodes, tree nodes, and pointers using cardstock and magnets



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Role-Play Exercises

- Dr. David Levine (St. Bonaventure Univ) is updating role-play script for GridWorld
 - <http://www.cs.sbu.edu/dlevine/RolePlay/roleplay.html>
- Other role-play exercises
 - <http://cs.colgate.edu/APCS/Java/RolePlays/JavaRolePlays.htm>

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Finally....

- Be enthusiastic!
- If you love it, they'll love it, too
- ...and they'll tell all their friends!

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