A USEFUL "BAG OF TRICKS"

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Being a student can sometimes be difficult. Why? Well, often I find that it's not the material that's so hard to learn, but rather that we just do not really know *how* to learn. Furthermore, most of us seriously lack basic organizational skills and have absolutely no clue how to manage our time efficiently. This is further encumbered by the fact that most of us are grossly inefficient when it comes to processing and storing information for later retrieval (i.e. taking exams).

With that in mind, I offer several *tricks* that make up my "Bag of Tricks." I use these myself very often and encourage you to do the same.

1. *Go simple.* Give yourself a simpler problem; use the trivial or base case. Often, it helps reveal useful insights to the problem.

2. *Doodle.* Draw pictures and diagrams to help you solve the problem. We're not always able to think formulae; we tend to be very visual people.

3. *Split it up.* Solving parts of the problem and then putting it all together often helps if that's possible. This is exactly what we do when we design complex algorithms.

4. *Work from both ends.* If you know what the outcome or solution is supposed to look like, then use that to help solve the problem. It may reveal clever ideas and useful shortcuts.

5. *"This is the same thing as..."* Many problems are similar in nature; try to recognize if a problem is the same thing as another you've already solved or know something about. There's nothing wrong with reusing old material if it is relevant.

6. *Does it make sense?* Often, students accept a first hack at an answer, forget to ask themselves this important question, and do not notice how nonsensical their answer might be. Ask yourself if an answer makes sense before you commit to it. This will avoid turning in assignments that contain unedited (and often unread) cut-and-pasted material from the Web with phrases like, "Click here for a detailed explanation." I wonder what I'm supposed to click with. And yes, that has actually happened. As a teacher, I find that this is perhaps the most ignored "trick."

7. *Optimize.* If possible (and if time permits), eliminate redundancy and optimize your solution to the problem.

8. *Don't give up!* If you need help, you may discuss general ideas with your fellow classmates (but absolutely NO code or specifics). Furthermore, I'll be glad to help you **if you show me that you've reasonably thought about the problem first**.

9. *Confidence is key.* Lack of it is absolutely deadly.