

NOW WHAT?

RECOMMENDATIONS FOR POST-TCOM STUDY THAT YOU MAY ENJOY

Theory of Computation Books

- **Michael Sipser, *Introduction to the Theory of Computation* (1st or 2nd edition)**
An excellent, as-introductory-as-you'll-get textbook for material very similar to what we covered in TCOM, plus some advanced topics we didn't cover. Math level is somewhat higher than TCOM, but you could probably work through a good chunk of it.
- **Richard Feynman, *Feynman Lectures on Computation***
Anything by Richard Feynman is automatically worth reading.
- **Michael Garey & David Johnson, *Computers and Intractability: A Guide to the Theory of NP-Completeness***
Some good intro chapters on what NP-completeness is, and then a huge index of descriptions of more than 300 NP-complete problems. Math level is *much* higher than TCOM, but it's an interesting book to browse through if you like NP-completeness.
- **Douglas Hofstadter, *Godel, Escher, Bach: An Eternal Golden Braid*.**
Is this a math or a philosophy book? We honestly can't tell! GEB talks about all sorts of exciting and interesting topics relating math, philosophy, and music together. TCOM-related math topics include formal logic and decidability. Don't be discouraged if you get lost sometimes; just enjoy whatever you get out of it, and reread every few years. Lots of fun!

Math Books

- **Martin Gardner, *Aha! Gotcha: Paradoxes to Puzzle and Delight*.**
- **Martin Gardner, *Aha! Insights*.**
Lots of fun math puzzles and paradoxes, with nice cartoons. Math level very reasonable.
- **Richard Trudeau, *Introduction to Graph Theory***
A delightful, slim little introductory text full of jokes and musings on How To Do Math. Prove the five-color theorem!
- **Clifton Fadiman, ed., *Fantasia Mathematica***
A collection of short stories and poetry about mathematics and mathematicians. Aldous Huxley's "Young Archimedes" is especially excellent, and there's even a sizable collection of math limericks.

Websites

- **Complexity Zoo**
http://qwiki.caltech.edu/wiki/Complexity_Zoo
Wiki of lots of complexity classes used in research today.
- **Wikipedia**
<http://wikipedia.org>
You'll learn lots here! Start off with "computability theory" and follow links until your eyes bulge out.
- **The On-line Encyclopedia of Integer Sequences**
<http://www.research.att.com/~njas/sequences/Seis.html>
Working with a nifty sequence of integers? Look it up and see what other neat properties people have found. You can even add your own.
- **MIT OpenCourseWare**
<http://ocw.mit.edu>
Free materials from nearly all of MIT's courses. Different classes have different materials, but there's a selection of lecture notes, problem sets, video presentations, exams, applets, and other nifty things. Search for their great TCOM-related classes including:
 - [Easiest]* **Automata, Computability, and Complexity** (6.045J/18.400J)
 - [Harder]* **Theory of Computation** (18.404J/8.840J)
 - [Impossible]* **Advanced Complexity Theory** (18.405J/6.841J)

Math Contests

- **USA Mathematical Talent Search (USAMTS) (usamts.org)**
A contest for high school students sponsored by the National Security Agency (NSA). Problems are posted online and participants have a couple weeks/months to work on them. Many are very well-written and fun. Unlike most high school contests, the USAMTS expects written-out explanations of how you got your answer and/or proof.
- **American Mathematics Competition (AMC)**
A standard, nation-wide competition for serious high school math students. Leads up to the International Math Olympiad after many levels of elimination. Some people become insanely cutthroat and competitive: don't do that. But otherwise, there are lots of fun and cool problems.
- **American Regions Mathematics League (ARML)**
A competition based on regional teams that compete during a spring weekend. Whether it's worth competing in depends entirely on the quality of your local team, but it's good to look into.