This thread is part of the proposed schedule for study for the first exam. Discuss the practice problems here.
View questions here: http://beastie.cs.ua.edu/concepts/cs/al/recurrences.html
This thread covers questions 36-70 of recurrences.

Work together on the proposed answers to questions on this shared Google Doc (comment reasoning/arguments behind answers)

Upcoming topics (threads start two days in advance): SB trees 1-26, Feb 12 | SB trees 26-52, Feb 13 | Recurrences 71-105, Feb 14 | Heaps 1-15, Feb 15
Full schedule

---

For all of these questions about identifying the case in which the master theorem applies, I don't understand how it could be between two cases. Isn't it either one of the three cases, or not applicable?

Since log(1/2)/log(2) = -1, this is definitely a case of not being able to use the theorem, right?

Yes, but I think because f(n) = 1 it fails to be asymptotically positive. In between cases has to do with whether or not the function is polynomially smaller (in between case 1 and 2) or polynomially larger (in between case 2 and 3)
My understanding of the master theorem is that if \( f(n) \) and \( n^\log_b(a) \) are within a polylog factor then the recurrence equation can be solved under case 2 of the master theorem. (the definition of the master theorem I'm referring to is shown at http://www.csd.uwo.ca/~moreno/CS433-CS9624/Resources/master.pdf) BUT I've also seen the master theorem defined where if \( f(n) \) and \( n^\log_b(a) \) are not equal but within a polylog factor then the master theorem doesn't apply because the \( f(n) \) and \( n^\log_b(a) \) are not equal or polynomially different so the recurrence falls between cases. The definition in the book is not 100% clear so just wondering which definition to use when solving recurrences.

The value of \( a \) is not \( \geq 1 \). Master theorem cannot be used.

I'll make sure my questions will be unambiguous with respect to our text and your citation.