# CSci242, Spring 2019
# Assignment 3
# Chapter 11.5 Exercise R-11.1

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1. Characterize each of the following recurrence equations using the master theorem (assuming that $T(n) = c$ for $n < d$, for constants $c > 0$ and $d \geq 1$).
   (a) $T(n) = 2T(n/2) + \log n$
   (b) $T(n) = 8T(n/2) + n^2$
   (c) $T(n) = 16T(n/2) + (n \log n)^4$
   (d) $T(n) = 7T(n/3) + n$
   (e) $T(n) = 9T(n/3) + n^3 \log n)$
2. Answers:
   (a) Case 1 of the master theorem applies. $n^{\log_b a} = n^{\log_2 2} = n$ and $f(n) = \log n$ so $f(n)$ is small compared to $n^{\log_b a}$. $T(n) \sim n$.
   (b) Case 1 applies. $T(n) \sim n^3$.
   (c) Case 2 applies. $T(n) \sim n^4(\log n)^5$.
   (d) Case 1 applies. $T(n) \sim n^{1.77\ldots}$.
   (e) None of the cases apply, so $T(n) \sim n^3 \log n$.