Steven Kravitsky
CS 260

1.10)

$$f_1 = n^2$$
$$f_2 = n^2 + 1000n$$
$$f_3 = \begin{cases} n \text{ if } n \text{ is odd} \\ n^3 \text{ if } n \text{ is even} \end{cases}$$
$$f_4 = \begin{cases} n \text{ if } n \leq 100 \\ n^3 \text{ if } n > 100 \end{cases}$$

a) $f_1, f_2$
   a. $f_2$ will dominate $f_1$ since $f_2$ will always grow faster than $f_1$

b) $f_1, f_3$
   a. $f_3$ will dominate $f_1$ since the worst case is that $n^3$ will grow faster than $n^2$ when $\lim_{n\to\infty} \frac{f_1(n)}{f_3(n)}$

c) $f_1, f_4$
   a. $f_4$ will dominate $f_1$ since the worst case is that $n^3$ will grow faster than $n^2$ when $\lim_{n\to\infty} \frac{f_1(n)}{f_4(n)}$

d) $f_2, f_3$
   a. $f_3$ will dominate $f_2$ since the worst case is that $n^3$ will grow faster than $n^2 + 1000n$ when $\lim_{n\to\infty} \frac{f_2(n)}{f_3(n)}$

e) $f_2, f_4$
   a. $f_3$ will dominate $f_4$ since the worst case is that $n^3$ will grow faster than $n^2 + 1000n$ when $\lim_{n\to\infty} \frac{f_2(n)}{f_4(n)}$

f) $f_3, f_4$
   a. $f_3$ and $f_4$ will dominate eachother since the worst case for both is $n^3$ $\lim_{n\to\infty} \frac{f_3(n)}{f_4(n)}$

1.12)