* Exercício: Em cada uma das situações

	f	g
1	$n-100$	$n-200$
2	$\log n$	$(\log n)^2$
3	$\log n$	$\log n^2$
4	2^n	2^{n+1}
5	$n!$	2^n
6	$2n^2+5n$	n^2
7	$2n^2+5n$	n^3

• 1: * $f(n) = O(g(n))$

$n \geq m$, $|f(n)| \leq c \times |g(n)|$

$n \geq 1$, $|n-100| \leq 1 \times |n-200|$

* $f(n) = \Omega(g(n))$

$n \geq m$, $|f(n)| \geq c \times |g(n)|$

$n \geq 200$, $|n-100| \geq 1 \times |n-200|$

* $f(n) = \Theta(g(n))$

$n \geq m$, $0 \leq c_1 \times f(n) \leq g(n) \leq c_2 \times f(n)$

$n \geq 700$, $0 \leq 0{,}5 \times |n-100| \leq |n-200| \leq 3 \times |n-100|$

$c_1 = 0{,}5$

$c_2 = 3$

$m = 700$

•2: $f(n) = \log n$
$g(n) = (\log n)^2$

$f(n) = O(g(n))$
$f(n) = o(g(n))$

$$\lim_{n\to\infty} \frac{f(n)}{g(n)} = \frac{\log n}{\log n \cdot \log n} = \frac{1}{\log n} = 0$$

•3: $f(n) = \log n$
$g(n) = \log n^2$

$$\lim_{n\to\infty} \frac{f(n)}{g(n)} = \frac{\log n}{\log n^2} = \frac{\log n}{2\log n} = \frac{1}{2}$$

$f(n) = O\,g(n)$
$f(n) = \Omega\, g(n)$
$f(n) = \Theta\, g(n)$

•4: $f(n) = 2^n$
$g(n) = 2^{n+1}$

$$\lim_{n\to\infty} \frac{f(n)}{g(n)} = \frac{2^n}{2^{n+1}} = \frac{2^n}{2^n \cdot 2^1} = \frac{1}{2}$$

$f(n) = O\,g(n)$
$f(n) = \Omega\, g(n)$
$f(n) = \Theta\, g(n)$

•5: $f(n) = n!$
$g(n) = 2^n$

$$\lim_{n\to\infty} \frac{f(n)}{g(n)} = \frac{n!}{2^n} = \infty$$

$f(n) = \Omega\, g(n)$

•6: $f(n) = 2n^2 + 5n$
$g(n) = n^2$

$$\lim_{n\to\infty} \frac{f(n)}{g(n)} = \frac{2n^2+5n}{n^2} = \frac{n^2\left(2 + 5n/n^2\right)}{1} = 2$$

$f(n) = O\,g(n)$
$f(n) = \Omega\, g(n)$
$f(n) = \Theta\, g(n)$

D S T Q Q S S
D L M M J V S

7: $f(n) = 2n^2 + 5n$
$g(n) = n^3$

$f(n) = O\,g(n)$

$$\lim_{n \to \infty} \frac{f(n)}{g(n)} = \frac{2n^2 + 5n}{n^3} = \frac{2}{n} = 0$$