

## Class work: Asymptotic notation

1. (R-1.2) Algorithm A uses  $10n \lg n$  operations, while algorithm B uses  $n^2$  operations. Determine the value  $n_0$  such that A is better than B for  $n \geq n_0$ .
2. (R-1.7) Let  $f(n) = \lg n$  and assume that we have an algorithm whose running time is  $f(n)$  microseconds. Determine the largest size of a problem that can be solved by the algorithm in: (a) 1 second; (b) 1 hour; (c) 1 month; (d) 1 century.  
Same problem for  $f(n) = \sqrt{n}$  and  $f(n) = n$ .
3. (R-1.6) Order the following expressions from fastest to slowest:

$$\sqrt{2}^{\lg n}, n^2, \left(\frac{3}{2}\right)^n, n^3, \lg n^2, \lg^2 n, 2^n, \lg \lg n, n \lg n$$