

# CSCI 303 Algorithms

## Homework 11

Due: 11:00 in class, November 29, 2001

1. The factorial function  $f(n) = n!$  can be defined in two ways:  $f(n) = 1 \times 2 \times \dots \times n$  or

$$f(n) = \begin{cases} 1 & \text{if } n = 0 \\ nf(n-1) & \text{if } n \geq 1 \end{cases}$$

- (a) (5 points) Give a nonrecursive algorithm (using the first definition) that computes  $f(n)$ . What is the time complexity of your algorithm?
- (b) (5 points) Give a recursive algorithm (using the second definition) that computes  $f(n)$ . What is the time complexity of your algorithm?
2. Given 0.42, 0.25, 0.27, 0.07, 0.72, 0.86, 0.09, 0.44, 0.50, 0.68, 0.73, 0.31, 0.78, 0.17, 0.79, 0.37, 0.73, 0.23, 0.30. Show the results of the following on-line bin packing algorithms on the above input.
- (a) (3 points) First-fit.
- (b) (4 points) Best-fit.
- (c) (3 points) Next-fit.