CS278 **Design and Analysis of Algorithms**
Assignment # 3 Due Date: October 11, 2001

Note: Create a subdirectory in your home directory and call it `<your_last_name>.3`, where `<your_last_name>` is your real last name (for example, `bhatia` for me). Do all the programs for this assignmnet in that directory. After you are done, submit the code by typing the following command:

```
~sanjiv/bin/handin <your_last_name>.3 cs278 3
```

Again, do not forget to substitute for `<your_last_name>`. The command should be executed from your home directory. Do the assignment on hoare.

1. Empirically determine the effect of removing the test `if a[i]` from Program 3.5 (in your textbook), for $N = 10^3, 10^4, 10^5$, and 10^6.
2. Write a program that checks whether a given string of characters is a palindrome.
3. Write a recursive program to compute $\lg(N!)$. Modify it to compute $N!$ mod M, such that overflow is no longer an issue. Try running your program for $M = 997$ and $N = 10^3, 10^4, 10^5$, and 10^6, to get an indication of how your programming system handles deeply nested recursive calls.
4. Write two functions to compute factorial, one iterative and the other recursive. Call them from a program and give the time in a tabular form on how long it takes to compute the factorial by two methods for different numbers (use a for loop to try different values of number whose factorial is to be computed). Use the function `gethrtime(3)` on Unix to get time in microseconds for comparison. Call this function just before and just after the call to your factorial functions.