

CS 385
Homework Assignment 1
Due by Sep 12, 2008, 1pm

Prof. Dietrich

Exercises

Know how to do:

- Levitin, Section 2.1, Exercise 10, page 52.
- Levitin, Section 2.3, Exercises 1-5, page 67.
- Levitin, Section 2.4, Exercises 1-4, page 76.

Linear search algorithm

Here is a simple algorithm to find the largest element in an array a of size n .

```
int findlargest(int a[], int n)
{
  guess <- a[0];

  while (i<n)
  {
    if (guess < a[i])
      guess <- a[i]; /* change the guess */
    i<- i+1;
  }
  return guess;
}
```

The program

Discover how to generate, given an integer n to generate an array a of n random integers.

Then, implement the `findlargest` function above on an array which consists of n random integers. Once your program is running, modify the program to output the *number of times* the guess is changed. Run your program many times to get an **average value** for the number of times the guess is changed on random arrays of size $n = 1000$ and $n = 10000$.

Explain the answers you get.

Submit

- Page 52, problem 10. Page 67, problems 2a and 2d.
- the source code (in C) of the program above.
- the values you computed for the average number of times the guess is changed on arrays of size 1000 and of size 10000. NOTE: Fill an array of size N ($N=1000$, or 10000) with random integers 1000 times, and for each new array calculate the number of times the guess is changed. Change the seed each of these 100 times.
- A reasoning for these results.