150015-Semester II - 5781

Data Structures I

**Homework Assignment #1**

**Question 1**

The following is a description of **Selection Sort**

Input: An array A with *n* numbers.

Output: An array A containing the same *n* numbers – sorted from the smallest to the largest.

The algorithm transverses the array *n* times. In the first iteration it finds the largest element in the array and assigns it to the last place in the array A[*n*].

In the second iteration it finds the second largest number and puts it A[*n*-1]. The algorithm continues this way until the array is sorted.

a. Implement the selection sort algorithm in pseudo-code.

b. Next to each command line write down how many times it is executed, and determine the function that describes the run time of the algorithm.

c. What is the complexity of the function in the worst case? And in the best case?

**Question 2**

Compute the run-time complexity of the following functions

* 1. *f*(*n*)

j=1

**for** i = 2 **to** log nby 2

j=j+i

* 1. *g*(*n*)

i = 1

while(i<n4)

i=i\*3

* 1. *h*(*n*)

i=2

k=2

while(i<n)

for j=1 to i

k=k-j

i=i\*2