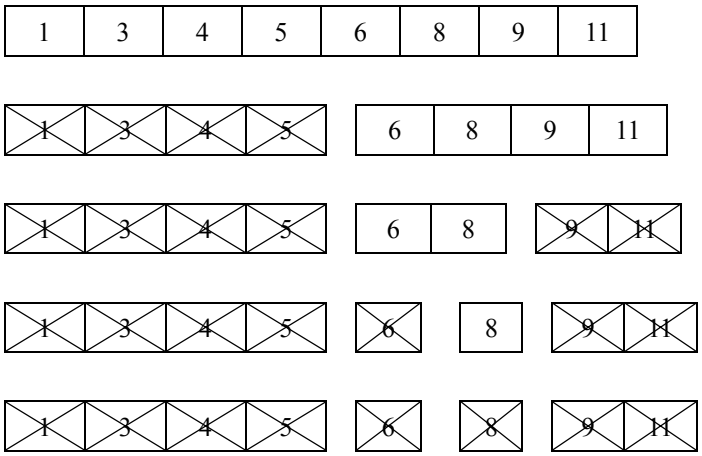
2007 Spring CS204 Homework #4

1. Exercise 3.1.14 (b)



There is no 7 in the list.

2. Exercise 3.1.42

Write the selection sort algorithm in pseudocode using the syntax of the text or the syntax you learned in the class.

procedure selection sort(a_1, a_2, ..., a_n: distinct integers with $n \geq 2$)
i := 1;
do (i < n)
    min := I;
    j := i + 1;
    do ($j \leq n$)
        if ($a_j < a_{min}$) min := j; fi;
        j := j + 1
    od;
    a_i, a_{min} := a_{min}, a_i;
    i := i + 1;
od;

3. Exercise 3.2.4

$\forall x > 1, |2^x+17| \leq 7|3^x|$

that is, C = 7, k = 1.

2^x+17 is $O(3^x)$ with the witness C = 7, k = 1.

4. Exercise 3.2.10

i) x^3 is $O(x^4)$

$\forall x > 1, x^3 \leq x^4$ (witness C = 1, k = 1)

ii) x^4 is not $O(x^3)$

모든 x에 대해 $|x^4| \leq C|x^3|$ 를 만족시키는 C 가 존재하지 않는다.

임의의 C에 대해 $|x^4| \leq C|x^3|$ 를 만족시키지 않는 x가 존재한다.(x = C + 1)

There does not exist C such that $|x^4| \leq C|x^3|$ for every x.

For arbitrary C, there exists x that does not satisfy $|x^4| \leq C|x^3|$.

5. Exercise 3.2.20

a) $O(n^3 \log n)$

b) $O(6^n)$

c) $O(n^n n!)$