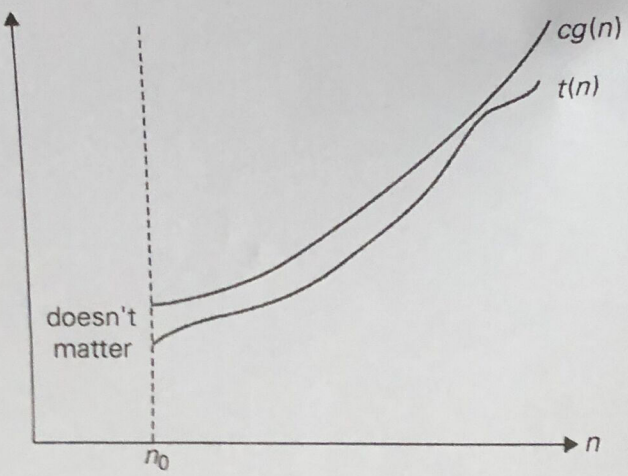
Student No: **07.11.2018**

Name- Surname:

ALGORITHM ANALYSIS MIDTERM EXAM

1) What is the **"worst case analysis"** of the function **f(n) = 100n + 5** for different values of n?

2) Give 3 statements about big-oh notation and prove these statements by using the graphic below.



Big-oh notation: $t(n) \in O(g(n))$.

3) Sort the numbers in the below list with

a) merge sort

b) quick sort.

What are the worst cases of these two sorting algorithms with this number list?

2 – 5 – 9 – 8 – 15 – 6 – 3 – 10

1. Question: 40 pts, 2. Question: 30 pts, 3. Question: 40 pts.

You have 60 minutes. Good Luck.

Assoc. Prof. Dr. Ruya SAMLI

Vize Çözümleri

1) What are the worst cases of the algorithms given below
a) computing the sum of n numbers?
b) computing $n!$
c) finding the largest element in a list of n numbers.
(Exercises 2.1 kitapta)
a) n sayısının çok büyük olması
b) 10^3 ten büyük sayıların hesaplanmasının çok zor olması ve recursion olması
c) Listenin çok büyük olması

2) Find the big-O notation of the algorithm given by $f(n) = 100n+5$.
a) for all $n \geq 5$
b) for all $n \leq 1$
You must find the C and $g(n)$ for both situations.

a) $f(x) \leq c \cdot g(x)$ $\quad n \geq 5$
$100n+5 \leq c \cdot g(x)$
$100n+5 \leq 100n+n$
$100n+5 \leq 101n$
$g(x) = O(n)$
$C = 101$ //

b) $f(x) \leq c \cdot g(x)$ $\quad n \geq 1$
$100n+5 \leq c \cdot g(x)$
$100n+5 \leq 100n+5n$
$100n+5 \leq 105n$
$g(x) = O(n)$
$C = 105$ //

(Kitapta olan bir soru).

3) Prove that bubble sort uses a brute-force algorithm approach.
Algoritmayı açıklayarak kanıtlamak doğru cevap.

Algorithms

Choosing between Exact and Approximate Problem Solving
Exact solving generally have an exact formula.
Approximate Solving Examples; Square root, evaluating definite integral kurt.