Addis Ababa University

Department of Computer Science

Analysis of Algorithms

COSC 4111 - Test III

Name: _____ **ID No:** _____/_____/____.

1. Use substitution method to guess and proof that the running time of $T(n) = T(n/2) + \Theta(\lg n)$ **(5 points)**

2. Use master method to fill in the following table **(1 point each)**

Recurrence	a	b	f(n)	$\log_a^b$	Case	Θ
$\boldsymbol{T(n)} = 4T\left(\frac{n}{2}\right) + \sqrt{n}$						
$\boldsymbol{T(n)} = T\left(\frac{n}{2}\right) + \frac{1}{4}n^3 + \frac{n}{3}$						
$\boldsymbol{T(n)} = T\left(\frac{n}{2}\right) + \frac{n}{3} + n$						
$\boldsymbol{T(n)} = T\left(\frac{n}{2}\right) + \frac{\log n}{n}$						
$\boldsymbol{T(n)} = 4T(\log n) + \log n$						

Bonus - The Skyline Problem

Given a sorted array and a value x, the floor of x is the largest element in array smaller than or equal to x. Write efficient functions to find floor of x. **(5 points)**