Homework 2: Master Method

1. T(n)=2T(n/4)+1

f(n)=1=n0 a=2 b=4

nlogba =nlog42 = nlog(2)/log(4)= (or n1/2)

f(n) < nlogba use case 1 where =1/2

By case 1, T(n)=()

1. T(n)=2T(n/4)+

f(n)==n1/2 a=2 b=4

nlog42 = n1/2

f(n) = nlogba = n1/2 use case 2!

By case 2, T(n)=(n1/2 lg n)

1. T(n)=2T(n/4)+n

f(n)=n=n1 a=2 b=4

nlog­ba =n0.5

f(n) > nlogba use case 3

f(n)=Ω(nlog42+ɛ) for 1/2

For a large n, the “regularity” will hold for c=1/2

af(n/b) \< cf(n)

2f(n/4) = 2 \* n/4 = 1/2n \< cf(n)

Let c = 1/2

By case 3, T(n)=(f(n))=(n)

1. T(n)=2T(n/4)+n2

f(n)=n2 a=2 b=4

nlog­ba = n1/2

f(n) > n1/2 use case 3

ɛ=1 ½ find c

af(n/b) ≤ cf(n)

2f(n/4) = 2 \* n2/16 = n2/8

Let c=1/8

By case 3, T(n) = O(n2)