Lista de exerc´ıcios 2 - Projeto e Ana´lise de Algoritmos

Setembro de 2018

1. Resolva as seguintes equa¸c˜oes de recorrˆencia utilizando o m´etodo da sub- stitui¸c˜ao visto em aula.
2. *x*(*n*) = *x*(*n −* 1) + 5 para *n >* 1*, x*(1) =0

1 ->0

2->x(2-1)+5=5

3->x(3-1)=5+5=10

4->x(4-1)=10+5=15

Logo x(n)=5\*(n-1)

(b) *x*(*n*) = 3*x*(*n −* 1) para *n >* 1*, x*(1) = 4

X(1)=4

X(2) = 3\*4=12

X(3)=3\*12= 36

x(4)=3\*36=108

X(5) 3\*108=324

Logo x(n)=4\*3^n

(c) *x*(*n*) = *x*(*n −* 1) + *n* para *n >* 0*, x*(0) =0

0->0

1->0+1

2->1+2=3 //(0+1)+2

3->3+3=6 //(0+1+2)+3

4->6+4=10 //(0+1+2+3)+4

5->10+5=15 //(0+1+2+3+4)+5

6->15+6=21

X(n)= n\*(n-1)/2+n

* 1. *x*(*n*) = *x*(*n/*2) + *n* para *n >* 1*, x*(1) = 1 (resolva para *n* = 2*k*)
  2. *x*(*n*) = *x*(*n/*3) + 1 para *n >* 1*, x*(1) = 1 (resolva para *n* = 3*k*)

1. Resolva as seguintes equa¸c˜oes de recorrˆencia (quando poss´ıvel) utilizando o m´etodo mestre.

* *T* (*n*) = 2*T* (*n/*3) + 1

A=2

B=3

c=0

Log3(2)>c

T(n)=Theta(n^0.630929)

* *T* (*n*) = 5*T* (*n/*4) + *n*

*A=5*

*B=4*

*C=1*

*=1.1609*

*T(n)=Theta(n^1.609)*

* *T* (*n*) = 7*T* (*n/*7) + *n*

*A=7*

*B=7*

*C=1*

*Log7(7)=1*

*1=1*

*T(n)=Theta(nlog(n))*

* *T* (*n*) = 9*T* (*n/*3) + *n*2

A=9

B=3

C=2

Log3(9)=0.5

3<2

T(n)=Theta(n^2)

* *T* (*n*) = 8*T* (*n/*2) + *n*3

A=8

B=2

C=3

Log2(8)=3

3=3

T(n)=Theta(n^3\*log(n))

* *T* (*n*) = 49*T* (*n/*25) + *n*3*/*2*logn*

*A=49*

*B=25*

*C=3/2*

*Log25(49)*

* *T* (*n*) = *T* (*n −* 1) + 2
* *T* (*n*) = *T* (*n −* 1) + *nc*, com constante *c ≥* 1
* *T* (*n*) = *T* (*n −* 1) + *cn*, com constante *c >* 1

Impossível resolver

* *T* (*n*) = 2*T* (*n −* 1) + 1
* *T* (*n*) = *T* (*√n*) + 1
* *T* (*n*) = 3*T* (*n/*2) + *n*2
* *T* (*n*) = 4*T* (*n/*2) + *n*2
* *T* (*n*) = *T* (*n/*2) + 2*n*
* *T* (*n*) = 2*nT* (*n/*2) + *nn*
* *T* (*n*) = 16*T* (*n/*4) + *n*
* *T* (*n*) = 2*T* (*n/*2) + *nlogn*
* *T* (*n*) = 2*T* (*n/*2) + *n/logn*
* *T* (*n*) = 2*T* (*n/*4) + *n*0*.*51
* *T* (*n*) = 0*.*5*T* (*n/*2) + 1*/n*
* *T* (*n*) = 16*T* (*n/*4) + *n*!
* *T* (*n*) = *√nT* (*n/*2) + *logn*
* *T* (*n*) = 3*T* (*n/*2) + *n*
* *T* (*n*) = 3*T* (*n/*3) + *√n*
* *T* (*n*) = 4*T* (*n/*2) + *cn*
* *T* (*n*) = 3*T* (*n/*4) + *nlogn*
* *T* (*n*) = 3*T* (*n/*3) + *n/*2
* *T* (*n*) = 6*T* (*n/*3) + *n*2*logn*
* *T* (*n*) = 4*T* (*n/*2) + *n/logn*
* *T* (*n*) = 64*T* (*n/*8) *− n*2*logn*
* *T* (*n*) = 7*T* (*n/*3) + *n*2
* *T* (*n*) = 4*T* (*n/*2) + *logn*

1. Desenhe a ´arvore de recurs˜ao para *T* (*n*) = 3*T* (*n/*3) + *n*3.