1) caso base: n=2

$$\frac{1}{2^{log2}} = 1 - \frac{1}{2}$$

Supor que $\frac{1}{2} + \frac{1}{2^2} + \cdots + \frac{1}{2^{logk}} = 1 - \frac{1}{k}$

Mostrar que $\frac{1}{2} + \frac{1}{2^2} + \cdots + \frac{1}{2^{logk}} + \frac{1}{2*2^{logk}} = 1 - \frac{1}{2k}$

$$1 - \frac{1}{k} + \frac{1}{2*2^{logk}} = 1 - \frac{1}{2k}$$

$$1 - \frac{1}{k} + \frac{1}{2*k} = 1 - \frac{1}{2k}$$

2) a) F(n+6)=F(n+5)+F(n+4)

F(n+6)=F(n+4)+F(n+3)+F(n+3)+F(n+2)

F(n+6)=3F(n+3)+2F(n+2)

F(n+6)=3F(n+3)+F(n+1)+F(n+1)+F(n+2)

F(n+6)=4F(n+3)+F(n+1)

b) Caso base:

Para n = 1

$$\mathrm{F}(1+6) = 4*\mathrm{F}(1+3) + \mathrm{F}(1) = 4*\mathrm{F}(4) + \mathrm{F}(1) = 13 = 4*3 + 1$$

Para n=2

$$\mathrm{F}(2+6) = 4*\mathrm{F}(2+3) + \mathrm{F}(2) = 4*\mathrm{F}(5) + \mathrm{F}(1) = 21 = 4*5 + 1$$

Supor F(p + 6) = 4*F(p+3) + F(p) , 3 ≤ p ≤ k :

Mostrar F (k +1 + 6) = 4*F(k+ 1 + 3) + F(k+1) = F (k+7) = 4*F(k+4) + F(k+1):

F(k+7) = F(k+6) + F(k+5)

F (k +7) = 4*F(k+ 2) + F(k-1) + 4*F(k+3) + F(k)

F (k+7) = 4*F(k+4) + F(k+1)

3)

a) k=0 A=[1,2,3,4,5,6] n=6 j=2 chave=2 i=1

K=1 A[i+1] =2 A=[1,2,3,4,5,6] n=6 chave=2 i=1

b) $\frac{(n^2-n)}{2}$

4) a)C=2 g(n) =nlogn $T(n) = 2^{logn}T(1) + \sum_{i=1}^{logn} 2^{(logn)-i}\, n(2^{logi})$

$$T(n) = n + \sum_{i=1}^{\log n} 2^{i*i} = n + 2^{logn}$$

B)C=1 G(n)=n^2 $T(n) = 1^{n-1} * 1 + \sum_{i=2}^{n} 1^{n-i}\, i^2$

$$T(n) = 1 + \sum_{i=2}^{n} i^2$$

T(n) = 1+n^2

C) Caso base:

S(1)=1

S(2)=1/2*1

S(3)=1/3*1/2*1

S(4) =1/4*1/3*1/2*1

Supor que $S(k) = \frac{1}{k!}$

Mostrar que $S(k+1) = \frac{1}{(k+1)!}$

$$S(k+1) = \frac{1}{K! * k + 1}$$

$$S(k+1) = \frac{1}{(k+1)!}$$

CQD

5) a) Cal(1) = 1

$$Cal(n) = 2n\left(\frac{n}{2}\right) + n^2$$

b)

c=2 e g(n) = n^2

$$Cal(n) = 2^{\log n} * 1 + \sum_{i=1}^{logn} 2^{(\log n)-1} * 2^i * 2^i$$

$$Cal(n) = 2^{logn} + \sum_{i=1}^{logn} 2^{logn} * 2^i$$

$$Cal(n) = n + \sum_{i=1}^{logn} n * 2^i = n + n * 2^{logn}$$