

Mynstur 8

1. a_n = fóldi bitastrengja af þessu lagi, grf. $n \geq 3$

$a_1 = 1$ og 0 , svo 2 möguleikar

$a_2 = 01, 10$ og 00 , svo 3 möguleikar

$a_3 = 000, 001, 010$ svo 5 möguleikar

~~011
100
101
110
111~~

00
01
10

$a_4 = 0000$

~~0001~~

~~0010~~

~~0100~~

~~0101~~

0101

~~0110~~

~~0111~~

~~1000~~

~~1001~~

1010

~~1011~~

~~1100~~

~~1101~~

~~1110~~

~~1111~~

Svo 8 möguleikar

Grannilega sest út frá þessu að $a_n = a_{n-1} + a_{n+2}$
þar sem $a_1 = 2$ og $a_2 = 3$

$$r^2 = r + 1 \Rightarrow r^2 - r - 1 = 0$$

$$\text{rót } 1 = \frac{1 + \sqrt{5}}{2}, \text{rót } 2 = \frac{1 - \sqrt{5}}{2}$$

$$a_n = x_1 \cdot \left(\frac{1 + \sqrt{5}}{2}\right)^n + x_2 \cdot \left(\frac{1 - \sqrt{5}}{2}\right)^n$$

$$a_1 = x_1 \cdot 1,618034 - x_2 \cdot 0,618^{03} = 2$$

$$a_2 = x_1 \cdot 2,618 - x_2^2 \cdot 0,382 = 3$$

$$\text{Lausmin á jöfnuhneppinu er } x_1 = \frac{3 + \sqrt{5}}{2\sqrt{5}} \text{ og } x_2 = \frac{5 - 3\sqrt{5}}{10}$$

$$\text{svo lausn er: } a_n = \left(\frac{3 + \sqrt{5}}{2\sqrt{5}}\right) \cdot \left(\frac{1 + \sqrt{5}}{2}\right)^n + \left(\frac{5 - 3\sqrt{5}}{10}\right) \cdot \left(\frac{1 - \sqrt{5}}{2}\right)^n$$

2.

$$a_2 = 12 \cdot 36 = 432$$

Ⓐ $a_0 = 3, a_1 = 12 \cdot 3 = 36, a_n = 12a_{n-1}$

$$r - 12 = 0$$

lausn: $a_n = 3 \cdot 12^n$

Ⓑ $a_0 = 2, a_1 = 1$

$$a_n = a_{n-1} + 6a_{n-2}$$

$$r^2 - r - 6 = 0, r_1 = \frac{1+\sqrt{25}}{2} = 3, r_2 = \frac{1-\sqrt{25}}{2} = -2$$

$$a_0 = x_1 + x_2 = 2$$

$$a_1 = x_1 \cdot 3 + x_2 \cdot (-2) = 1$$

$$x_1 = 2 - x_2 \Rightarrow (2 - x_2)3 - 2x_2 = 1$$

$$6 - 3x_2 - 2x_2 = 1 \Rightarrow -5x_2 = -5 \Rightarrow x_2 = 1$$

$$x_1 + 1 = 2 \text{ SVO } x_1 = 1$$

lausn: $a_n = 1 \cdot 3^n + 1 \cdot (-2)^n$

Mynstur 8

2. C) $a_0 = 1, a_1 = 4, a_n = -4a_{n-1} - 4a_{n-2}$

$$r^2 + 4r + 4 = 0 \quad \text{röt } 1 = -2, \text{ röt } 2 = -2 = \text{samla röt}$$

$$a_2 = -4 \cdot (4) - 1(4) = -20$$

$$a_0 = x_1 + x_2 \cdot D = 1$$

$$a_1 = x_1 \cdot (-2)^1 + x_2 \cdot 1 \cdot (-2)^1 = 4$$

$$a_2 = x_1 \cdot (-2)^2 + x_2 \cdot 2 \cdot (-2)^2 = -20$$

Lugt jöfauhneppi: $x=1$ og $y=-3$
 svo lausn: $a_n = 1 \cdot (-2)^n - 3 \cdot n \cdot (-2)^n$

```
3. int veldi(int a, int n){  

    if (n==0){  

        return 1;  

    }  

    else if (n%2==0){  

        return veldi(a*a, n/2);  

    }  

    else {  

        return a * veldi(a*a, n/2);  

    }  

}
```

Skotum $2^4 \therefore$

Til að fá útkomuna 16 þarf að
 deila í $n=4$ tvisvar sinnum sem er hæð tíesins.
 En hún er hæð=2 og $\log_2 4 = 2$