

Heimadæmi - heimadæmi 4

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1.
3.a)

GR. 4

1. @

	X	X	
X	X	X	X

0:0
1:1
n \Rightarrow 2:2
n \Rightarrow 3:4
n \Rightarrow 4:6
n \Rightarrow 5:8

X	X

	X	
X	X	X

	X	X	X	X
X	X	X	X	X

6:10
7:12
8:14

$f(n) = 2 \cdot (n-1)$
þar sem $f(0) = 0$ og $f(1) = 1$

3. @ $M_{\text{Sum}}(i, j) = \begin{cases} 0 & \text{ef } i > j \\ \max_{i \leq j \leq n} (i + i + i + \dots + j), M_{\text{Sum}}(i+1, j), \\ M_{\text{Sum}}(i, j-1) & \text{annars.} \end{cases}$

2.

```
13 ∨ def CountSS(X, i, T, count):
14 ∨     if T == 0:
15         return count + 1
16 ∨     elif T < 0 or i == 0:
17         return count
18 ∨     else:
19         med = CountSS(X, i-1, T - X[i], count)
20         an = CountSS(X, i-1, T, count)
21         return med + an
22
23 listinn = [0,1,2,3,4,5,6,7]
24 print("fjöldi mismunandi hlutmengja með summu 26:",CountSS(listinn,len(listinn)-1, 26, 0))
25 print("fjöldi mismunandi hlutmengja með summu 25:",CountSS(listinn,len(listinn)-1, 25, 0))
26
27 ∨ def ValueSS(X, V, i, T, val):
28 ∨     if T == 0:
29         return val
30 ∨     elif T < 0 or i == 0:
31         return float("-inf")
32 ∨     else:
33         med = ValueSS(X, V, i-1, T - X[i], val + V[i])
34         an = ValueSS(X, V, i-1, T, val)
35         # med = int(med)
36         # an = int(an)
37         return max(med, an)
38
39 listinn = [0,1,2,3,4,5,6,7]
40 values = [10,3,7,6,4,9,4,1]
41 print("max value með summu 27:",ValueSS(listinn, values, len(listinn)-1, 27, 0))
42 print("max value með summu 26:",ValueSS(listinn, values, len(listinn)-1, 26, 0))
43 print("max value með summu 29:",ValueSS(listinn, values, len(listinn)-1, 29, 0))

fjöldi mismunandi hlutmengja með summu 26: 1
fjöldi mismunandi hlutmengja með summu 25: 2
max value með summu 27: 31
max value með summu 26: 27
max value með summu 29: -inf
```

3. b)

```
1  A = [-6, 12, -7, 0, 14, -7, 5]
2
3  def MSum(i, j):
4      orgI = i
5      orgJ = j
6      if i>j:
7          return 0
8      best = 0
9      while i<=j:
10         best = best + A[i]
11         i += 1
12     return max(best, MSum(orgI + 1, orgJ), MSum(orgI, orgJ-1))
13
14 print("listi A:", MSum(0, len(A)-1))
```

```
listi A: 19
```

4.

```
1  def LIS(A):
2      best = 0
3      n = len(A)
4      for i in range(n):
5          best = max(best, LISfirst(A, i, n))
6      return best
7
8  def LISfirst(A, i, n):
9      best = 0
10     j = i + 1
11     while j < n:
12         if A[j] > A[i]:
13             best = max(best, LISfirst(A, j, n))
14         j = j + 1
15     return 1 + best
16
17 listinn = [2, 7, 1, 8, 2, 8, 1, 8, 2, 8, 4, 5, 9, 0, 4, 5, 2, 3, 5, 3]
18 print(LIS(listinn))
```

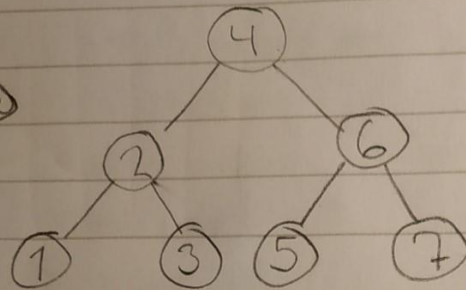
```
C:\Users\addi\Desktop\Háskóli\onn 4\GreiningReiknirita\vika4>python daemi4.py
5
```

5.

GR. 4

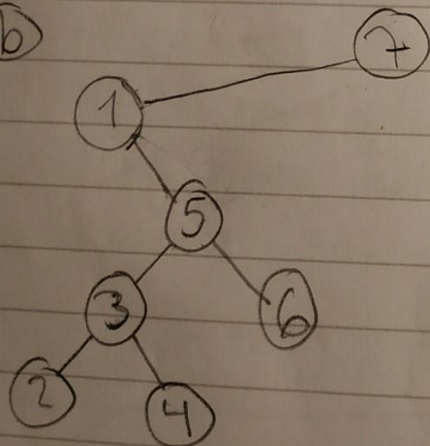
5.

a



$$\begin{aligned}
 \text{leitarkostnaður: } & 3 \cdot 10 + 2 \cdot 2 + 3 \cdot 5 + 1 \cdot 2 \\
 & + 3 \cdot 8 + 2 \cdot 2 + 3 \cdot 20 \\
 & = 139 //
 \end{aligned}$$

b



$$\begin{aligned}
 \text{leitarkostnaður: } & 1 \cdot 20 + 2 \cdot 10 + 3 \cdot 8 \\
 & + 4 \cdot 2 + 4 \cdot 5 + 5 \cdot 2 \\
 & + 5 \cdot 2 = 112 //
 \end{aligned}$$