LUKAS KLUSIS

4 Namų darbas

24 variantas

Uždavinys 1

Jei $\mathcal{L}(n) = a\mathcal{L}\left(\frac{n}{b}\right) + cn^d$

kur $\left.\begin{matrix} a \geq 1 \\ b > 1 \end{matrix}\right\} \in \mathbb{Z}$

$\left.\begin{matrix} c \geq 0 \\ d \geq 0 \end{matrix}\right\} \in \mathbb{R}$ $\Rightarrow \mathcal{L}(n) = \begin{cases} O(n^d), & \text{jei } a < b^d \\ O(n^d \log_b n), & \text{jei } a = b^d \\ O(n^{\log_b a}), & \text{jei } a > b^d \end{cases}$

(a) $\mathcal{L}(n) = 3\mathcal{L}\left(\frac{n}{3}\right) + 3\sqrt{n}$

$a = 3,\ b = 3,\ c = 3,\ d = \frac{1}{2}$

$b^d = 3^{\frac{1}{2}} = \sqrt{3} < 3 = a$

$a > b^d \Rightarrow$

$\Rightarrow O(n^{\log_3 3}) = O(n)$

(b) $\mathcal{L}(n) = 2\mathcal{L}\left(\frac{n}{4}\right) + 6n$

$a = 2,\ b = 4,\ c = 6,\ d = 1$

$a = 2 < 4 = 4^1 = b^d \Rightarrow$

$\Rightarrow O(n^1) = O(n)$

Uždavinys 2

NAME = { A, B, C, D }

SIZE = { 3, 4, 5, 7 }

VALUE = { 4, 6, 9, 11 }

M = 24

~~i 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21~~

i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
j=1																								
cost[i]	0	0	4	4	4	8	8	8	12	12	12	16	16	16	20	20	20	24	24	24	28	28	28	32
best[i]			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
j=2																								
cost[i]	0	0	4	6	6	8	10	12	12	14	16	18	18	20	22	24	24	26	28	30	30	32	34	36
best[i]			1	2	2	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
j=3																								
cost[i]	0	0	4	6	9	9	10	13	15	18	18	19	~~24~~ 22	~~27~~ 24	27	~~24~~ 27	28	31	~~36~~ 33	36	36	37	40	42
best[i]			1	2	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
j=4																								
cost[i]	0	0	4	6	9	9	11	13	15	18	18	20	22	24	27	27	~~31~~ 29	31	~~36~~ 33	36	36	38	40	42
best[i]			1	2	3	3	4	3	3	3	3	4	3	3	3	3	4	3	3	3	3	4	3	3
name[i]			A	B	C	C	D	C	C	C	C	D	C	C	C	C	D	C	C	C	C	D	C	C

optimalus kuprinės sudėjimo būdas: B, C, C, C, C

vertė – 42

dydis – 24

LUKAS KLUSIS

24 variantas

Užduotis 3

$$\begin{pmatrix} \infty & 1 & 21 & 27 & 5 \\ 30 & \infty & 18 & 23 & 23 \\ 27 & 29 & \infty & 20 & 10 \\ 15 & 2 & 27 & \infty & 14 \\ 28 & 9 & 15 & 6 & \infty \end{pmatrix} \begin{matrix} -1 \\ -18 \\ -10 \\ -2 \\ -6 \end{matrix} \sim \begin{pmatrix} \infty & 0 & 20 & 26 & 4 \\ 12 & \infty & 0 & 5 & 5 \\ 17 & 19 & \infty & 10 & 0 \\ 13 & 0 & 25 & \infty & 12 \\ 22 & 3 & 9 & 0 & \infty \end{pmatrix} \sim$$

$$\begin{matrix} -12 & & & & \end{matrix}$$

$$\sim \begin{pmatrix} \infty & 0 & 20 & 26 & 4 \\ 0 & \infty & 0 & 5 & 5 \\ 5 & 19 & \infty & 10 & 0 \\ 1 & 0 & 25 & \infty & 12 \\ 10 & 3 & 9 & 0 & \infty \end{pmatrix}$$

$D[1,2] = 4+0 = 0$ $\quad D[4,2] = 1+0 = 1$

$D[2,1] = 0+1 = 1$ $\quad D[5,4] = 3+5 = 8$

$D[2,3] = 9+0 = 9$

$D[3,5] = 5+4 = 9$

$Bound(\emptyset) = 1+18+10+2+6+12 = 49$

$Bound(\overline{35}) = 49 + D[3,5] = 58$, braukiame 3,5 , 5,3 keičiame į ∞

$$\begin{array}{c|c} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 4 \\ 5 \end{matrix} & \begin{pmatrix} \infty & 0 & 20 & 26 \\ 0 & \infty & 0 & 5 \\ 1 & 0 & 25 & \infty \\ 10 & 3 & \infty & 0 \end{pmatrix} \end{array}$$

$D[1,2] = 20+0 = 20$ $\quad D[5,4] = 5+3 = 8$

$D[2,1] = 1+0 = 1$

$D[2,3] = 0+20 = 20$

$D[4,2] = 0+1 = 1$

$Bound(35) = Bound(\emptyset) + 0 = 49$

$Bound(\overline{23}) = Bound(35) + D[2,3] = 69$

$$\begin{array}{c|c} & \begin{matrix} 1 & 2 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 4 \\ 5 \end{matrix} & \begin{pmatrix} \infty & 0 & 26 \\ 1 & 0 & \infty \\ 10 & 3 & 0 \end{pmatrix} \\ & \begin{matrix} -1 & & \end{matrix} \end{array} \sim \begin{array}{c|c} & \begin{matrix} 1 & 2 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 4 \\ 5 \end{matrix} & \begin{pmatrix} \infty & 0 & 26 \\ 0 & 0 & \infty \\ 9 & 3 & 0 \end{pmatrix} \end{array}$$

$D[1,2] = 26+0 = 26$

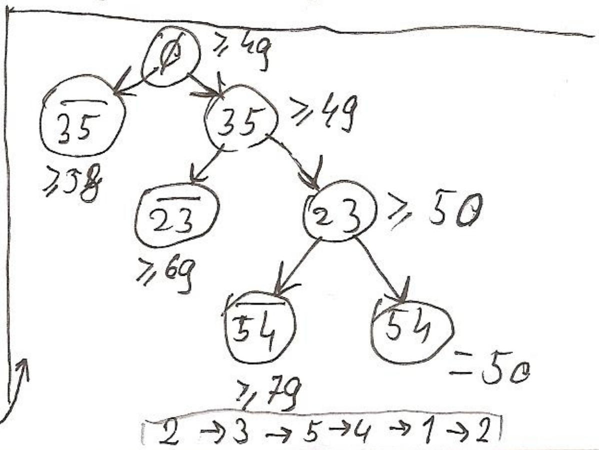
$D[5,4] = 3+26 = 29$

$Bound(23) = Bound(35) + 1 = 50$

$Bound(\overline{54}) = Bound(23) + D[5,4] = 29 + 50 = 79$

$$\begin{array}{c|c} & \begin{matrix} 1 & 2 \end{matrix} \\ \begin{matrix} 1 \\ 4 \end{matrix} & \begin{pmatrix} \infty & 0 \\ 0 & 0 \end{pmatrix} \end{array}$$

$Bound(54) = Bound(35) + 0 = 50$



$2 \to 3 \to 5 \to 4 \to 1 \to 2$