SAKARYA
ÜNİVERSİTESİ

BİLGİSAYAR VE BİLİŞİM BİLİMLERİ FAKÜLTESİ

BİLGİSAYAR MÜHENDİSLİĞİ BÖLÜMÜ

ALGORİTMA ANALİZİ VE TASARIMI DERSİ

PROJE ÖDEVİ

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ÖĞRENCİ NO: G171210014

ÖĞRENİM: 2. ÖĞRETİM

DERS GRUBU: A

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ALGORİTMA ANALİZİ VE TASARIMI
ÖDEVİ

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2A Grubu

1. $M_1: 2\times3$ $M_2: 3\times6$, $M_3: 6\times4$, $M_4: 4\times2$, $M_5: 2\times7$

i \ j	1	2	3	4	5
5	124	126	132	56	0
4	96	84	48	0	
3	84	72	0		
2	36	0			
1	0				

$\rightarrow m[i,k] + m[k+1, j] + P_{i-1}P_kP_j$

$m[1,2] = m[1,1] + m[2,2] + P_0P_1P_2$ (M_1M_2) $= 36$

$m[2,3] = m[2,2] + m[3,3] + P_1P_2P_3$ (M_2M_3) $= 72$

$m[3,4] = m[3,3] + m[4,4] + P_2P_3P_4$ $(M_3M_4) = 48$

$m(4,5) = m[4,4] + m[5,5] + P_3P_4P_5$ $(M_4M_5) = 56$

$m[1,3] = m[1,1] + m[2,3] + P_0P_1P_3$ $(k=1) \rightarrow 96$
$m[1,2] + m[3,3] + P_0P_2P_3$ $(k=2) \rightarrow 84$ ✓

$m[2,4] = m[2,2] + m[3,4] + P_1P_2P_4$ $(k=2) \rightarrow 84$ ✓
$m[2,3] + m[4,4] + P_1P_3P_4$ $(k=3) \rightarrow 96$

$m[3,5] = m[3,3] + m[4,5] + P_2P_3P_5$ $(k=3) \rightarrow 224$ ✓
$m[3,4] + m[5,5] + P_2P_4P_5$ $(k=4) \rightarrow 132$

$m[1,4] = m[1,1] + m[2,4] + P_0P_1P_4$ $(k=1) \rightarrow 96$ ✓
$m[1,2] + m[3,4] + P_0P_2P_4$ $k=2 \rightarrow 108$
$m[1,3] + m[4,4] + P_0P_3P_4$ $k=3 \rightarrow 100$

$m[2,5] = m[2,2] + m[3,5] + P_1P_2P_5$ $(k=2)$ 350
$m[2,3] + m[4,5] + P_1P_3P_5$ $(k=3)$ 212
$m[2,4] + m[5,5] + P_1P_4P_5$ $(k=4)$ 126 ✓

$m[1,5] = m[1,1] + m[2,5] + P_0P_1P_5$ $(k=1) \rightarrow 392$
$m[1,2] + m[3,5] + P_0P_2P_5$ $(k=2) \rightarrow 252$
$m[1,3] + m[4,5] + P_0P_3P_5$ $(k=3) \rightarrow 196$
$m[1,4] + m[5,5] + P_0P_4P_5$ $(k=4) \rightarrow 124$

2. A = xzyzzyx B = zxyyzxz

			z	x	y	y	z	x	z
		0	1	2	3	4	5	6	7
	0	0	0	0	0	0	0	0	0
x	1	0	0	1	1	1	1	1	1
z	2	0	1	1	1	1	2	2	2
y	3	0	1	1	2	2	2	2	2
z	4	0	1	1	2	2	3	3	3
z	5	0	1	1	2	2	3	3	4
y	6	0	1	1	2	3	3	3	4
x	7	0	1	2	2	3	3	4	4

sağdan sola → |zyyx| = 4

yukarıdan aşağı → |xzzz| = 4

3. $2^{2n+1} > 2^{2n} > (n+1)! > n! > e^n > n.2^n > 2^n > \left(\frac{3}{2}\right)^n > n^{\log(\log n)} = (\log n)^{\log n} >$

$(\log n)! > n^3 > n^2 = 4^{\log n} > n.\log n = \log(n!) > n = 2^{\log n} > (\sqrt{2})^{\log n}$

$> 2^{\sqrt{2\log n}} > \log^2 n > \ln n > \sqrt{\log n} > \ln(\ln n) > 2^{\log^* n} > \log^*(\log n)$

$= \log^* n > \log(\log^* n) > 1 = n^{\frac{1}{\log n}}$

4. $T(n) = \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} \sum_{k=1}^{j} 1 = \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} j = \sum_{i=1}^{n-1} \left(\sum_{j=1}^{n} j - \sum_{j=1}^{i} j \right)$

$= \sum_{i=1}^{n-1} \left(\frac{n(n+1)}{2} - \frac{i(i+1)}{2} \right)$

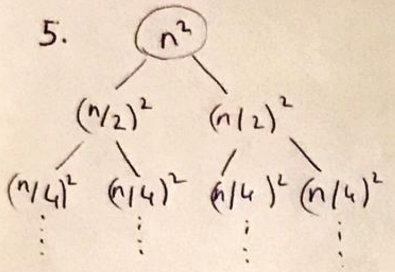
$= \sum_{i=1}^{n-1} \frac{n(n+1)}{2} - \frac{1}{2} \sum_{i=1}^{n-1} (i^2+i)$

$= \frac{n(n+1)(n-1)}{2} - \frac{1}{2} \frac{(n-1)\,n\,(2n-1)}{6} - \frac{1}{2} \frac{n(n-1)}{2}$

$= \frac{1}{12} . n.(n-1)(4n+4) = \frac{1}{3} n(n-1)(n+1)$

$= \Theta(n^3)$

5.



$T(n) = n^2 + \frac{n^2}{2} + \frac{n^2}{4} \dots$

$T(n) \leq \sum_{i=0}^{\infty} \left(\frac{1}{2^i}\right)$

$T(n) \leq n^2 \left(\frac{1}{1-\frac{1}{2}}\right) \leq 2n^2$

$T(n) = \Theta(n^2)$

6.

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

$a=1 \quad b=3/2 \quad c=0$

$c = \log_{3/2} 1 = 0 \quad f(n)=1 \quad k=0$ <u>Durum 2</u>

$T(n) = \Theta(n^0 \log n)$

$T(n) = \Theta(\log n)$

2) $T(n) = 3T(n/4) + n \log n$

$\log_a^b = \log_4^3 = 0 \quad c=1$

$c > \log_4^3$ <u>Durum 3</u>

$a.f\left(\frac{n}{b}\right) \leq k f(n), \; k<1$

$3.f\left(\frac{n}{4}\right) \leq k.\, n \log n \quad k=3/4$

$T(n) = \Theta(f(n))$

$T(n) = \Theta(n \log n)$

3) $T(n) = 4T(n/2) + n$

$\log_a^b = \log_2 4 = 2$

$c=1 \quad c < \log_a^b$ <u>Durum 1</u>

$T(n) = \Theta(n^{\log_a b})$

$= \Theta(n^2)$