ICS 621 Spring 2012

Dynamic Programming

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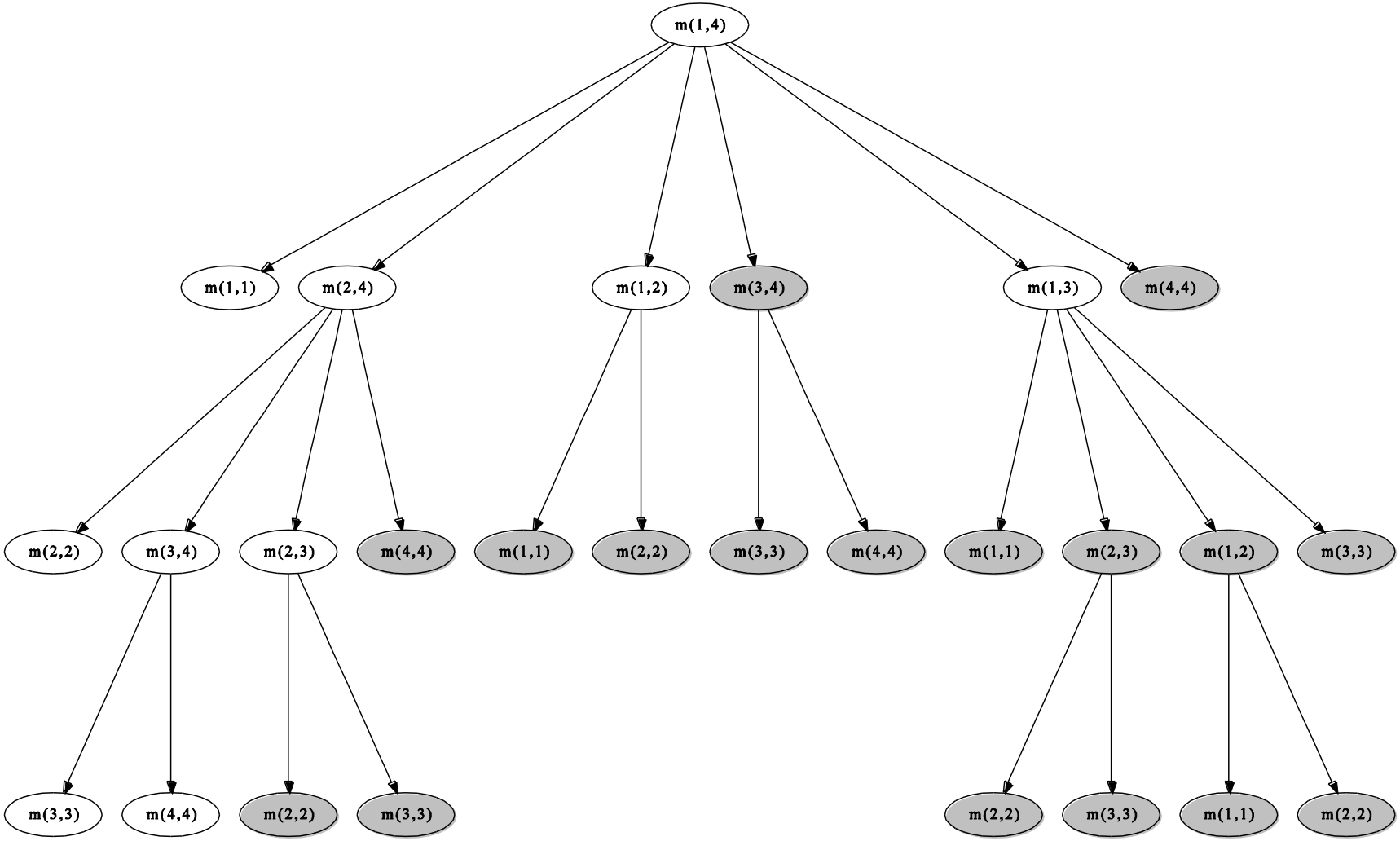
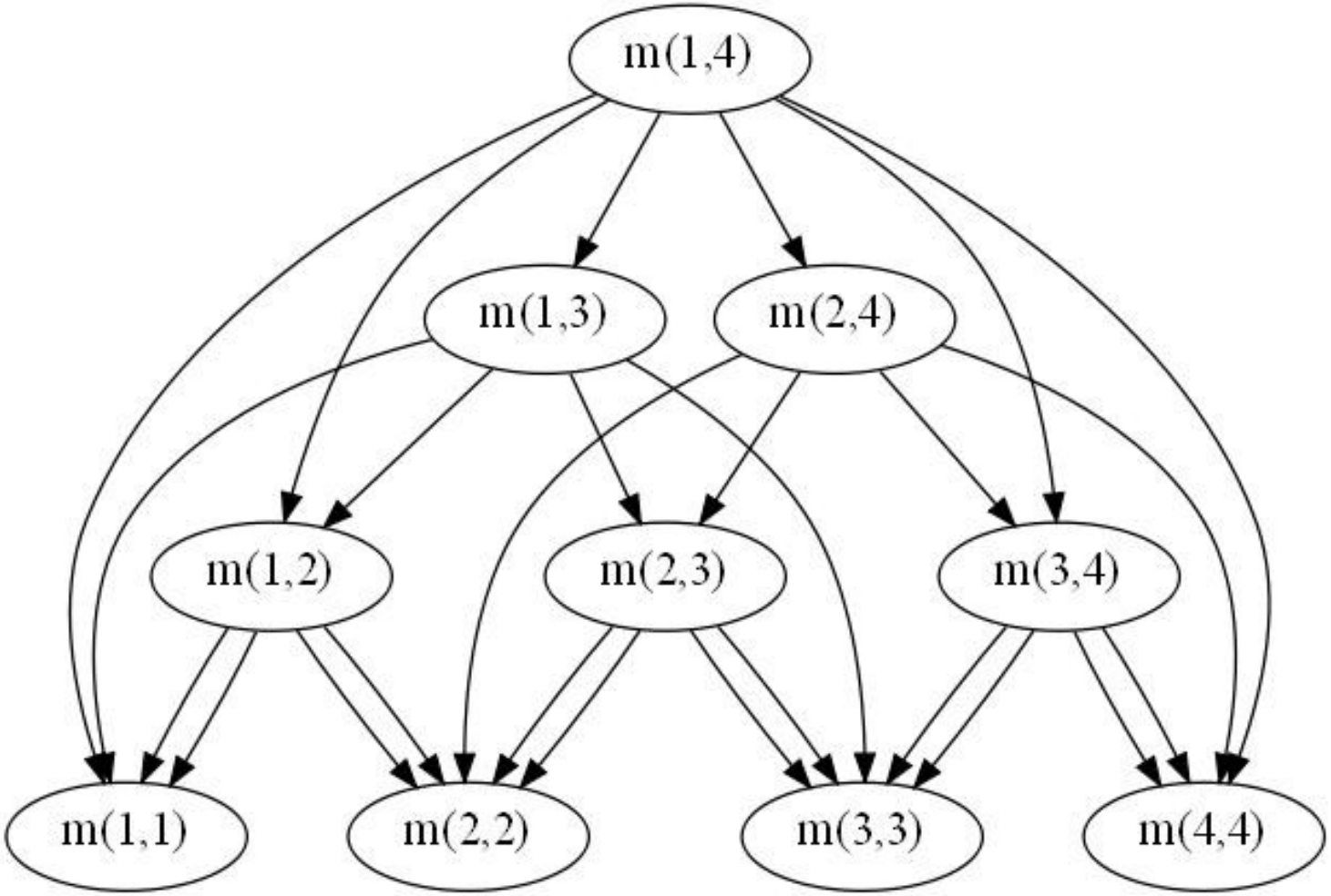
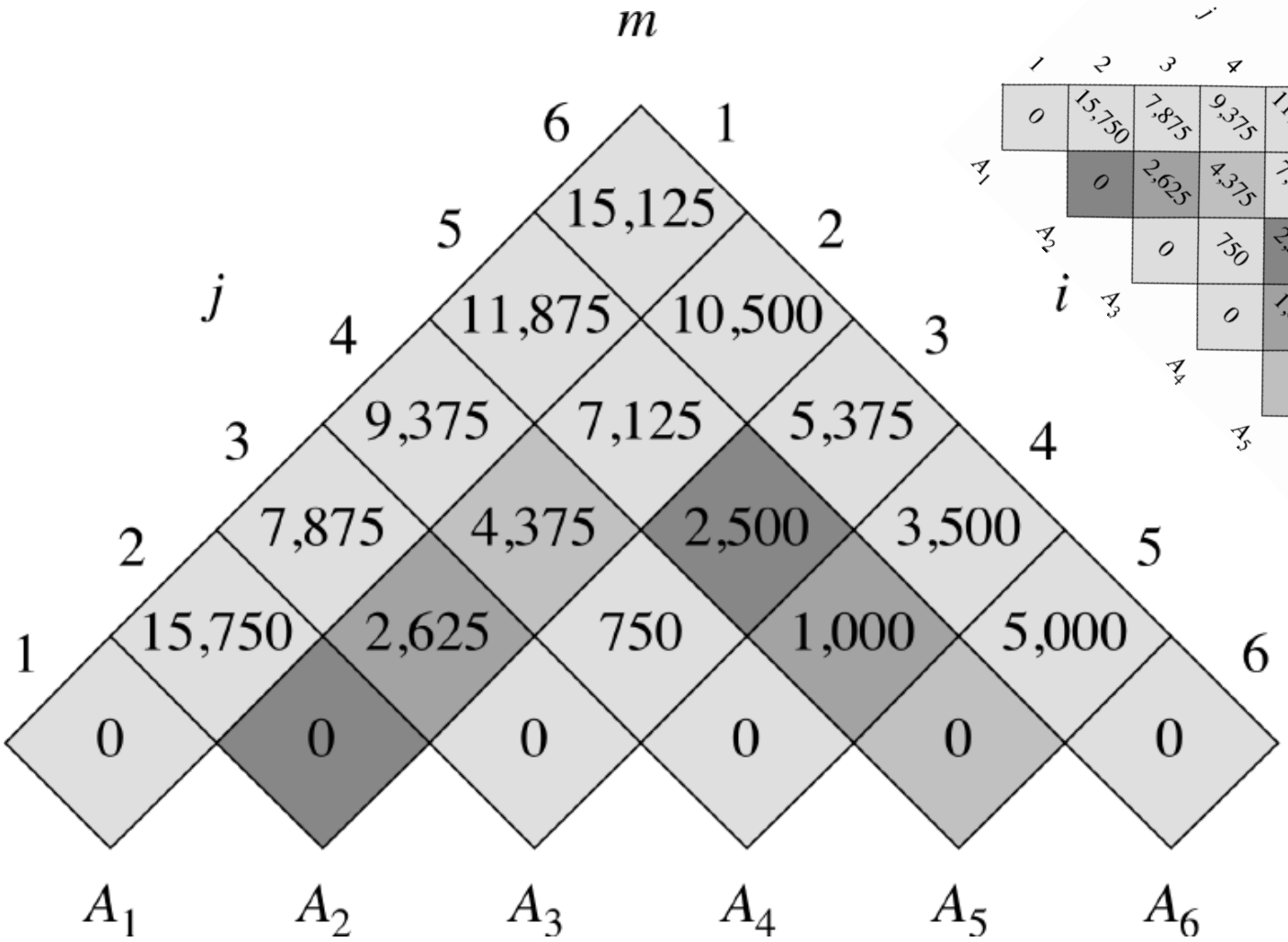
Call Graph for m(1,4)



Dependency Graph for m(1,4)



Bottom-Up Ordering



Longest Common Subsequence

i		j	0	1	2	3	4	5	6
		y_j		B	D	C	A	B	A
0	x_i		0	0	0	0	0	0	0
1	A		0	↑ 0	↑ 0	↑ 0	↖ 1	←1	↖ 1
2	B		0	↖ 1	←1	←1	↑ 1	↖ 2	←2
3	C		0	↑ 1	↑ 1	↖ 2	←2	↑ 2	↑ 2
4	B		0	↖ 1	↑ 1	↑ 2	↑ 2	↖ 3	←3
5	D		0	↑ 1	↖ 2	↑ 2	↑ 2	↑ 3	↑ 3
6	A		0	↑ 1	↑ 2	↑ 2	↖ 3	↑ 3	↖ 4
7	B		0	↖ 1	↑ 2	↑ 2	↑ 3	↖ 4	↑ 4

LCS-LENGTH(X, Y, m, n)

let $b[1..m, 1..n]$ and $c[0..m, o..n]$ be new tables
for $i = 1$ **to** m
  $c[i, 0] = 0$
for $j = 0$ **to** n
  $c[0, j] = 0$
for $i = 1$ **to** m
  for $j = 1$ **to** n
    if x_i == y_j
      $c[i, j] = c[i-1, j-1] + 1$
      $b[i, j] =$ "↖"
    else if $c[i-1, j] \geq c[i, j-1]$
      $c[i, j] = c[i-1, j]$
      $b[i, j] =$ "↑"
    else $c[i, j] = c[i, j-1]$
      $b[i, j] =$ "←"
return c and b