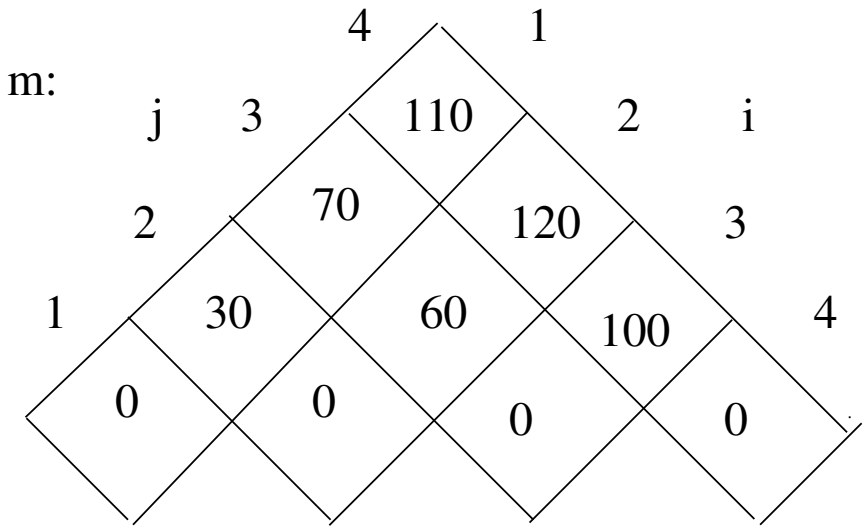
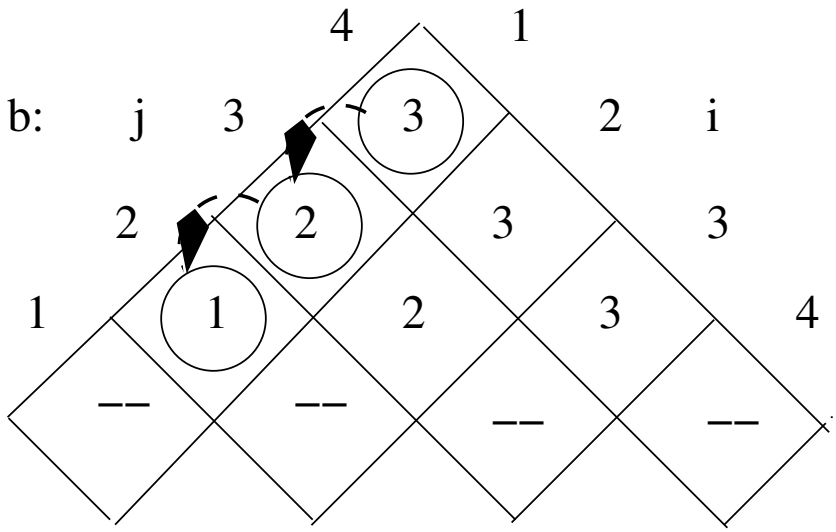
The value and backpointer matrices m and b are as follows:





The "backpointer path" (more properly, the backpointer tree) is indicated by dashed arrows linking cells in the b matrix. This tree implies that the optimal parenthesization of the given matrix chain is

$$
\begin{aligned}
&(M_1 M_2 M_3 M_4) \\
&\Rightarrow ((M_1 M_2 M_3) M_4) \\
&\Rightarrow (((M_1 M_2) M_3) M_4)
\end{aligned}
$$

The computations for each of the cells in matrices m and b are given below:

$$m[1,2] = \min \left\{ \begin{array}{ll} m[1,1] + m[2,2] + (p[0] * p[1] * p[2]) & (k = 1) \\ = 0 + 0 + (2 * 3 * 5) = 30 & \end{array} \right\} = 30 \ (k = 1)$$

$$m[2,3] = \min \left\{ \begin{array}{ll} m[2,2] + m[3,3] + (p[1] * p[2] * p[3]) & (k = 2) \\ = 0 + 0 + (3 * 5 * 4) = 60 & \end{array} \right\} = 60 \ (k = 2)$$

$$m[3,4] = \min \left\{ \begin{array}{ll} m[3,3] + m[4,4] + (p[2] * p[3] * p[4]) & (k = 3) \\ = 0 + 0 + (5 * 4 * 5) = 100 & \end{array} \right\} = 100 \ (k = 3)$$

$$m[1,3] = \min \left\{ \begin{array}{ll} m[1,1] + m[2,3] + (p[0] * p[1] * p[3]) & (k = 1) \\ = 0 + 60 + (2 * 3 * 4) = 84, & \\ m[1,2] + m[3,3] + (p[0] * p[2] * p[3]) & (k = 2) \\ = 30 + 0 + (2 * 5 * 4) = 70 & \end{array} \right\} = 70 \ (k = 2)$$

$$m[2,4] = \min \left\{ \begin{array}{ll} m[2,2] + m[3,4] + (p[1] * p[2] * p[4]) & (k = 2) \\ = 0 + 100 + (3 * 5 * 5) = 175, & \\ m[2,3] + m[4,4] + (p[1] * p[3] * p[4]) & (k = 3) \\ = 60 + 0 + (3 * 4 * 5) = 120 & \end{array} \right\} = 120 \ (k = 3)$$

$$m[1,4] = \min \left\{ \begin{array}{ll} m[1,1] + m[2,4] + (p[0] * p[1] * p[4]) & (k = 1) \\ = 0 + 120 + (2 * 3 * 5) = 150, & \\ m[1,2] + m[3,4] + (p[0] * p[2] * p[4]) & (k = 2) \\ = 30 + 100 + (2 * 5 * 5) = 180, & \\ m[1,3] + m[4,4] + (p[0] * p[3] * p[4]) & (k = 3) \\ = 70 + 0 + (2 * 4 * 5) = 110 & \end{array} \right\} = 110 \ (k = 3)$$