The following table summarizes methods known to me.

Name	Original Recurrence	Sufficient Condition of Applicability	Original Complexity	Optimized Complexity	Links
Convex Hull Optimization1	$dp[i] = min_{j<i}\{dp[j] + b[j] \star a[i]\}$	$b[j] \geq b[j+1]$ ~~optionally~~ $a[i] \leq a[i+1]$	$O(n^2)$	$O(n)$	1 2 3 p1
Convex Hull Optimization2	$dp[i][j] = min_{k<j}\{dp[i-1][k] + b[k] * a[j]\}$	$b[k] \geq b[k+1]$ ~~optionally~~ $a[j] \leq a[j+1]$	$O(kn^2)$	$O(kn)$	1 p1 p2
Divide and Conquer Optimization	$dp[i][j] = min_{k<j}\{dp[i-1][k] + C[k][j]\}$	$A[i][j] \leq A[i][j+1]$	$O(kn^2)$	$O(knlogn)$	1 p1
Knuth Optimization	$dp[i][j] = min_{i<k<j}\{dp[i][k] + dp[k][j]\} + C[i][j]$	$A[i,j-1] \leq A[i,j] \leq A[i+1,j]$	$O(n^3)$	$O(n^2)$	1 2 p1

Notes:

- $A[i][j]$ — the smallest k that gives optimal answer, for example in $dp[i][j] = dp[i-1][k] + C[k][j]$
- $C[i][j]$ — some given cost function
- We can generalize a bit in the following way: $dp[i] = min_{j<i}\{F[j] + b[j] * a[i]\}$, where $F[j]$ is computed from $dp[j]$ in constant time.
- It looks like **Convex Hull Optimization2** is a special case of **Divide and Conquer Optimization**.
- It is claimed (in the references) that **Knuth Optimization** is applicable if $C[i][j]$ satisfies the following 2 conditions:
- **quadrangle inequality**: $C[a][c] + C[b][d] \leq C[a][d] + C[b][c],\ a \leq b \leq c \leq d$
- **monotonicity**: $C[b][c] \leq C[a][d],\ a \leq b \leq c \leq d$
- It is claimed (in the references) that the recurrence $dp[j] = min_{i<j}\{dp[i] + C[i][j]\}$ can be solved in $O(nlogn)$ (and even $O(n)$) if $C[i][j]$ satisfies **quadrangle inequality**. **YuukaKazami** described how to solve some case of this problem.