Algorithms and Analysis

Dynamic Programming

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Objectives

- Dynamic programming
- Rod cutting problem

Rod cutting (example)

The ***rod-cutting problem*** is the following. Given a rod of length n inches and a table of prices p_i for $i = 1, 2, \ldots, n$, determine the maximum revenue r_n obtainable by cutting up the rod and selling the pieces.

length i	1	2	3	4	5	6	7	8	9	10
price p_i	1	5	8	9	10	17	17	20	24	30

i	0	1	2	3	4	5	6	7	8	9	10
$r[i]$	0	1	5	8	10	13	17	18	22	25	30
$s[i]$	0	1	2	3	2	2	6	1	2	3	10

Note: the table is not unique, but you can use it to check the answers.

1. Your program must implement the "top-down with memoization" method: MEMOIZED-CUT-ROD-AUX(p, n, r).
2. Your program can use the default data given above.
3. User can select from 1 to 10 for the length of the original rod.
4. Your program should display the maximum profit and how the rod should be cut to get it.