

# Dynamic Programming: Bottum-up Problem Solving

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## Bottom-up Problem Solving

Richard Bellman described this problem solving technique in the 1950's and called it Dynamic Programming to impress his sponsors. Dynamic Programming is an important problem solving paradigm. Read about Bellman on Wikipedia and summarize the importance of his contributions.

Describe how dynamic programming works: Solve and memorizing solutions to small problems and use these solutions as building blocks to construct a solution to a larger problem from the bottom-up.

### *Example uses of Dynamic Programming*

Give at least three examples problems that use the dynamic programming paradigm to solve problems. (You should be able to search finding examples and summarize these in your group's words.)

### *Good approximations to hard problems*

There are Hard Problems: Problems that do not (seem) to have efficient solutions. You will explore some of these later in future quests.

There are dynamic programming algorithms that provide good approximate solutions to these hard problems. My memory tells me the 0-1 Knapsack Problem is an example of a hard problem with a good dynamic programming approximation. Report on this example and at least 2 additional hard problems with good approximate solutions.

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