DYNAMIC PROGRAMMING

Dynamic programming

- Dynamic programming is a method for solving a complex problem by breaking it down into a collection of simpler subproblems
- It is applicable to problems exhibiting the properties of overlapping subproblems
- The method takes far less time than other methods that don't take advantage of the subproblem overlap
- We need to solve different parts of the problem (subproblems) + combine the solutions of the subproblems to reach an overall solution
- We solve each subproblems only once → we reduce the number of computations
- Subproblems can be stored („**memoization**”) !!!!

Dynamic prgramming vs „divide and conquer” method

- Several problems can be solved by combining optimal solutions to *non-overlapping* sub-problems
- This strategy is called "divide and conquer" method
- This is why merge sort / quick sort are not classified as dynamic programming problems
- Overlapping subproblems → dynamic programming
- Non-overlapping subproblems → divide and conquer method