

## Foundation of Computer Science — FM2

### Assignment 1b - Assignment on the video lectures from “5-1” to “5-7” (from *RNA secondary structure problem* to *Pairwise sequence alignment*)

1. Consider the following problem **Sum of Subset (SOS)**:

Given: non-negative integers  $m, a_1, a_2, \dots, a_m, b$

Question: Is there is set  $J \subseteq \{1, 2, \dots, m\}$  such that  $\sum_{i \in J} a_i = b$ ?

(a) Solve the SOS problem with dynamic programming.

*Hint:* Use a table  $SUM(i, j)$  storing the maximal values that can be obtained as a sum of numbers from  $a_1, a_2, \dots, a_i$  such that this sum does not exceed the number  $j$ .

(b) Find out what the *knapsack problem* is.

How can you modify your algorithm solving SOS in order to solve the knapsack problem?