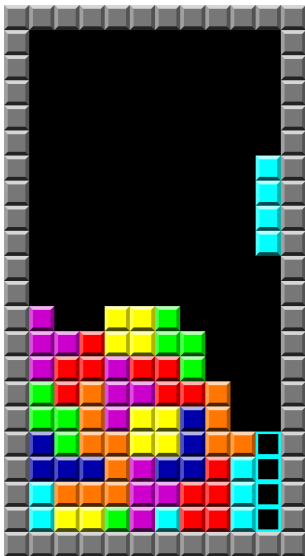


Tetris

kuko

17.2.2021

Pokročilá teória zložitosti





The letter L



The letter J



The letter O



The letter T



The letter S



The letter Z



The letter I

3-Partition

1,2,3,4,5,6,7,8,9,10,10,11

(1,7,11)

(2,8,9)

(3,6,10)

(4,5,10)

3-Partition

1,2,3,4,5,6,7,8,9,10,10,11

(1,7,11)

(2,8,9)

(3,6,10)

(4,5,10)

0, 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 20

NIE (súčet 30; pozri 5)

0, 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 20

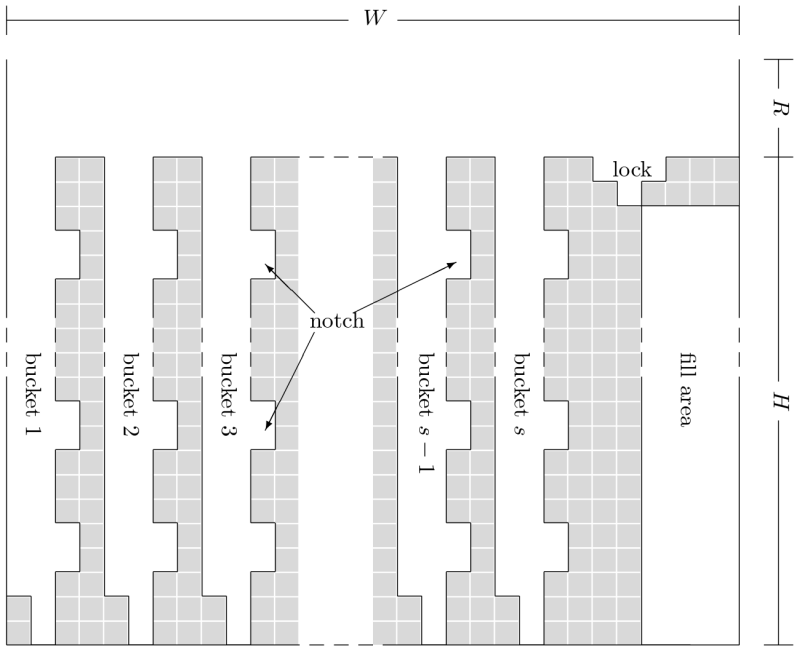
NIE (súčet 30; pozri 5)

3-Partition

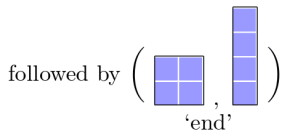
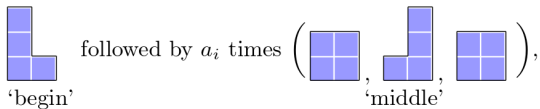
The problem 3-PARTITION can be defined as follows:

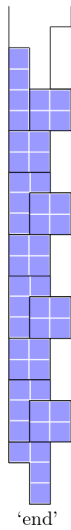
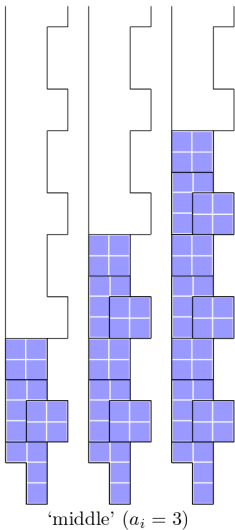
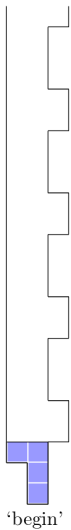
Given A sequence A of positive integer values a_1, \dots, a_{3s} and a positive integer value T such that $T/4 < a_i < T/2$ for all $1 \leq i \leq 3s$, and such that $\sum_{i=1}^{3s} a_i = sT$.

Question Can A be divided into s disjoint subsets (or rather subsequences) B_1, \dots, B_s such that: $\sum_{a_i \in B_j} a_i = T$ for all $1 \leq j \leq s$? (Call (A, T) a “yes” instance if this is the case and a “no” instance otherwise.)



1. First for every $a_i \in A$ the sequence (in this order):





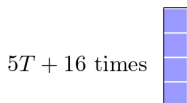
2. Then to fill the top of all the s buckets the ‘subset fillers’:

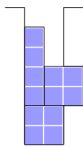


3. Then the T-shape to unlock the ‘lock’:

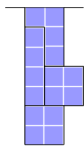


4. And to clear the whole board by filling the ‘fill area’:

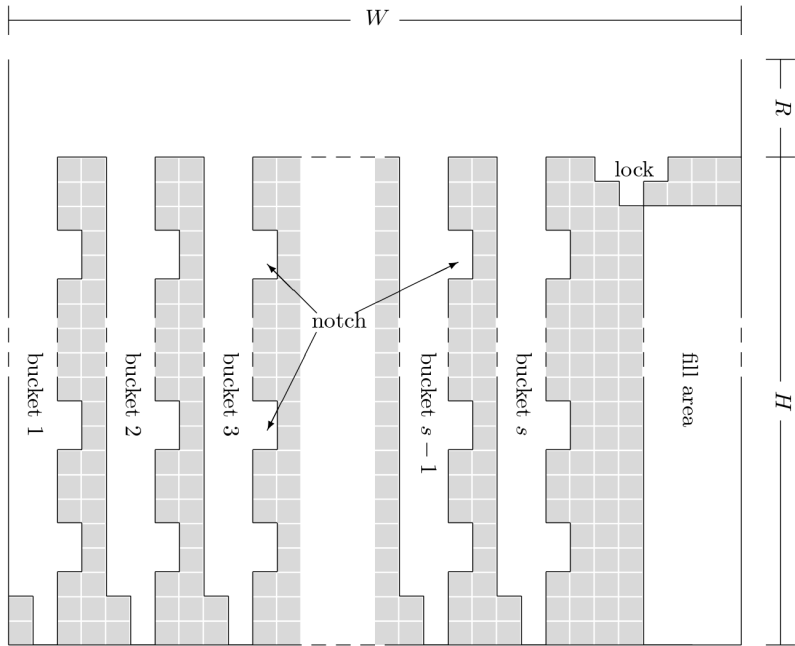


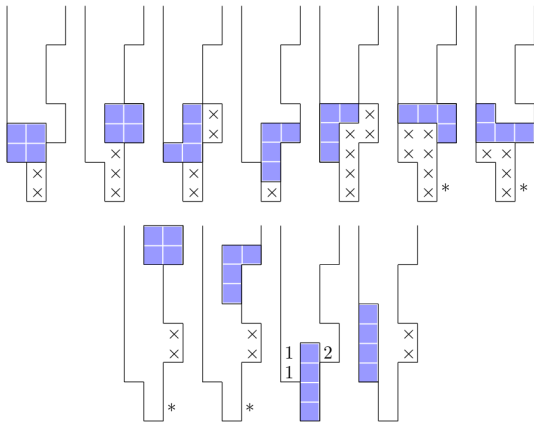


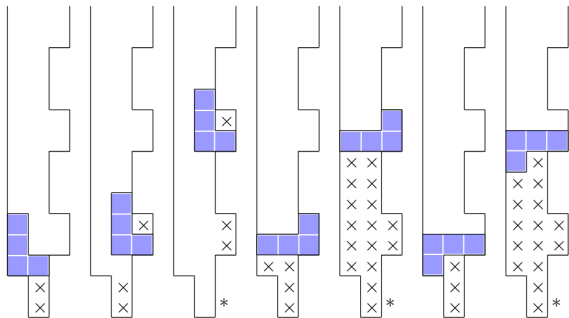
(a)

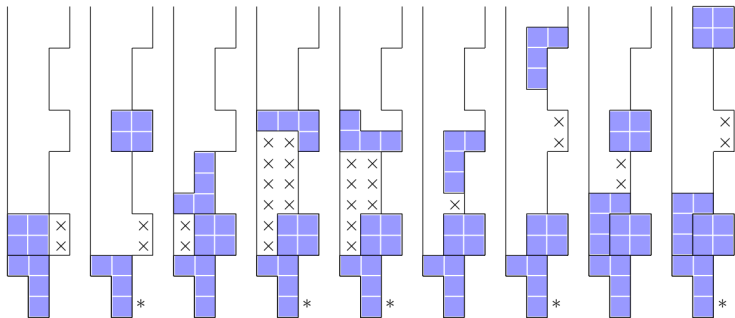


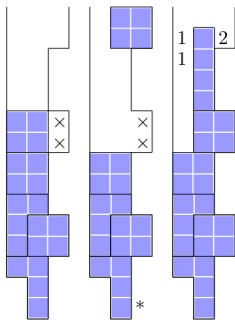
(b)











Veta

Hra TETRIS je NP-úplná. Presnejšie: Je daný počiatočný stav hracej plochy, kde už nejaké kocky sú a je známa postupnosť všetkých kociek, v poradí, v akom budú postupne prichádzať. Otázky ako „Dá sa v tejto pozícii prežiť? Dajú sa vymazať všetky riadky?“ sú NP-úplné.

■ **Dôkaz.** Redukcia 3-PARTITION \longrightarrow TETRIS.

