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New heuristics for one-dimensional bin-packing

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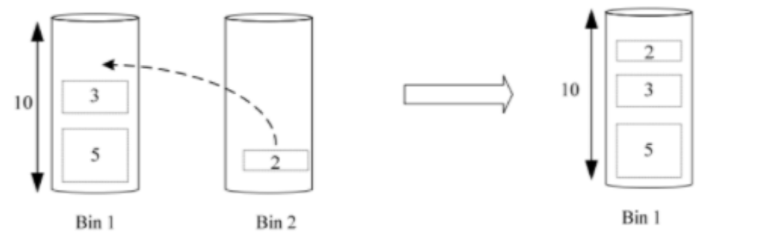
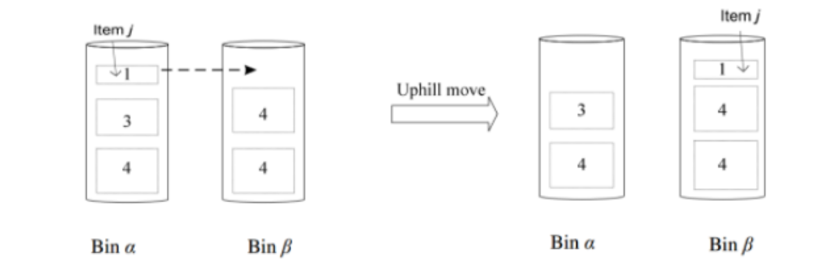
5.1. *Objective function*

The crucial factor of any neighbourhood search procedure is the choice of the objective function. In the present context, choosing the real objective function, which is to minimise the number of bins, is rather pointless, since very many different configurations, in terms of the assignment of items to bins, correspond to the same number of bins. Observing that a good solution will always have nearly full bins leads naturally to an objective function that seeks configurations having this feature. One such objective function is

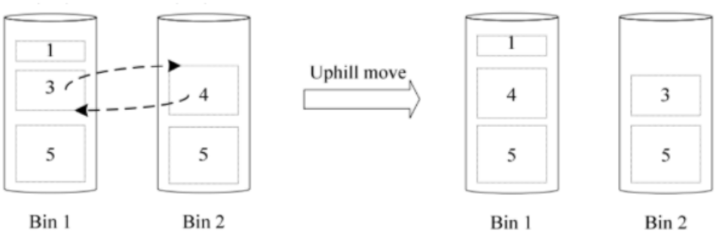
$$\max f(x) = \sum_{\alpha=1}^{m} (l(\alpha))^2, \tag{1}$$



$f = (5+3)^2 + 2^2 = 68$ $\qquad f_{new} = (5+3+2)^2 = 100$



$f = (1+3+4)^2 + (4+4)^2 = 128$ $\qquad f_{new} = (3+4)^2 + (1+4+4)^2 = 130$



$(f = 162)$ $\qquad (f_{new} = 164)$