

New Lower Bounds for Certain Relaxed Online Packing Problems

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Packing problems are optimization problems that involve finding efficient ways to arrange items into containers. In the case of online problems the items arrive one by one and the decisions are irrevocable. We prove new lower bounds for two online packing problems that have some flexibility [1]. In the online removable multiple knapsack problem, we have a fixed number of identical bins and a sequence of items with sizes and values that arrive online. The goal is to maximize the total value of the items that are packed in the bins. An online algorithm can reject an item without packing it, or remove a previously packed item at any time. In the online minimum peak appointment scheduling an online algorithm must assign a position to each item upon its arrival, where the position is an interval of length equal to the item's size within a bin; minimizing the maximum number of overlapping intervals at any point in time.

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References

- [1] J. Balogh, Gy. Dósa, L. Epstein, and Ł. Jeż, Lower Bounds on the Performance of Online Algorithms for Relaxed Packing Problems, Lecture Notes in Computer Science (LNCS) 13270, pp. 101-113, 2022.