Format of the Berth Allocation Problem instance files

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The notation that we will use to describe the format of the BAP instance files refers to the Technical Report:

- The Berth Allocation Problem: Application to the Gioia Tauro Maritime Terminal, Cordeau, J.-F., Laporte, G., Legato, P., Moccia, L., Août 2003 Centre de recherche sur les transports - Montréal - CRT-2003-17

The instance set I2 (file I2.zip) contains 50 instances labelled as "nxm-c, where n is the number of ships, m is the number of berths and c is a sequential order number $c = 1, ..., 10$. The instance set I3 (file I3.zip) contains 30 instances labelled as "ic, $c = 1, ..., 30$ and their size is $n = 60, m = 13$. Results of our heuristics on these instance sets are illustrated in the Technical Report: Table 5, 6 for instance set I2, and Table 7 for instance set I3.

An instance file presents the following structure. In the first row we have two values, n and m. Then the handling time matrix with m rows and n columns is reported. Time values are always expressed with one hour as unit time. When t_i^k, handling time of ship i at berth k, is equal to zero we indicate that the berth k is forbidden to ship i. The following m rows (with three values each row) report s^k, start of availability time of berth k, e^k, end of availability time of berth k, and the third value is the difference between the first two and is redundant. Next we have a row with n values, the a_i, arrival time of ship i. Follows another row with n values, b_i, upper bound of the service time window on the ship i. In our computation experiments we wanted to compare the heuristic that handles time windows, with a formulation that do not consider them. Therefore, in these instance sets, the time windows are disabled and b_i is set to a value higher than the end of berth availability.

The following data represents the structure of the berth segments and vessel lengths and are relevant only in the spatial version of the BAP. Length values are reported in meters. We have m rows with four values. The first two values represent the lengths of the left and right parts of the berth segment k. The other two values represent the neighbor segments of the left and right parts, if one of this value is equal to zero the berth segment cannot extend on that direction. This models the beginning and the end of the quay or quay discontinuities. The vessel lengths (including safety distances) are reported in the next row with n values. The last row indicate how many ships of the instance belongs to one of the six ship classes. For example in instance i01 we have as last row: "24 16 6 3 8 3". It means that the ships $1, ..., 24$ are common feeders, the ships $25, ..., 40$ dedicated feeders, etc. This information is important to apply other constraints not considered in our experiments but relevant for the application. Instances where n is smaller than 60 do not consider all ship classes since these instances represents a subset of the port operations. Ships in the same class share *favorite*, *acceptable* and *forbidden* berthing areas and their handling times and vessel lengths are randomly generated according to distributions different from other classes.