KREATIZE Technical Task

Bin Packing Problem

Expected duration : 1h30 max.

KREATIZE solution is a two sided platform that matches customer and potential partners to realise manufacturing project. To create a relevant match, KREATIZE libraries extract geometric features, verify that the project respect a set of validation rules and predict a quote that portray each partner pricing strategy. Each match are then bundled in offers that according to 3 offer type : “best”, the KREATIZE pick - “fastest”, with partners with available capacities and “cheapest”.

For different manufacturing process, the set of validation rule will different. For instance, Additive Manufacturing processes can accommodate many parts in the machine bounding box (the three dimensional area that can be reached by the printing head). The problem we will focus on can be expressed as a very simple bin-packing problem: given a part bounding box and a machine bounding box, find the maximum quantity that fits the machine.

Each problem are written as:
200,200,200 <- the machine bounding box : X, Y, Z
10,10,5 <- the part bounding box (the bin) : x, y, z

In the technical task, you are asked to implement a library to solve this problem. The library should contain :

- a parser to load a text file containing with different problems (a file is provided as example : data.csv);
- a heuristic that computes the maximum number of parts (bins) that fits the given machine bounding box, null if the bin does not fit.

We consider the part bounding box. Rotations are possible. We are only interested in rotations that leaves the part’s bounding parallel to the machine bounding box.

For this technical test you are free to choose the language you feel more comfortable with. We will pay attention to the quality of the code you produce (readability, documentation, ..). We are not interested in optimality but rather in a simple and fast heuristic that gives a good estimate of the optimum.