A dairy product chain produces a new type of fruit yogurt particularly for Summer 2023 season. Production occurs weekly and it is delivered to the stores at 7 a.m. every week on Thursdays.

The company has 2 types of machines with different capacities. There are 25 machines, and the capacities of the machines differ from 50 to 750 yogurts per machine. However, due to the energy-efficient productivity goals, at most 7 of 25 machines must be used for the production except Machine 4. Machine capacities are given in the “Machines” tab of the attached Excel file. In addition, there is a fixed cost for the machine usage, which are also given in the “Machines” tab of the attached Excel file.

Each week the company has a batch of regular orders that must be delivered to different stores around the cities of Europe. In addition, the company sometimes receives additional orders due to dynamic demand and these additional orders yield additional profit. Therefore, a model needs to be created to decide on the additional orders that can be accepted. Don’t forget, regular orders must be accepted. Order amounts and the profit for each order are given in the “Orders” tab of the Excel file. For this case, there are 60 regular orders and 40 additional orders.

The number of machines amount, the number of regular orders, and the number of all types of orders are given in the “MainData” tab of the Excel file.

Create a CPLEX project and formulate a mixed-integer problem (MIP) where the objective is to **maximize the profit** obtained from the additional orders. **Run your model twice, with 15 seconds and 60 seconds time limits, separately.**

**Sets:**

**Parameters:**

**Decision variables:**

**Mathematical Model:**

maximize

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