* Text with underline is the steps, small black text is an explanation of the steps, small blue text is an example of applying the data in *project.xlsx* in the steps we built.

Step 1 Preparation

1）According to the information provided by the Excel document, set the truck capacity for each kind of truck, and the number of various types of trucks.

"j" is the current truck number:

T_ Capacity[j]   T_num[j]

For example, in this case:
T_Capacity1 = 100, T_Capacity2 = 150, T_Capacity3 =200, T_Capacity4 = 250
T_num [1] = 1, T_num [2] = 1, T_num [3] = 1, T_num [4] = 1

2）According to the information provided by the Excel document, set the unit weight for each kind of item.

m is the number of the current item:

Item_weight[m]

For example, in this case:
Item_weight [1] = 12, Item_weight [2] = 15, Item_weight [3] = 70, Item_weight [4] = 80

3）According to the information provided by the Excel document, set the quantity of each type of items, and the total quantity of each type of items.

Item_num[m]

For example, in this case:
Item_num [1] = 5, Item_num [2] = 20, Item_num [3] = 2, Item_num [4] = 1
Item Sum=Item_num [1] + Item_num [2] + Item_num [3] + Item_num [4]=28

Step 2

Select the truck with the largest capacity and the current number of trucks > 0 from all trucks, set its capacity as T_Max and truck number as "j".

This value indicates the maximum remaining capacity of the currently selected truck.

For example: the current maximum capacity of the truck is 250, so T_Max = T_Capacity [4] = 250 and number j = 4.

Step 3

From all items, select the item with the lagrest weight, the number of which > 0 and the unit weight less than or equal to T_Max. And follow the instructions listed:

1)If this type of item exists, set its weight as Item_Max, item number as "m" and continue to Step 4.

For example: the current maximum weight of the items is 80, the quantity is 1>0, and 80<250, so Item_Max = Item_weight [4] = 80, m = 4.

2)If this type of item does not exist, and Item_Sum = 0, ending the whole loading process. Go to Step 5.

Item_Sum = 0 means that the items have been fully loaded,

3)If this type of item does not exist, and Item_Sum > 0, then the current type trucks number T_num [j] = T_num [j] -1 and return to Step 2.

Item_Sum > 0 means that the current truck has not enough capacity to load any type of items, which means that the current truck is loaded,

Step 4:

T_Max = T_Max – Item_Max, Item_num [m] = Item_num[m] – 1, Item_Sum=Item_Sum-1, and then go back to Step 3.

At this moment, this type of item has been successfully loaded into the selected truck, and the quantity of the item is reduced by one, total quantity of items mins one.

In this case T_Max = 250 – 80 = 170, so the maximum remaining capacity of the currently selected truck is 170, Item_num [4] = Item_num [4] – 1= 1 – 1 = 0, Item_Sum=Item_Sum-1

Step 5:

All items have been loaded, then the amount of current type of truck minus 1, T_num [j]= T_num[j]-1. Loading process completed and output the number of remaining trucks.

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┌─────────────────────┐                              ┌──────────────────────────┐
│ Get the available   │                              │  ▢ Step1                 │
│ trucks and the item │                              │  ▢ Step2                 │
│ have to be shiped   │                              │  ▢ Step3                 │
└─────────────────────┘                              │  ▢ Step4                 │
           │                                         │  ▢ Step5                 │
           ▼                                         └──────────────────────────┘
┌─────────────────────┐
│ Name trucks, set    │
│ the truck capacity: │
│ T_Capacity[j] and   │
│ numbers: T_num[j]   │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│ Name items, set the │
│ unit weight:        │
│ Item_weight[m] and  │
│ numbers: Item_num[m]│
└─────────────────────┘
```

Get the available trucks and the item have to be shiped

Name trucks, set the truck capacity: T_Capacity[j] and numbers: T_num[j]

Name items, set the unit weight: Item_weight[m] and numbers: Item_num[m]

Select the largest available truck "j", set its capacity as T_Max

current type trucks number minus 1

There is a heaveist available item's weight less or equal to T_Max ?

No → Item_Sum > 0 ?

Yes

Yes

Set its weight as Item_Max

T_Max = T_Max – Item_Max,
Item_num [m] = Item_num[m] – 1
Item_Sum=Item_Sum-1

No

The amount of current type of truck minus 1, output the number of remaining trucks

Loading process completed

Step1
Step2
Step3
Step4
Step5