Numerical Examples

Revenue maximization for LTL Transportation

Case

- You are an international LTL transportation company.
- In your warehouse, there are LTL freights waiting for shipping to different location in Europe.
- The transportation starts in Turkey and continues to North Italy, South Germany, Central Germany, and North Germany route.

Regions	Minimum Price	<1000 kg.	1001 - 2000 kg.	2001 - 3000 kg.	3001 - 5000 kg.	5001 - 7000 kg.	>7001 kg.	FTL (Full Truck Load) Price
N. Italy	160	23	20	19	17	16	15	2.500
S. Germany	180	25	23	21	18	17	16	2.700
C. Germany	200	27	25	23	20	19	18	2.800
N. Germany	210	29	27	25	23	21	19	3.000

Each rate given in the above table is for 100 kg freight.

Details of The Case

FREIGHT LIST IN YOUR WAREHOUSE

Freight No	Type and Quantity of The Freight		Number of Pallets	Destination
1	10.000	kg bulk freight	12	N. Italy
2	4.400	kg bulk freight	7	N. Germany
3	3,6	LDM (loading meter) bulk freight		N. Italy
4	600	kg. ADR class freight	1	S. Germany
5	9.750	kg bulk freight	14	C. Germany
6	2,4	LDM ADR class freight		C. Germany
7	1.400	kg. ADR class freight	2	N. Germany
8	9.600	kg. ADR class freight	12	S. Germany
9	400	kg. ADR class freight	1	N. Germany
10	2.400	kg bulk freight	4	N. Italy

Question?

- Considering these data, find the loading combination that maximizes the total income of the transportation company for one-way transportation.
- Calculate the total transportation revenue and weight of each freight combined in the vehicle.

Required Information

- Size of the trailer:
- Size of the pallet:
- Maximum loading capacity of the trailer:
- Extra price taken for ADR class products:
- _____ m^3 =_____ kg
- _____LDM = _____ kg

Solution

- **Freight 1 :** 10.000 x (15/100) = **1.500 €**
- **Freight 2 :** 4.400 x (23/100) = **1.012 €**
- **Freight 3 :** 3,6 ldm = 3,6 x 1.750 kg = 6.300 kg ; 6.300 x (16/100) = **1.008 €**
- **Freight 4 :** 600 x (25/100) = 150 €. This is under the min.value so 180 €. 180 x 1,20 = **216 €** (with 20% ADR difference)
- **Freight 5:** 9.750 x (18/100) = **1.755 €**
- **Freight 6:** 2,4 ldm = 2,4 x 1.750 kg = 4.200 kg ; 4.200 x (20/100) = 840 €. 840 x 1,20 = **1.008 €** (with 20% ADR difference)
- **Freight 7:** 1.400 x (27/100) = 378 ; 378 x 1,20 = **453,6 €** (with 20% ADR difference)
- **Freight 8:** 9.600 x (16/100) = 1.536 € ; 1.536 x 1,20 = **1.843,2 €** (with 20% ADR difference)
- **Freight 9:** 400 x (29/100) = 116 €. This is under the min.value so 210 €. 210 x 1,20 = **252 €** (with 20% ADR difference)
- **Freight 10:** 2.400 x (19/100) = **456 €**

Solution

Freight No	Revenue	Pallet	Weight	Revenue/pallet
1	1500	12	10.000	125
2	1012	7	4.400	144,571
3	1008	9	6.300	112
4	216	1	600	216
5	1755	14	9.750	125,357
6	1008	6	4.200	168
7	453,6	2	1.400	226,8
8	1843,2	12	9.600	153,6
9	252	1	400	252
10	456	4	2.400	114
	9.504	68	49.050	139,762

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	5240,8	33	23000	