§9.5: Branch-and-Bound for Knapsack Problems

1.] Solve the LP Relaxation of the following knapsack problem:

Maximize: $z = 40x_1 + 80x_2 + 10x_3 + 10x_4 + 4x_5 + 20x_6 + 60x_7$

Subject to: $40x_1 + 50x_2 + 30x_3 + 10x_4 + 10x_5 + 40x_6 + 30x_7 \leq 100$
$$x_i \geq 0, x_i \in \{0, 1\}$$

2.] Karen wants to take four items on a trip. The benefit and weight of each item is given in the table below. Assuming Karen's knapsack can only hold 14 lbs of items, formulate the knapsack problem that maximizes benefit and solve it using the Branch-and-Bound method.

Item	Weight (lbs)	Benefit
1	5	16
2	7	22
3	4	12
4	3	8