- Suppose

$$c_{i,j} = \text{cost of producing one type } i \text{ hat at factory } j \qquad \text{for } i \in H \text{ and } j \in F$$

- If we produce $x_{i,j}$ hats of type i at factory j (for $i \in H$ and $j \in F$), then the total cost is

Problem 3. Let $M = \{1, 2, 3\}$ and $N = \{1, 2, 3, 4\}$. Write following as compactly as possible using summation notation and "for" statements.

Let y_1 = amount of product 1 produced
y_2 = amount of product 2 produced
y_3 = amount of product 3 produced
y_4 = amount of product 4 produced

$$a_{1,1}y_1 + a_{1,2}y_2 + a_{1,3}y_3 + a_{1,4}y_4 = b_1 \quad \rightarrow \quad \sum_{j \in N} a_{1,j} y_j = b_1$$
$$a_{2,1}y_1 + a_{2,2}y_2 + a_{2,3}y_3 + a_{2,4}y_4 = b_2 \quad \rightarrow \quad \sum_{j \in N} a_{2,j} y_j = b_2$$
$$a_{3,1}y_1 + a_{3,2}y_2 + a_{3,3}y_3 + a_{3,4}y_4 = b_3 \quad \rightarrow \quad \sum_{j \in N} a_{3,j} y_j = b_3$$

Let y_i = amount of product i produced for $i \in N$ $\sum_{j \in N} a_{i,j} y_j = b_i$ for $i \in M$