BOZ 780
Operations Research
Math and assignment template

Student name: My name
Student number: 12345678

Mathematical notation

First of all you need to define the variables and parameters in your model. I usually do this using a tabular environment:

$c_i \triangleq$ the given unit cost of ordering heart valves from supplier i, where $i = \{1, 2, 3\}$

$p_{ij} \triangleq$ the given proportion of heart valves from supplier i that falls in size category j, where $i = \{1, 2, 3\}$, and $j = \{1, 2, 3\}$. Size $j = 1$ represents large; $j = 2$ medium; and $j = 3$ small heart valves.

$r_j \triangleq$ the given requirement (in units) for valves of size j, where $j = \{1, 2, 3\}$

$x_k \triangleq \begin{cases} 1 & \text{if player } k \text{ is in the starting lineup, where } k = \{1, \ldots, 7\} \\ 0 & \text{otherwise} \end{cases}$

Then you need to define the objective function and constraints. I usually use the equation environment for this purpose:

$$minz = \sum_{i=1}^{3} c_i x_i \tag{1}$$

When you define the constraints you can either use the equation environment and define a separate equation for every constraint or you can use the align environment (preferred option) to ensure that the constraints are properly aligned.

Equation example

$$x_i \leq 700 \quad \forall \quad i \in \{1, 2, 3\} \tag{2}$$

$$\sum_{i=1}^{3} p_{ij} x_i \geq r_j \quad \forall \quad j \in \{1, 2, 3\} \tag{3}$$

$$x_i \geq 0 \quad \forall \quad i \in \{1, 2, 3\} \tag{4}$$

Align example (Preferred)

$$x_i \leq 700 \qquad \forall \quad i \in \{1, 2, 3\} \tag{5}$$

$$\sum_{i=1}^{3} p_{ij} x_i \geq r_j \qquad \forall \quad j \in \{1, 2, 3\} \tag{6}$$

$$x_i \geq 0 \qquad \forall \quad i \in \{1, 2, 3\} \tag{7}$$

Now you need to discuss the model by referring to each of the equations/constraints:

The objective in (1) minimises the total cost of purchasing the heart valves from the three suppliers. Constraint (2) ensures that we do not exceed the available heart valves. The three sizes are each addressed in a constraint, as formulated in (3). Each model formulation must end with a description of the variable sign restrictions, and is presented in (4).

Other symbols

Additional symbols that me be required are the following:

- Bigger brackets $\left(\left[\left\{\left(\right)\right\}\right]\right)$
- Element of $\in$
- Superscript A^B
- Subscript A_B
- Fraction $\frac{A}{B}$

Note

If you include mathematical symbols within normal text, you need to enclose the symbol within two $ symbols. However, the $ symbols are not required in the equation or align environments as these are mathematical environments.