
AIMMS Tutorial for Beginners - What to Expect

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Chapter 2

What to Expect

In this chapter you will find a brief overview of the tasks to be performed, a compact statement of the underlying model to be built, and a glimpse of the output you will produce.

This chapter

2.1 Scope of one-hour tutorial

Once you have read the short problem description and the associated mathematical model statement, you will be asked to complete a series of tasks that make up this one-hour tutorial, namely:

*Summarizing
your work*

- create a new project in AIMMS,
- enter all identifier declarations,
- enter the data manually,
- save your data in a case,
- build a small procedure,
- build a single page with
 - header text,
 - a standard table and two bar charts with input data,
 - a composite table and a stacked bar chart with output data,
 - a button to execute the procedure, and
 - a scalar object with the optimal value,
- perform a what-if run.

2.2 Problem description and model statement

Truckloads of beer are to be shipped from two plants to five customers during a particular period of time. Both the available supply at each plant and the required demand by each customer (measured in terms of truckloads) are known. The cost associated with moving one truck load from a plant to a customer is also provided. The objective is to make a least-cost plan for moving the beer such that the demand is met and shipments do not exceed the available supply from each brewery.

*Problem
description*

The following table provides the data for the problem described in the previous paragraph. *Data overview*

| Customers Plants | Unit Transport Cost | | | | | Supply |
|---------------------|---------------------|-------|-------|------------|-----------|--------|
| | Amsterdam | Breda | Gouda | Amersfoort | Den Bosch | |
| Haarlem | 131 | 405 | 188 | 396 | 485 | 47 |
| Eindhoven | 554 | 351 | 479 | 366 | 155 | 63 |
| Demand | 28 | 16 | 22 | 31 | 12 | |

Table 2.1: Input data for beer transport problem

The following declarations list the identifiers that are part of the mathematical program to be built. *Identifier declarations*

Indices:

p *plants*
 c *customers*

Parameters:

S_p *supply at plant p*
 D_c *demand by customer c*
 U_{pc} *unit transport cost from p to c*

Variables:

x_{pc} *transport from p to c*
 z *total transport cost*

The mathematical model summary below captures the least-cost plan to transport beer such that the demand is met and shipments do not exceed available supply. *Model summary*

Minimize:

$$z = \sum_{pc} U_{pc} x_{pc}$$

Subject to:

$$\begin{aligned} \sum_c x_{pc} &\leq S_p && \forall p \\ \sum_p x_{pc} &\geq D_c && \forall c \\ x_{pc} &\geq 0 && \forall (p, c) \end{aligned}$$



Figure 2.1: The Netherlands

Even though the above notation with one-letter symbols is typical of small mathematical optimization models, it will not be used to represent the model in AIMMS. Instead, explicit names will be used throughout to avoid any unnecessary translation symbols. The number of symbols needed to describe practical applications is generally large, and a clear naming convention supports the understanding and maintenance of large models.

Using explicit names

2.3 A preview of your output

Figure 2.2 is a page that contains both input and output data associated with the beer transport model. In Chapter 6 you will be asked to construct this page using the point-and-click facilities available in AIMMS. *A single page*

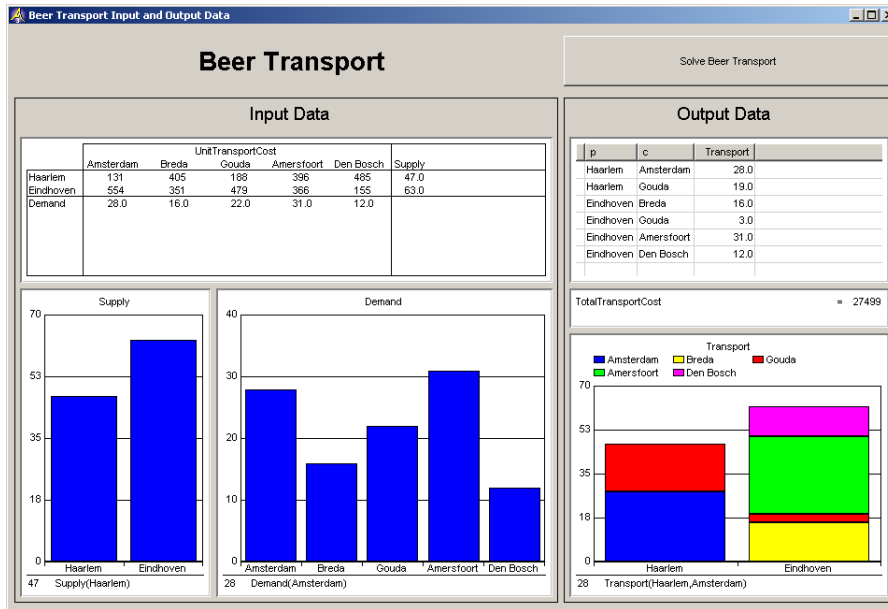


Figure 2.2: An input-output page