

cars

An auto company manufactures cars and trucks. Each vehicle must be processed in the paint shop and body assembly shop.

- If the paint shop were only painting trucks, 40 per day could be painted.
- If the paint shop were painting only cars, it could process 60 per day.
- If the body shop were only producing trucks, it could process 50 per day.
- If the body shop were only producing cars, it could process 50 per day.

Each truck contributes \$300 to profit, and each car contributes \$200 to profit. Assume fractional cars and trucks can be produced and sold.

(a) Consider the following LP:

$$\begin{aligned} & \text{maximize} && 300x_1 + 200x_2 \\ & \text{subject to} && \frac{1}{40}x_1 + \frac{1}{60}x_2 \leq 1 \\ & && \frac{1}{50}x_1 + \frac{1}{50}x_2 \leq 1 \\ & && x_1 \geq 0, x_2 \geq 0 \end{aligned}$$

Explain why this LP determines a daily production schedule that maximizes the company's profits: define the decision variables x_1 and x_2 , and describe each constraint.

(b) Write the dual of this LP.

(c) Give an economic interpretation of the dual LP.