

620-261 Introduction to Operations Research

ASSIGNMENT 1

Post in boxes by 3.00 pm on Friday 14th March 2008

1. Four jobs are to be processed on a printing machine. The machine can process only one job at a time. When a new job is processed, the machine must be adjusted and this set-up process is time consuming. The set-up times (in hours) involved in switching from job i to job j is given by the (i, j) entry of the table below, for example, the set-up time incurred in switching from job B to job D is equal to 5 hrs. There is no set-up time for the first job processed.

	A	B	C	D
A	–	3	1	4
B	2	–	1	5
C	4	3	–	4
D	2	2	2	–

The Manager is interested in a scheduling policy that will process the jobs in an order that will minimize the total set-up time (sum of the all the individual set-up times). Formulate a mathematical model for this problem.

2. A company assembles both cars and trucks. The assembly is carried out in three departments: sheet metal stamping, engine assembly and final assembly. The number of person hours required for assembling cars and trucks in each of these departments is shown below:

	sheet metal	engine assembly	final assembly
cars	50	50	25
trucks	25	50	100

Each department has a capacity of 200,000 person hours per year. Cars earn a profit of \$6000 each, and trucks \$10,000 each, for the company. Formulate a linear program that can be used to determine how many cars and trucks the company should manufacture each year to maximise its profit?