

620-261 Introduction to Operations Research

TUTORIAL 1

Week beginning Friday 7th March 2008

1. A company produces glass products which include windows and doors. It has three plants which contribute to the manufacture of these products. The first plant produces aluminium frames, the second produces wooden frames and the third produces glass and assembles the products. The company decides to revamp its production routine after discontinuing production of unprofitable products. The company wishes to use the excess production time to produce two new products, each of which will be produced in batches of 20.

The first product is an 8 ft glass door with aluminium frame which uses 1 hour/batch at plant 1 and 8 hours/batch at plant 3 to produce. The second product is a 4×6 ft wood-framed window which requires 2 hours/batch of production time at plant 2 and 2 hours/batch at plant 3.

The total profit for product 1 is \$3,000 per batch whilst product 2 yields \$5,000 per batch. The sales department claims that the company will sell as many batches of each product as the company can make. Production is limited by available production time which is 4 hours per week at plant 1, 12 hours per week at plant 2 and 18 hours per week at plant 3. The company would like to know the number of batches of each product they need to manufacture to maximize their profit.

Formulate the above problem as an optimization problem. Using whatever knowledge you might have acquired from previous subjects, give the optimal solution to the problem.