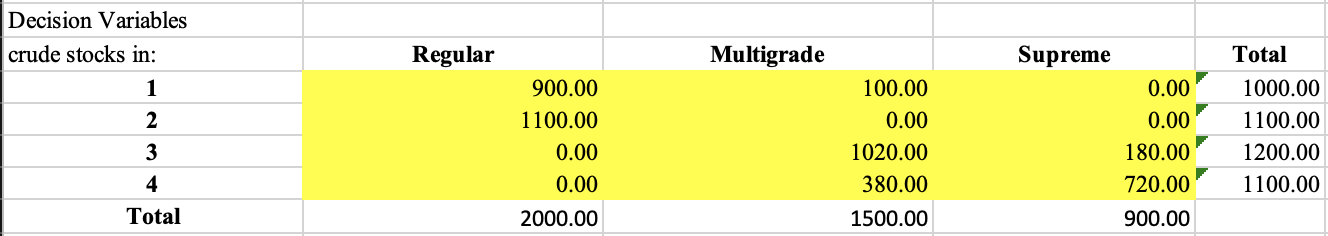
BUDT732 – Individual Assignment 1

**Question 2.2:**

Decision variables:

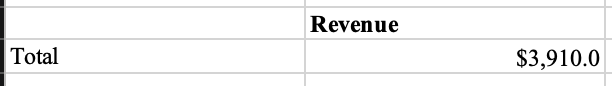


The description says that there are three kinds of oil products: regular, multigrade, and

supreme. Each brand of oil is composed of one or more of four crude stocks: 1-4. Therefore, the decision variables should be each kind of crude stocks used in each kind of oil products (marked as , where o represents the type of oil and c the type of crude stocks

The objective function:

Shows in excel as:

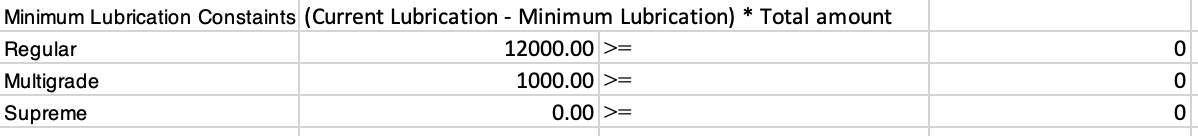


The constraints are:

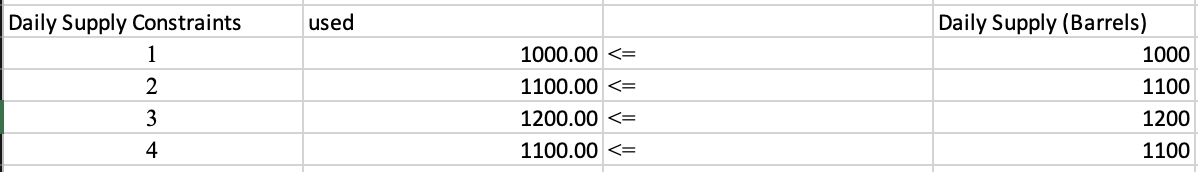
(1) Each brand of oil must meet a minimum standard for a lubrication index. For example, the Regular oil:

But the above is non-linear, so we simply it to be linear as:

Shows in excel as:

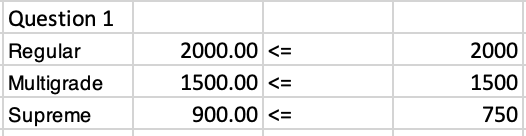


(2) Daily Supply of each kind of crude stocks, show in excel as:



Question a:

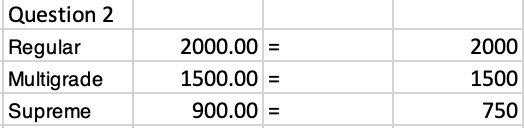
In this question, there’s an extra constraint that the productions of oil shouldn’t be more than the Daily Demand, show in excel as:



Thus, the optimal profit is 3964.2.

Question b:

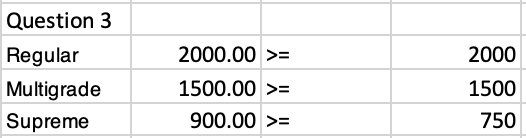
In this question, there’s an extra constraint that the productions of oil should equal to the Daily Demand, show in excel as:



Thus, the optimal profit is 3760.

Question c:

In this question, there’s an extra constraint that the productions of oil shouldn’t be less than the Daily Demand, show in excel as:



Thus, the optimal profit is 3910.

Note:

In my excel program, I used the same table in all questions, and only change the constraints. You may not find problem a and b’s optimal situations. But the report of each questions are attached, you can check it.