COMP6925: Applied Operations Research
The University of the West Indies
Sept 2020

Assignment 2

Due Date: 30th October 2020 @ 11:59 PM (AoE)

Instructions:

- Create **.zip** folder with code and write-up to inzamam.rahaman@outlook.com. Your folder should be named using your UWI ID number
- Document code with comments

1. The government is considering to allocate portions of three sites for home construction to four companies. The first site comprises 10,000 acres; the second site comprises 20,000 acres; the third site comprises 30,000 acres. Each company has proposed a bid for the money they are willing to pay per acre for each site they are interested in. No construction company can bid for more than 40% of the total amount of land. The bids per acre are given below, with blank bids implying a company is not interested in that site.

Site\Bidder	Bidder 1	Bidder 2	Bidder 3	Bidder 4
Site 1	520		650	190
Site 2	210	410		530
Site 3	570	495	235	715

Table 1: Price per acre for each site by different bidders

Answer the following:

(a) Formalize the above as an optimization problem. [5 marks]

(b) Write Julia code to solve the above problem. Write the description of the solution obtained in your code's comments. [5 marks]

2. Yum Yum Foods is a restaurant that is open from Monday to Saturday. They project their per kilo expected demand of variety of mushroom over the next week as follows:

Day	Mon	Tues	Wed	Thurs	Fri	Sat
Demand in kg	134	109	107	85	69	90

Table 2: Demands for each day of the week

Moreover, they project the daily prices per pound of mushrooms to be as follows:

Day	Mon	Tues	Wed	Thurs	Fri	Sat
$ per lb	16	16	32	23	20	15

Table 3: Price per lb for each day of the week

The mushrooms are highly perishable, but can be viable for use for up to one day after purchase. For example, if we purchase the mushrooms on Monday, they are viable for both the entirety of Monday and Tuesday, but are not viable for subsequent days.

Answer the following:

- Formulate the above as an optimization problem. [10 marks]
- Write Julia code to determine their purchase schedule of mushrooms. [10 marks]

- Suppose that they can store the mushrooms in a fridge such they remain viable for an additional day. Doing this incurs a cost of $20 per lb of mushroom stored per day. Should Yum Yum Foods consider this an option? Justify your answer, ensuring that you provide an modified formulation(s) and/or code.[10 marks]