**Mathematics of Industry and Government**

# Binary Programming Project

Objective:

* To develop TWO binary programming problems:
  + One that is a traditional binary programming problem
  + One that is an assignment problem

The Process:

* + Create an excel file saved under the title: ***Unit6\_Project4.xlsx***
  + Develop two problems (Traditional and Assignment)
  + Apply the Solver to determine the Optimal Solutions and the Minimum/Maximum Values
  + Create TWO real world problems that could connect to your chosen two problems.
  + Create ONE Prezi that puts all of this information together.

Requirements:

Your group:

* + You may have only one partner per group. However, any group member that is absent more than 2 days will be removed from the group and given the test. **GROUP MEMBERS MAY BE REMOVED FOR NOT PARTICIPATING WITH THEIR PARTNERS!!!**
  + Any group that is addressed for conduct three times will be split up and possibly given the test. You will be responsible for all the test prep work if given the test.
  + Make sure you share your Prezi login with your partners in the event that one is absent. Additionally, save the Excel file to both of your student numbers at the end of each day.

Your Prezi must include:

1. *A screen shot* 
   * of the Excel file with your problem solved as an Binary Programming problem.
2. *Your real world connection*

* A word problem that corresponds with your problem as a Binary Programming problem.
* MUST HAVE A SLIDE LISTING YOUR OBJECTIVE FUNCTION AND ALL CONSTRAINTS (WITH NAMES) FOR YOUR ASSIGNMENT AND TRADITIONAL BINARY PROBLEM. Don’t forget the binary constraint.

1. *Your answer explanation.* 
   * define your decision variables
   * a sentence indicating the optimal solution and min /max value **WITH CONTEXT!!!!**.
2. *Binary programming explanation*
   * A reason given why your situation must be a binary programming problem. **YOU MUST ALSO EXPLAIN** what a 1 and a 0 mean in the context of your problem.

Grading:

This project will count as a test grade. And will be broken down by the following:

80% - By the teacher

20% - By your partners

Follow the guidelines on the rubrics on the next page for more specific grading information. Notice that appearance, creativity, and other extras affect your grade!

Alternative Assignment:

A test consisting of:

* Vocabulary section
* Writing BP problems as equations and inequalities
* Solving BP problems with the computer
* Solving word problems using the computer.
* Essay portion dealing with how to tell the difference between LP, IP, and BP problems.

**Grading Rubric:**

**TEACHER – 80% of the total grade**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number of Constraints**  **For Traditional BP Problem**  (10 points) | There are 4 or more constraints included  (10) | There are 3 constraints included  (7) | There are 2 constraints included    (4) | There is 1 constraints included  (0) |
| **Realism for Traditional BP Problem**  (10 points) | All constraints make sense  (10) | 1 or 2 constraints DO NOT make sense  (7) | 3 OR MORE constraints DO NOT make sense  (4) | This problem is totally unrealistic  (0) |
| **Realism for Assignment BP Problem**  (10 points) | This is a PERFECT example of an assignment problem  (10) | This WOULD BE a perfect example but there are some issues with the connection  (7) | This is SORT OF an assignment-type problem  (4) | This problem is totally unrealistic  (0) |
| **Answers to the Assignment BP Problem**  (15 points) | Problem is correct with no errors and is in context of the problem  (15) | Problem is correct with no errors but is NOT in context of the problem  (10) | Problem is incorrect, but the answer is in context of the problem  (5) | Problem is totally wrong  (0) |
| **Answers to the Traditional BP Problem**  (15 points) | Problem is correct with no errors and is in context of the problem  (15) | Problem is correct with no errors but is NOT in context of the problem  (10) | Problem is incorrect, but the answer is in context of the problem  (5) | Problem is totally wrong  (0) |
| **Binary Programming Explanation**  (10 points) | Both examples have full explanations and are in CONTEXT of the word problems  (10) | Both examples have full explanations but lack CONTEXT of the word problems  (7) | One example lacks a full explanation with context  (4) | No discussion of why the problems need Binary Programming  (0) |
| **Creativity**  (10 points) | Looks totally original  (10) | Think I’ve seen this problem before but they’ve gone a different direction with it.  (7) | I know I’ve seen this project before.  (4) | Thanks for practically copying my problem!  (0) |

**PARTNER’S EVALUATION – 20% of the total grade**

|  |  |  |  |
| --- | --- | --- | --- |
|  | He/She did this very well.  (4) | This was okay.  (2) | My partner let me down.  (0) |
| My partner made a lot of good suggestion. |  |  |  |
| My partner was on task for the majority of the time we worked together. |  |  |  |
| My partner was open to my suggestions. |  |  |  |
| My partner knew what was expected of him/her. |  |  |  |
| I was able to complete the project effectively as a result of working with my partner. |  |  |  |