Exam: Module 12 Quiz
Submitted: 11/17/2022 09:54:17 PM
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Attempt: 1

Score
Your score on this attempt: 6.000 out of a possible 6 (100.00%)
Graded Score: 6 out of a possible 6 (100.00%)
Completion Time: 16 minutes 51 seconds

Question 1:
You are modeling the selection of team members for your newly authorized project. Let P1 through P12 represent the 12 people you can select for this project from your workgroup. There is not a specific requirement for how many people can be assigned to the project.

The following 'vector' represents the relative experience levels (in years) of the 12 possible project members (i.e., the experience level of the 7th person P7 is "2").

<3,7,4,5,10,1,2,8,4,5,6,9>

Algebraically, identify the constraint below that says "We must have at least 4 people assigned to this project".

Type: Multiple Choice

Points Awarded: 1.000/1.000

User Answer(s):

P1 + P2 + P3 + P4 + P5 + P6 + P7 + P8 +P9 + P10 + P11 + P12 >= 4

Correct Answer(s) :

P1 + P2 + P3 + P4 + P5 + P6 + P7 + P8 +P9 + P10 + P11 + P12 >= 4 (correct)

4P1 + 4P2 + 4P3 + 4P4 + 4P5 + 4P6 + 4P7 + 4P8 +4P9 + 4P10 + 4P11 + 4P12 >= 0

P4 >= 4 (P1 + P2 + P3 + P4 + P5 + P6 + P7 + P8 +P9 + P10 + P11 + P12)

P2 + P3 + P6 + P7 >= 1

Question 2:
You are modeling the selection of team members for your newly authorized project. Let P1 through P12 represent the 12 people you can select for this project from your workgroup. There is not a specific requirement for how many people can be assigned to the project.

The following 'vector' represents the relative experience levels (in years) of the 12 possible project members (i.e., the experience level of the 7th person P7 is "2").

<3,7,4,5,10,1,2,8,4,5,6,9>

Algebraically, identify the best constraint which reflects the following requirement: At least 25% of those selected for the project must be staff with experience levels greater than or equal to 7.

Type: Multiple Choice

Points Awarded: 1.000/1.000

User Answer(s):

0.25P1 - 0.75P2 + 0.25P3 + 0.25P4 - 0.75P5 + 0.25P6 + 0.25 P7 - 0.75P8 + 0.25P9 + 0.25P10 +0.25P11 - 0.75P12 <= 0

Correct Answer(s) :

P2 + P5 + P8 + P12 >= 1

-P1 + P2 -P3 - P4 +P5 - P6 - P7 + P8 -P9 - P10 - P11 + P12 >= 0

0.25 * (P1 + P2 + P3 + P4 + P5 + P6 + P7 + P8 +P9 + P10 + P11 + P12) >= 0

0.25P1 - 0.75P2 + 0.25P3 + 0.25P4 - 0.75P5 + 0.25P6 + 0.25 P7 - 0.75P8 + 0.25P9 + 0.25P10 +0.25P11 - 0.75P12 <= 0 (correct)

Question 3:

You are modeling the selection of team members for your newly authorized project. Let P1 through P12 represent the 12 people you can select for this project from your workgroup. There is not a specific requirement for how many people can be assigned to the project.

The following 'vector' represents the relative experience levels (in years) of the 12 possible project members (i.e., the experience level of the 7th person P7 is "2").

<3,7,4,5,10,1,2,8,4,5,6,9>

Which constraint does NOT linearly implement "The average experience level of people selected for the project must be at least 6 years"?

Type: Multiple Choice

Points Awarded: 1.000/1.000

User Answer(s):

P1 + P2 + P3 + P4 + P5 + P6 + P7 + P8 +P9 + P10 + P11 + P12 >= 6

Correct Answer(s) :

-3 P1 + P2 - 2P3 - P4 +4P5 - 5P6 - 4P7 +2P8 -2P9 - P10 +3P12 >= 0

P1 + P2 + P3 + P4 + P5 + P6 + P7 + P8 +P9 + P10 + P11 + P12 >= 6 (correct)

3P1 + 7P2 + 4P3 + 5P4 + 10P5 + 1P6 + 2P7 + 8P8 +4P9 + 5P10 + 6P11 + 9P12 >= 6(P1 + P2 + P3 + P4 + P5 + P6 + P7 + P8 +P9 + P10 P11 + P12)

6P1 - 2P2 + 4P3 +2P4 - 8P5 +10P6 + 8P7 -4P8 +4 P9 +2 P10 + 0 P11 - 6P12 <= 0

Question 4:
In a dynamic supply-chain model, you are considering the possible addition of a new supply depot at Wichita with two possible capacities - one is 500 units, the other, 750 units. These capacities are not additive in nature. There are 4 different warehouse locations that the Wichita depot could ship to if the company decides to open a supply depot of either size at Wichita.

There would be other model parameters relating to the existing supply depots and costs, but we are going to define X1 through X4 as the amount of units going from Wichita to Warehouses 1,2,3 and 4 respectively. Let Z1 = 0/1 variable indicating, if a '1', that a supply depot of size 500 will be built in Wichita, Z2 = 0/1 variables, with a "1" indicating that a supply depot of size 750 will be built in Wichita. (Obviously, if both decision variables are 0, no new supply depot is added. This of course is also perfectly acceptable).

What does the 'supply' constraint look like for Wichita?

Type: Multiple Choice

Points Awarded: 1.000/1.000

User Answer(s):

X1 + X2 + X3 + X4 <= 500Z1 + 750Z2

Correct Answer(s) :

X1Z1 + X1Z2 + X2Z1 + X2Z2 + X3Z1 + X3Z2 + X4Z1 + X4Z2 <= 750

X1 + X2 + X3 + X4 <= 500Z1 + 750Z2 (correct)

X1 + X2 + X3 <= Z1*Z2(500 + 750)

(Z1 + Z2) * (X1 + X2 + X3) <= 750

Question 5:
In a dynamic supply-chain model, you are considering the possible addition of a new supply depot at Wichita with two possible capacities - one is 500 units, the other, 750 units. These capacities are not additive in nature. There are 4 different warehouse locations that the Wichita depot could ship to if the company decides to open a supply depot of either size at Wichita.

There would be other model parameters relating to the existing supply depots and costs, but we are going to define X1 through X4 as the amount of units going from Wichita to Warehouses 1,2,3 and 4 respectively. Let Z1 = 0/1 variable indicating, if a '1', that a supply depot of size 500 will be built in Wichita, Z2 = 0/1 variables, with a "1" indicating that a supply depot of size 750 will be built in Wichita. (Obviously, if both decision variables are 0, no new supply depot is added. This of course is also perfectly acceptable).

What constraint must also be added to make sure the model doesn't try to build two depots on the same spot in Wichita?

Type: Multiple Choice

Points Awarded: 1.000/1.000

User Answer(s):

Z1 + Z2 <= 1

Correct Answer(s) :

X1 + X2 + X3 <=1

Z1*Z2 = 0

Z1 + Z2 <= 1 (correct)

Z1 + Z2 = 1

Question 6:
Which answer is most accurate as it relates to achieving a correct solution to an LP model with integer decision variables?

Type: Multiple Choice

Points Awarded: 1.000/1.000

User Answer(s):

All of the above statements are true and if any are not done, will cause the model to not properly solve.

Correct Answer(s) :

Must use the linear solver

Make sure that the appropriate constraints are added to force variables = INT or BIN.

Make sure the option screen has not been enabled to "Ignore Integer Constraints."

All of the above statements are true and if any are not done, will cause the model to not properly solve. (correct)