

Unit 8 Self-Check

Due Mar 28 at 11:59pm	Points 8	Questions 8	Available Mar 22 at 2am - Mar 29 at 1am 7 days
Time Limit None			

Instructions

Unit 8 Self-Check

Attempt History

	Attempt	Time	Score
LATEST	<u>Attempt 1</u>	1,703 minutes	3.83 out of 8

Score for this quiz: **3.83** out of 8
Submitted Mar 28 at 5:06pm
This attempt took 1,703 minutes.

Question 1

0 / 1 pts

Rounding an LP minimization problem optimal solution to the nearest integer:

You Answered

☒ Provides a valid lower bound to the related IP problem

☐ Provides a valid upper bound to the related IP problem

☐ Creates a valid inequality

☐ None of the above

Correct Answer

☐ None of the above

Question 2

0.5 / 1 pts

Strategies to using branch and bound successfully include (select all that apply):

Correct!

☒ Generate an incumbent solution even before beginning the branch and bound process if possible

Correct!

☒ Formulate the IP with a tight LP relaxation

☐ Formulate the IP with a loose LP relaxation

You Answered

☒ Remove as many cutting planes as possible

Question 3

0.33 / 1 pts

Branch and bound node i may be fathomed for the following reason(s) in a minimization problem (select all that apply)

Correct Answer

☐ LP_i is integer feasible

Correct!

☒ LP_i is infeasible

Correct!

☐ LP_i is feasible, but the relaxation objective is less than the incumbent objective

☒ LP_i is feasible, but the relaxation objective is greater than the incumbent objective

You Answered

☒ The LP_i down-branch is integer feasible

☐ The LP_i up-branch is infeasible

Question 4

1 / 1 pts

Assume an MIP with five integer variables, x_1 , x_2 , x_3 , x_4 , and x_5 .

Given the following LP relaxation solution, $x_1 = 2.5$, $x_2 = 3.7$, $x_3 = 4$, $x_4 = 5.9$ and $x_5 = 1.7$, which of the following are valid down-branch and up-branch restrictions, respectively, that would be used in branch and bound (select all that apply)

☐ $x_1 \leq 2, x_1 \geq 2$

☐ $x_2 \leq 4, x_2 \geq 3$

☐ $x_3 \leq 4, x_3 \geq 5$

☐ $x_4 \leq 5, x_4 \leq 6$

☐ $x_5 \leq 1, x_5 > 2$

Correct!

☒ None of the above

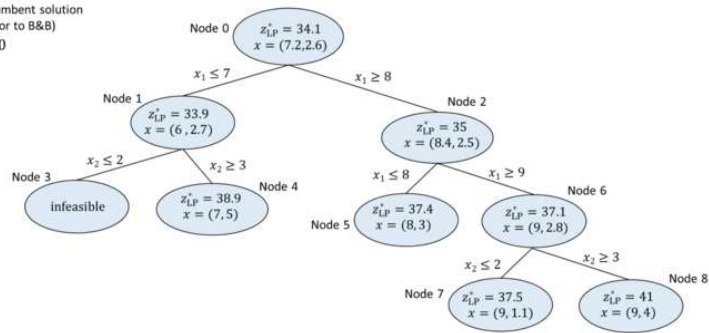
Question 5

0 / 1 pts

In this *incorrect* branch and bound tree for an IP minimization problem, identify the mistakes (select all that apply).

Note, the number of node denotes the order in which they were explored:

Initial incumbent solution
(found prior to B&B)
 $z_{IP} = 40$



☐ All down and up branches are incorrect

Correct Answer

☐ Node 1 has impossible values

☐ Node 2 has impossible values

☐ Node 2 should never be split since the objective value is integer

☐ Node 2 down and up branches are incorrect

You Answered

☒ Node 5 should not be fathomed

☐ Node 7 needs down and up branches since one solution value is still fractional

You Answered

☒ Node 8 objective value is impossible since it is larger than the incumbent solution's upper bound

Consider the mathematical program below for the remaining questions:

$$\begin{aligned} \max \quad & 18x_1 + 22x_2 + 7x_3 + 14x_4 + 9x_5 \\ \text{s.t.} \quad & 3x_1 - 4x_2 + 2x_3 - 3x_4 + x_5 \leq -2 \\ & x_1, x_2, x_3, x_4, x_5 \in \{0, 1\} \end{aligned}$$

Question 6

1 / 1 pts

$x_2 + x_4 \geq 1$ is a valid inequality.

Correct!

☒ True

☐ False

Question 7

1 / 1 pts

 $x_1 \leq x_2$ is a valid inequality.

Correct!

☒ True☐ False**Question 8**

0 / 1 pts

 $x_3 \leq x_4$ is a valid inequality.

You Answered

☒ True

Correct Answer

☐ FalseQuiz Score: **3.83** out of 8