Econ 172A, Fall 2010: Quiz IV

IMPORTANT

Added after the fact:

The quiz you took had several mistakes. I "corrected" these mistakes in class. The first three pages describe the quiz as corrected (the substantive correction: $7/3 = 2.33$ not 1.33).

I also added "Real Quiz IV (Form 3)." This quiz is different from the one that you took in two ways: I change the value of item 4 (so that the value/weight ratio is really 1.33). Also, I modified the working in Question 8. As the result of my mistakes, it was impossible to answer Questions 4, 7, and 8 correctly. Everyone received full credit for these questions (5 points each).

1. The quiz has 3 forms. You should answer the questions from only one form.
   - If your student identification number ends in 1, 3, 9 answer the questions from Form 1.
   - If your student identification number ends in 2, 4, 8, or 0 answer the questions from Form 2.
   - If your student identification number ends in 5, 6, 7 or if you have no student identification number, answer the questions from Form 3.
2. You may not use calculators, books, or notes during this quiz.
3. If you do not know how to interpret a question, then ask me.
4. Please remain in your seat until the exam is over.
5. I will collect the quizzes at 12:20.
6. Fill in the information below:
   - NAME:
   - STUDENT IDENTIFICATION NUMBER:
   - I read the instructions and I am answering the questions corresponding to the appropriate form, which is FORM:
7. Put your answers on the appropriate page.

Table 1: Knapsack Data

Value	16	16	10	7	1
Weight	10	8	6	3	1
Value/Weight	1.6	2	1.67	2.33	1

Quiz 4 - Form 1

Consider a knapsack problem in which there are 5 items. Assume that the knapsack has capacity 21 and the numbers above describe the values and weights of the objects.

For each question below select the best answer. (Only one answer per question.)

1. The solution to the relaxed problem (ignoring integer constraints) yields an upper bound for the true problem equal to:

   a. 37 b. 40 c. 50 d. other

   Branch on the first item (the one with weight 10 and value 16). This creates two subproblems, one in which you bring the item (call this Subprogram I) and one in which you do not (call this Subproblem II).

2. The solution to the relaxed Subproblem I (ignoring integer constraints) yields an upper bound for the true Subproblem I equal to:

   a. 34 b. 37 c. 40 d. other

3. The solution to the relaxed Subproblem II (ignoring integer constraints) yields an upper bound for the true Subproblem II equal to:

   a. 34 b. 37 c. 40 d. other

4. Based on the information from solving relaxed versions of the original problem, Subproblem I and Subproblem II, the lower bound for the problem is:

   a. $-\infty$ b. 34 c. 35 d. 40

5. Subproblem I has been fathomed.

   a. True b. False.

6. Subproblem II has been fathomed.

   a. True b. False.

7. Based only on the upper and lower bounds obtained from the computations above, the value of the true problem is:

   a. 34 b. 35 c. 37 d. Not enough information.

8. Which of the following changes might decrease the value of the problem:

   (a) Increasing the weight of an item.
   (b) Decreasing the value of an item.
   (c) Increasing the value to weight ratio of an item.
   (d) None of the above.

Table 2: Knapsack Data

Value	16	16	10	7	1
Weight	10	8	6	3	1
Value/Weight	1.6	2	1.67	2.33	1

Quiz 4 - Form 2

Consider a knapsack problem in which there are 5 items. Assume that the knapsack has capacity 20 and the numbers above describe the values and weights of the objects.

For each question below select the best answer. (Only one answer per question.)

1. The solution to the relaxed problem (ignoring integer constraints) yields an upper bound for the true problem equal to:

   a. 35 b. 37 c. 50 d. other

   Branch on the first item (the one with weight 10 and value 16). This creates two subproblems, one in which you do not bring the item (call this Subprogram I) and one in which you do (call this Subproblem II).

2. The solution to the relaxed Subproblem I (ignoring integer constraints) yields an upper bound for the true Subproblem I equal to:

   a. 34 b. 35 c. 37 d. other

3. The solution to the relaxed Subproblem II (ignoring integer constraints) yields an upper bound for the true Subproblem II equal to:

   a. 34 b. 35 c. 37 d. other

4. Based on the information from solving relaxed versions of the original problem, Subproblem I and Subproblem II, the lower bound for the problem is:

   a. $-\infty$ b. 34 c. 35 d. 40

5. Subproblem I has been fathomed.

   a. True b. False.

6. Subproblem II has been fathomed.

   a. True b. False.

7. Based only on the upper and lower bounds obtained from the computations above, the value to the true problem is:

   a. 34 b. 35 c. 37 d. Not enough information.

8. Which of the following changes might decrease the value of the problem:

   (a) Increasing the weight of an item.
   (b) Decreasing the value of an item.
   (c) Increasing the value to weight ratio of an item.
   (d) None of the above.

Table 3: Knapsack Data

Value	32	32	20	14	2
Weight	20	16	12	6	2
Value/Weight	1.6	2	1.67	2.33	1

Quiz 4 - Form 3

Consider a knapsack problem in which there are 5 items. Assume that the knapsack has capacity 42 and the numbers above describe the values and weights of the objects.

For each question below select the best answer. (Only one answer per question.)

1. The solution to the relaxed problem (ignoring integer constraints) yields an upper bound for the true problem equal to:

   a. 100 b. 80 c. 74 d. other

   Branch on the first item (the one with weight 20 and value 32). This creates two subproblems, one in which you do not bring the item (call this subprogram I) and one in which you (call this subproblem II).

2. The solution to the relaxed Subproblem I (ignoring integer constraints) yields an upper bound for the true Subproblem I equal to:

   a. 80 b. 74 c. 68 d. other

3. The solution to the relaxed Subproblem II (ignoring integer constraints) yields an upper bound for the true Subproblem II equal to:

   a. 80 b. 74 c. 68 d. other

4. Based on the information from solving relaxed versions of the original problem, Subproblem I and Subproblem II, the lower bound for the problem is:

   a. 80 b. 70 c. 68 d. $-\infty$

5. Subproblem I has been fathomed.

   a. True b. False.

6. Subproblem II has been fathomed.

   a. True b. False.

7. Based only on the upper and lower bounds obtained from the computations above, the value to the true problem is:

   a. 68 b. 70 c. 74 d. Not enough information.

8. Which of the following changes might decrease the value of the problem:

   (a) Increasing the weight of an item.
   (b) Decreasing the value of an item.
   (c) Increasing the value to weight ratio of an item.
   (d) None of the above.

True Quiz 4 - Form 3

This is the quiz that I meant to give. I underlined the changes (in table and in Question 8).

Consider a knapsack problem in which there are 5 items. Assume that the knapsack has capacity 42 and the numbers above describe the values and weights of the objects.

Value	32	32	20	<u>8</u>	2
Weight	20	16	12	6	2
Value/Weight	1.6	2	1.67	<u>1.33</u>	1

For each question below select the best answer. (Only one answer per question.)

1. The solution to the relaxed problem (ignoring integer constraints) yields an upper bound for the true problem equal to:

   a. 100 b. 80 c. 74 d. other

   Branch on the first item (the one with weight 20 and value 32). This creates two subproblems, one in which you do not bring the item (call this subprogram I) and one in which you do (call this subproblem II).

2. The solution to the relaxed Subproblem I (ignoring integer constraints) yields an upper bound for the true Subproblem I equal to:

   a. 80 b. 74 c. <u>62</u> d. other

3. The solution to the relaxed Subproblem II (ignoring integer constraints) yields an upper bound for the true Subproblem II equal to:

   a. 80 b. 74 c. <u>62</u> d. other

4. Based on the information from solving relaxed versions of the original problem, Subproblem I and Subproblem II, the lower bound for the problem is:

   a. 80 b. 70 c. <u>62</u> d. $-\infty$

5. Subproblem I has been fathomed.

   a. True b. False.

6. Subproblem II has been fathomed.

   a. True b. False.

7. Based only on the upper and lower bounds obtained from the computations above, the value to the true problem is:

   a. <u>62</u> b. 70 c. 74 d. Not enough information.

8. Which of the following changes might <u>increase</u> the value of the problem?:

   (a) Increasing the weight of an item.

   (b) Decreasing the value of an item.

   (c) Increasing the value to weight ratio of an item.

   (d) None of the above.