

Quiz 22 Xtra Best-First Branch-and-Bound [Computational] 1-Page NOTE SHEET PERMITTED!

Started: Dec 12 at 7:26pm

Quiz Instructions



Question 1 1 pts

(1 point) Question 1: “My brain is open. . . .”

I pledge that I am taking this quiz on my own, with help only from my permitted notes:

[CS2223Quiz22Xtra_BTerm2024WPI.pdf \(https://canvas.wpi.edu/courses/64919/files/7106697?wrap=1\)](https://canvas.wpi.edu/courses/64919/files/7106697?wrap=1)

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True



False



Question 2 4 pts

(4 points) Question 2: [Numerical Answer] Use a Branch-and-Bound method to find an optimal solution to the assignment problem with the following “Cost Matrix”, C :

	job 1	job 2	job 3	job 4	
$C =$	4	3	2	1	applicant a
	5	6	7	8	applicant b
	10	12	18	14	applicant c
	20	15	10	5	applicant d

What is the minimum possible cost for a feasible assignment in the given matrix?



Question 3 3 pts

For Questions 3 and 4, use a Branch-and-Bound Algorithm to solve the following instance of the Knapsack Problem for a knapsack with a capacity (weight limit) of **14**:

item	weight	value	value/weight
1	4	\$40	10
2	6	\$36	6
3	5	\$25	5
4	7	\$28	4

(3 points) Question 3: [Numerical Answer] What is the maximum value your knapsack can hold?



Question 4 2 pts

For Questions 3 and 4, use a Branch-and-Bound Algorithm to solve the following instance of the Knapsack Problem for a knapsack with a capacity (weight limit) of **14**:

item	weight	value	value/weight
1	4	\$40	10
2	6	\$36	6
3	5	\$25	5
4	7	\$28	4

(2 points) Question 4: [Multiple Multiple Choice: Select ALL that apply!]

Which items are in the value-maximized knapsack? More than one **will** apply. [Why?!?]

- a.) 1
- b.) 2
- c.) 3
- d.) 4

☐

a.) 1

☐

b.) 2

☐

c.) 3

☐

d.) 4



Question 5 1 pts

(1 point) Bonus Question: For the Assignment Problem in Question 2 we might also have asked whether the solution is unique, and whether it must be unique.

- a.) The solution to the Assignment Problem is always unique; it is thus unique here.
- b.) The solution to the Assignment Problem not necessarily unique, but it IS unique here.
- c.) The solution to the Assignment Problem can be unique, but it is NOT unique here.
- d.) The solution to the Assignment Problem is never unique; it is thus not unique here.

☐

a.)

☐

b.)

☐

c.)

☐

d.)

Quiz saved at 7:26pm

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