Started on	Sunday, 4 June 2023, 10:37 PM
State	Finished
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Time taken	22 mins 34 secs
Grade	**7.50** out of 10.00 (**75**%)

Question 1

Partially correct

Mark 0.50 out of 1.00

Solve the knapsack problem for the given parameters.

n = 4, c = 6

Item (i)	1	2	3	4
w(i)	2	1	5	4
p(i)	9	7	15	14

Which of the items are included in the optimal solution?

Select one or more:

- a. 1 ✔
- b. 2 ✖
- c. 3
- d. 4 ✔

The correct answers are: 1, 4

Question 2

Correct

Mark 1.00 out of 1.00

A divide and conquer approach to solving a problem is useful when

Select one:

- a. The complexity is exponential to solve the entire problem
- b. We can break the problem into several subproblems that are similar to the original problems but smaller in size ✔
- c. None of the above
- d. The subproblems are overlapping so we don't have to solve them over and over again

Your answer is correct.

The correct answer is: We can break the problem into several subproblems that are similar to the original problems but smaller in size

Question 3

Partially correct

Mark 0.50 out of 1.00

Which of the following statements is/are incorrect regarding dynamic programming?

Select one or more:

- a. Could employ recursion and memorization
- b. Could not minimize redundant calculations ✔
- c. Problems are solved by combining the solutions to independent sub-problems
- d. Answers to sub-problems could be stored in a tabular structure

The correct answers are: Problems are solved by combining the solutions to independent sub-problems, Could not minimize redundant calculations

Question 4

Correct

Mark 1.00 out of 1.00

The difference between Divide and Conquer and Dynamic Programming is:

Select one:

- a. The depth of recurrence
- b. Whether the subproblems overlap or not ✔
- c. The way we solve the base case
- d. The division of problems and combination of subproblems

Your answer is correct.

The correct answer is: Whether the subproblems overlap or not

Question 5

Correct

Mark 1.00 out of 1.00

The fractional knapsack problem can be solved using which of the following techniques?

Select one:

- a. Branch and bound
- b. Greedy algorithm ✔
- c. Dynamic programming
- d. Backtracking

Your answer is correct.

The correct answer is: Greedy algorithm

Question 6

Correct

Mark 1.00 out of 1.00

The matrix-chain multiply problem for a chain of matrix multiplications $A_1 \ldots A_n$ in the book is an example of a dynamic programming problem. Consider the subchain $A_i A_{i+1} .. A_j$. The problem is to minimize the cost of the multiplication (in terms of the number of required scalar multiplications) by choosing where to parenthesize the chain. In this case choosing where to split the chain and parenthesize it results in how many subproblems and how many choices for each subproblem?

Select one:

- a. 2 subproblems, and j-i choices for each ✔
- b. 1 subproblem, j choices
- c. 1 subproblem, n-j choices
- d. 2 subproblems, n- i choices for each

Your answer is correct.

The correct answer is: 2 subproblems, and j-i choices for each

Question 7

Incorrect

Mark 0.00 out of 1.00

Which of the following statements is true about the knapsack problem?

Select one:

- a. It is an optimization problem where the goal is to minimize the weight of items that can be put into a knapsack of a given capacity
- b. It is a decision problem where the goal is to determine if a given set of items can be put into a knapsack of a given capacity
- c. It is a decision problem where the goal is to determine the maximum weight that can be put into a knapsack of a given capacity ✖
- d. It is an optimization problem where the goal is to maximize the weight of items that can be put into a knapsack of a given capacity

Your answer is incorrect.

The correct answer is: It is an optimization problem where the goal is to maximize the weight of items that can be put into a knapsack of a given capacity

Question 8

Partially correct

Mark 0.50 out of 1.00

Select the problems with the technique that can best be used to solve them.

1. Matrix chain multiplication parenthesization: Divide and Conquer ✖
2. Unweighted shortest simple path in a graph: None of the above ✖
3. Quicksort: Divide and Conquer ✔
4. Longest common subsequence: Dynamic Programming ✔

Your answer is partially correct.

You have correctly selected 2.
The correct answer is:
Select the problems with the technique that can best be used to solve them.

1. Matrix chain multiplication parenthesization: [Dynamic Programming]
2. Unweighted shortest simple path in a graph: [Dynamic Programming]
3. Quicksort: [Divide and Conquer]
4. Longest common subsequence: [Dynamic Programming]

Question 9

Correct

Mark 1.00 out of 1.00

Which of the following algorithms can be used to solve the 0/1 knapsack problem? (The 0/1 knapsack problem means that the items are either completely or no items are filled in a knapsack.)

Select one:

- a. Greedy algorithm
- b. Backtracking
- c. Dynamic programming
- d. Both b and c ✔

Your answer is correct.

The correct answer is: Both b and c

Question 10

Correct

Mark 1.00 out of 1.00

Dynamic programming does not work if the subproblems:

Select one:

- a. Cannot be divided in half
- b. Overlap
- c. Share resources and thus are not independent ✔
- d. Have to be divided too many times to fit into memory

Your answer is correct.

The correct answer is: Share resources and thus are not independent