

<b>Started on</b>	Sunday, 4 June 2023, 10:50 PM
<b>State</b>	Finished
<b>Completed on</b>	Sunday, 4 June 2023, 10:58 PM
<b>Time taken</b>	7 mins 22 secs
<b>Grade</b>	7.25 out of 10.00 (72.5%)

**Question 1**

Correct

Mark 1.00 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 the maximum weight that can be put into a knapsack of a given capacity
- ☒ c. 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 ✓
- ☐ d. 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

Your answer is correct.

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 2**

Correct

Mark 1.00 out of 1.00

Every recurrence can be solved using the Master Theorem

Select one:

- ☐ True
- ☒ False ✓

The correct answer is 'False'.

**Question 3**

Correct

Mark 1.00 out of 1.00

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

Select one:

- ☐ a. Backtracking
- ☐ b. Branch and bound
- ☒ c. Greedy algorithm ✓
- ☐ d. Dynamic programming

Your answer is correct.

The correct answer is: Greedy algorithm

**Question 4**

Correct

Mark 1.00 out of 1.00

Dynamic programming does not work if the subproblems:

Select one:

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

Your answer is correct.

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

**Question 5**

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 6**

Incorrect

Mark 0.00 out of 1.00

Assume we are solving the rod-cutting problem in the book using dynamic programming, and we have a rod of length  $n$  that we decide to cut at location

- i. How many subproblems are left after we make this cut
- ii. How many choices do we need to check for each subproblem?

We are trying to find the maximum profit from the rod lengths that we cut.

Select one:

- ☐ a. 3 subproblems,  $n-1$  choices to check
- ☐ b. 1 subproblem, up to  $n$  choices we have to check
- ☐ c. No subproblems, we just solve the problem directly
- ☒ d. 2 subproblems,  $n$  choices we have to check ✗

Your answer is incorrect.

The correct answer is: 1 subproblem, up to  $n$  choices we have to check

**Question 7**

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 8**

Partially correct

Mark 0.25 out of 1.00

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

1. Matrix multiplication: Dynamic Programming ✗
2. Rod cutting: Greedy Strategy ✗
3. Quicksort: Divide and Conquer ✓
4. Interval scheduling: Dynamic Programming ✗

Your answer is partially correct.

You have correctly selected 1.

The correct answer is:

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

1. Matrix multiplication: [Divide and Conquer]
2. Rod cutting: [Dynamic Programming]
3. Quicksort: [Divide and Conquer]
4. Interval scheduling: [Greedy Strategy]

**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

Recurrence equations describing the work done during recursion are only useful for divide and conquer algorithm analysis

Select one:

- ☐ True
- ☒ False ✓

The correct answer is 'False'.