Started on	Tuesday, 23 April 2024, 10:56 AM
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Time taken	6 mins 25 secs
Grade	**10.00** out of 10.00 (**100**%)

Question 1

Correct

Mark 1.00 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 ✔

Your answer is correct.
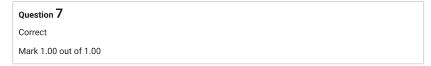
The correct answers are: 1, 4

Question 2

Correct

Mark 1.00 out of 1.00

Dynamic Programming is often used for (choose all that apply)

Select one or more:

- ☐ a. Non-polynomial solution problems
- ☐ b. Subproblems where resources are shared
- ☑ c. Problems previously solved using divide and conquer that have ✔ overlapping subproblems
- ☑ d. Optimization problems that involve making a choice that leave one ✔ or more subproblems to be solved

Your answer is correct.

The correct answers are: Optimization problems that involve making a choice that leave one or more subproblems to be solved, Problems previously solved using divide and conquer that have overlapping subproblems

Question 3

Correct

Mark 1.00 out of 1.00

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

Select one:

- ○ a. 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
- ○ 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 an optimization problem where the goal is to minimize the weight of items 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 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 4

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 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. Backtracking

⦿ b. Greedy algorithm ✔

○ c. Dynamic programming

○ d. Branch and bound

Your answer is correct.

The correct answer is: Greedy algorithm

Question 6

Correct

Mark 1.00 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. 2 subproblems, n choices we have to check

⦿ b. 1 subproblem, up to n choices we have to check ✔

○ c. 3 subproblems, n-1 choices to check

○ d. No subproblems, we just solve the problem directly

Your answer is correct.

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

Question 7

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 8

Correct

Mark 1.00 out of 1.00

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 | ✔

Your answer is correct.

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 statements is/are incorrect regarding dynamic programming?

Select one or more:

☑ a.   Could not minimize redundant calculations ✔

☑ b.   Problems are solved by combining the solutions to independent   ✔
        sub-problems

☐ c.   Could employ recursion and memorization

☐ d.   Answers to sub-problems could be stored in a tabular structure

Your answer is correct.

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

Question 10

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.   The way we solve the base case

○ c.   The division of problems and combination of subproblems

◉ d.   Whether the subproblems overlap or not ✔

Your answer is correct.

The correct answer is: Whether the subproblems overlap or not