**Unit-1**

**Question 1**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False:  Is [2^{\left(n+1\right)}=O\left(2^{n}\right) ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=2%5E%7B%5Cleft%28n%2B1%5Cright%29%7D%3DO%5Cleft%282%5E%7Bn%7D%5Cright%29%20) ?

Question 1Select one:

True

False

**Feedback**

The correct answer is 'False'.

**Question 2**

Not answered

Marked out of 1.00

Flag question

**Question text**

[3^{n}+12](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=3%5E%7Bn%7D%2B12)

Question 2Select one:

a. Θ([3^{n}](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=3%5E%7Bn%7D))

b. Ω([3^{n}](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=3%5E%7Bn%7D))

c. Ο([2^{n}](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=2%5E%7Bn%7D))

d. Ο([3^{n}](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=3%5E%7Bn%7D))

**Feedback**

The correct answer is: Θ([3^{n}](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=3%5E%7Bn%7D))

**Question 3**

Not answered

Marked out of 1.00

Flag question

**Question text**

What is the Asymptotic complexity of a binary search given the code below and the following recursion equation:

[ T\left(n\right)=T\left( \frac{n}{2} \right)+1 ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20T%5Cleft%28n%5Cright%29%3DT%5Cleft%28%20%5Cfrac%7Bn%7D%7B2%7D%20%5Cright%29%2B1%20)

 // initially called with low = 0, high = N - 1  
  BinarySearch\_Right(A[0..N-1], value, low, high) {  
      // invariants: value >= A[i] for all i < low  
                     value < A[i] for all i > high  
      if (high < low)  
          return low  
      mid = (low + high) / 2  
      if (A[mid] > value)  
          return BinarySearch\_Right(A, value, low, mid-1)  
      else  
          return BinarySearch\_Right(A, value, mid+1, high)  
  }

Question 3Select one:

a. [ \Theta \left(lg \cdot n\right)](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20%5CTheta%20%5Cleft%28lg%20%5Ccdot%20n%5Cright%29)

b. [O\left(n^{2}\right)](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=O%5Cleft%28n%5E%7B2%7D%5Cright%29)

c. [ \O \left(lg \cdot n\right)](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20%5CO%20%5Cleft%28lg%20%5Ccdot%20n%5Cright%29)

d. [ \Omega \left(lg \cdot n\right)](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20%5COmega%20%5Cleft%28lg%20%5Ccdot%20n%5Cright%29)

**Feedback**

[ \Theta \left(lg \cdot n\right)](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20%5CTheta%20%5Cleft%28lg%20%5Ccdot%20n%5Cright%29)

The correct answer is: [ \Theta \left(lg \cdot n\right)](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20%5CTheta%20%5Cleft%28lg%20%5Ccdot%20n%5Cright%29)

**Question 4**

Not answered

Marked out of 1.00

Flag question

**Question text**

Given the following algorithm, what is the number of  fundamental instructions that this routine will execute if  the value of  n is 4?

var M = A[ 0 ];

for ( var i = 0; i < n; ++i ) {

   if ( A[ i ] >= M ) {

      M = A[ i ];

   }

}

Question 4Select one:

a. 4+2n

b. 10

c. [ n^{2} ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20n%5E%7B2%7D%20)

d. 2n+2

**Feedback**

The correct answer is: 4+2n

**Question 5**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: A Boolean variable can take on only 1 value.

Question 5Select one:

True

False

**Feedback**

The correct answer is 'False'.

**Question 6**

Not answered

Marked out of 1.00

Flag question

**Question text**

Which of the following is NOT a property of logarithms?

Question 6Select one:

a. log(nm) = log n + log m

b. log(n/m) = log n - log m

c. [ \log \left(n^{r}\right)=r log n ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20%5Clog%20%5Cleft%28n%5E%7Br%7D%5Cright%29%3Dr%20log%20n%20)

d. [ log_{b} n=log_{n}b \ log_{a}b ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20log_%7Bb%7D%20n%3Dlog_%7Bn%7Db%20%5C%20log_%7Ba%7Db%20)

**Feedback**

The correct answer is: [ log_{b} n=log_{n}b \ log_{a}b ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20log_%7Bb%7D%20n%3Dlog_%7Bn%7Db%20%5C%20log_%7Ba%7Db%20)

**Question 7**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: An algorithm is a well-defined sequence of steps used to solve a well-defined problem in finite time.

True

False

**Feedback**

The correct answer is 'True'.

**Question 8**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False:  The running time of an algorithm is the number of instructions it executes when run on a particular instance.

True

False

**Feedback**

The correct answer is 'True'.

**Question 9**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: An algorithm is a well-defined sequence of steps used to solve a well-defined problem in an infinite number of steps.

True

False

**Feedback**

The correct answer is 'False'.

**Question 10**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: The backtracking algorithm treats the solution space as a graph and follows a path to conclusion to find a solution to a problem.   The algorithm may 'backtrack' by reversing up to previous branches in a tree and try all branches to find the solution.

True

False

**Feedback**

The correct answer is 'True'.

**Question 11**

Not answered

Marked out of 1.00

Flag question

**Question text**

The Backtracking algorithm implements the following search?

Question 11Select one:

a. Depth First Search

b. Sequential search

c. Breadth First Search

d. Binary Search

**Feedback**

The correct answer is: Depth First Search

**Unit-2**

**Question 1**

**Question text**

Which of the following is NOT one of the steps used in a Divide-and-conquer algorithm to solve a problem?

a. Breaking the problem into subproblems that are themselves smaller instances of the same type of problem

b. Recursively solving the subproblems

c. Appropriately combining the answers of the solved subproblems

d. Exhaustively searching every potential path of the problem to identify all solution  candidates

**Feedback**

The correct answer is: Exhaustively searching every potential path of the problem to identify all solution  candidates

**Question 2**

**Question text**

True/False: Amortized analysis allows for the establishment of a worst-case bound for the performance of an algorithm irrespective of the inputs by looking at all of the operations.

True

False

**Feedback**

The correct answer is 'True'.

**Unit-3**

**Question 1**

**Question text**

True/False: Let T be a minimum spanning tree of G. Then, for any pair of vertices s and t, the shortest path from s to T is G is the path from s to t in T.

True

False

**Feedback**

The correct answer is 'False'.

**Question 2**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: A graph is a set of vertices and a set of edges such that each edge is a connection between a pair of vertices.

True

False

**Feedback**

The correct answer is 'True'.

**Question 3**

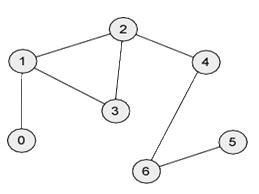
Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: A graph with edges that have no directional indication as in the following diagram is called a uni-directed graph.



Question 3Select one:

True

False

**Feedback**

The correct answer is 'False'.

**Question 4**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: A graph with numbers or letters on the vertices is called a labeled graph.

Question 4Select one:

True

False

**Feedback**

The correct answer is 'True'.

**Question 5**

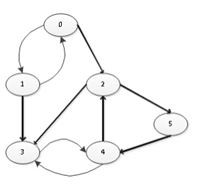
Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: A graph with edges that point in such a way that one could follow such directed edges and visit the same vertex again, as is illustrated in the following diagram is a graph that is said to have or be:



Question 5Select one:

a. Directed

b. Cyclic or cycles

c. Free tree

d. Acyclic

**Feedback**

The correct answer is: Cyclic or cycles

**Question 6**

Not answered

Marked out of 1.00

Flag question

**Question text**

A process that is designed to visit every vertex in a graph is known as a:

Question 6Select one:

a. Graph traversal

b. Graph search

c. Binary search

d. Enumeration

**Feedback**

The correct answer is: Graph traversal

**Question 7**

Not answered

Marked out of 1.00

Flag question

**Question text**

In the following graph what do the circles represent?

A diagram of a network

Description automatically generated

Question 7Select one:

a. Edges

b. Vertices

c. Nodes

d. Cycles

**Feedback**

The correct answer is: Vertices

**Question 8**

Not answered

Marked out of 1.00

Flag question

**Question text**

What term best describes this graph?

A diagram of a network

Description automatically generated

Question 8Select one:

a. Directed Graph

b. Undirected Graph

c. Tree

d. Directed Acyclic Graph

**Feedback**

The correct answer is: Undirected Graph

**Question 9**

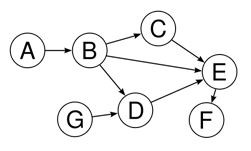
Not answered

Marked out of 1.00

Flag question

**Question text**

What term best describes this graph?



Question 9Select one:

a. Directed Graph

b. Undirected Graph

c. Tree

d. Directed Acyclic Graph

**Feedback**

The correct answer is: Directed Acyclic Graph

**Unit-4**

**Graded Quiz Unit 4**

**Question 1**

**Question text**

What will be the Big-Oh complexity of a linear search?

Question 1Select one:

a. O(n)

b. O(1)

c. O(n²)

d. O(2n)

**Feedback**

The correct answer is: O(n)

**Question 2**

**Question text**

If the characters 'D', 'C', 'B', 'A' are placed in a queue (in that order), and then removed one at a time, in what order will they be removed?

a. ABCD

b. ABDC

c. DCAB

d. DCBA

e. ACDB

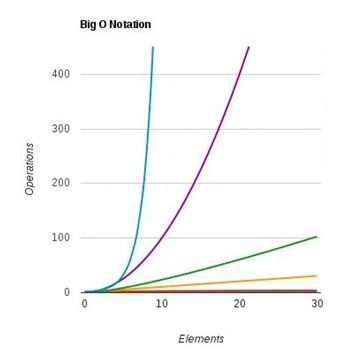
**Feedback**

The correct answer is: DCBA

**Question 3**

**Question text**

What is the big-o complexity of the red line?



a. O(n)

b. O(log n)

c. O(n²)

d. O(1)

**Feedback**

The correct answer is: O(1)

**Question 4**

Correct

Mark 1.00 out of 1.00

Flag question

**Question text**

What is the big-o complexity of the blue line?

A graph of different colored lines

Description automatically generated

Question 4Select one:

a. O(n)

b. O(log n)

c. O(n2)

d. O(2n)

**Feedback**

The correct answer is: O(2n)

**Question 5**

**Question text**

Which method of traversal does not use stack to hold nodes that are waiting to be processed?

Question 5Select one:

a. Depth First

b. Breadth first

c. Back-tracking

d. Bounding

**Feedback**

The correct answer is: Breadth first

**Question 6**

**Question text**

What will be the Big-Oh complexity to traverse a linked list?

Question 6Select one:

a. O(n)

b. O(1)

c. O(n2)

d. O(2n)

**Feedback**

The correct answer is: O(n)

**Question 7**

**Question text**

True/False: Dijkstra's algorithm finds the shortest paths in a graph from all vertices to a given vertex.

True

False

**Feedback**

The correct answer is 'False'.

**Question 8**

**Question text**

What is the big-o complexity of the purple line?

Question 8Select one:

a. O(n)

b. O(log n)

c. O(n²)

d. O(2n)

**Feedback**

The correct answer is: O(n²)

**Question 9**

**Question text**

What will be the Big-Oh complexity to search a balanced binary tree?

Question 9Select one:

a. O(n)

b. O(log n)

c. O(n2)

d. O(2n)

**Feedback**

The correct answer is: O(log n)

**Question 10**

**Question text**

\_\_\_\_\_\_ is the time complexity of an algorithm that operates in exponential time. This means that process times doubles with the addition of each data element.

a. O(n)

b. O(log n)

c. O(n2)

d. O(2n)

**Feedback**

The correct answer is: O(2n)

**Question 11**

**Question text**

What is the big-o complexity of the green line?

A graph of different colored lines

Description automatically generated

Question 11Select one:

a. O(n)

b. O(log n)

c. O(n log n)

d. O(2n)

**Feedback**

The correct answer is: O(n log n)

**Question 12**

**Question text**

What is the Big-Oh complexity of the selection sort?

Question 12Select one:

a. O(n)

b. O(log n)

c. O(n2)

d. O(2n)

**Feedback**

The correct answer is: O(n2)

**Question 13**

**Question text**

True/False: O(1) is the time complexity of an algorithm that operates in constant time. The process time required stays constant regardless of the data size.

True

False

**Feedback**

The correct answer is 'True'.

**Question 14**

**Question text**

Breadth first search \_\_\_\_\_\_\_\_\_\_.

a. Scans each incident node along with its children.

b. Scans all incident edges before moving to other node.

c. Is same as backtracking.

d. Scans all the nodes in random order.

e. Scans all the nodes in pre-order manner.

**Feedback**

The correct answer is: Scans all incident edges before moving to other node.

**Question 15**

Correct

Mark 1.00 out of 1.00

Flag question

**Question text**

 \_\_\_\_\_ is the time complexity of an algorithm that operates in linear time. The process time changes in the same ratio as the data size.

a. O(n)

b. O(1)

c. O(n²)

d. O(2n)

**Feedback**

n

The correct answer is: O(n)

**Question 16**

Correct

Mark 1.00 out of 1.00

Flag question

**Question text**

Suppose you have a directed graph representing all the flights that an airline flies and the flying times for each connection. What algorithm might be used to find the best sequence of connections from one city to another to minimize the overall time of the flight?

a. Breadth first search.

b. Depth first search.

c. A cycle-finding algorithm.

d. A shortest-path algorithm.

**Feedback**

The correct answer is: A shortest-path algorithm.

**Unit-5**

**Question 1**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: Dynamic Programming reduces asymptotic complexity by eliminating redundant computations.

True

False

**Feedback**

The correct answer is 'True'.

**Question 2**

**Question text**

True/False: Recursive routines cannot be used in Dynamic Programming algorithms?

Question 2Select one:

True

False

**Feedback**

The correct answer is 'True'.

**Question 3**

**Question text**

Which of the following is NOT one of the main principles of dynamic programming algorithms?

a. Optimal substructure: optimal solutions to problems are built from optimal solutions to subproblems.

b. "Shop around": to determine the best option, try them all and select the best one. Do not employ heuristics.

c. Memorization: answers to subproblems are remembered to avoid repeated computation of the same thing.

d. Recursion: implemented as a recursive routine to reduce overhead and improve computational efficiency.

**Feedback**

The correct answer is: Recursion: implemented as a recursive routine to reduce overhead and improve computational efficiency.

**Question 4**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: In a dynamic programming algorithm, we can use a table to store results of sub-problems and then refer to this table to ensure that we don't recomputed those sub-problems.

True

False

**Feedback**

The correct answer is 'True'.

**Question 5**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: Dynamic programming is a variation of the linear programming model in that it breaks the problem down into smaller problems that are solved using the simplex method?

True

False

**Feedback**

The correct answer is 'False'.

**Question 6**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: Dynamic programming is less complex asymptotically but is substantially more complex from a programming perspective?

Question 6Select one:

True

False

**Feedback**

The correct answer is 'False'.

**Unit-6**

**Question 1**

Not answered

Marked out of 1.00

Flag question

**Question text**

Linear programming problems can be solved using which of the following:

a. Simplex method

b. Quick method

c. Stochastic method

d. None of these answers

**Feedback**

The correct answer is: Simplex method

**Question 2**

Not answered

Marked out of 1.00

Flag question

**Question text**

Consider: A farmer can plant up to 8 acres of land with wheat and barley. He can earn $5,000 for every acre he plants with wheat and $3,000 for every acre he plants with barley. His use of a necessary pesticide is limited by federal regulations to 10 gallons for his entire 8 acres. Wheat requires 2 gallons of pesticide for every acre planted and barley requires just 1 gallon per acre. Problem: What is the maximum profit he can make? Assumptions: let x = the number of acres of wheat and let y = the number of acres of barley. Which of the following is a valid constraint for this problem?

a. y <= 8 - 2x

b. x <= 0

c. x <= 8-x

d. y <= 10 - 2x

**Feedback**

The correct answer is: y <= 10 - 2x

**Question 3**

Not answered

Marked out of 1.00

Flag question

**Question text**

Consider the following figure:

A diagram of a person with numbers and text

Description automatically generated with medium confidence

Question 3Select one:

a. Pivot column

b. The Vertex

c. Objective Value

d. Optimal point

**Feedback**

The correct answer is: Pivot column

**Question 4**

Not answered

Marked out of 1.00

Flag question

**Question text**

Consider the following figure. What does the region that is shaded represent?

A graph of a function

Description automatically generated

a. The Feasible region

b. The Infeasible solutions

c. The optimal solution

d. The Constraint Space

**Feedback**

The correct answer is: The Feasible region

**Question 5**

Not answered

Marked out of 1.00

Flag question

**Question text**

Consider the following figure:

A graph of a person with a purple line

Description automatically generated

Question 5Select one:

a. The optimal solution

b. An infeasible solution

c. An Alternate vertex

d. None of these answers

**Feedback**

The correct answer is: The optimal solution

**Question 6**

Not answered

Marked out of 1.00

Flag question

**Question text**

In a linear programming problem assuming the Simplex Method the following is known as:

A white background with black text

Description automatically generated

a. The Constraints

b. The Solution definition

c. The Problem definition

d. The Tableau

**Feedback**

The correct answer is: The Tableau

**Question 7**

Not answered

Marked out of 1.00

Flag question

**Question text**

In a linear programming problem, a statement such as max x1 + 6x2 represents:

Question 7Select one:

a. A constraint function

b. The Objective function

c. The maximization function

d. The feasible function

**Feedback**

The correct answer is: The Objective function

**Question 8**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: Linear programming is used primarily to solve problems of optimization?

True

False

**Feedback**

The correct answer is 'True'.

**Question 9**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: In linear programming, either the constraints or the optimization criteria must be linear functions.

True

False

**Feedback**

The correct answer is 'False'.

**Question 10**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: In a linear programming problem there can be no more than 3 constraints:

Question 10Select one:

True

False

**Feedback**

The correct answer is 'False'.

**Question 11**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: In linear programming a constraint must be represented as a inequality.

True

False

**Feedback**

The correct answer is 'False'.

**Question 12**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: Linear programming is an excellent approach for optimization problems where the objective function graphs as a curvilinear line.

True

False

**Feedback**

The correct answer is 'False'.

**Question 13**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: The Simplex method is important for computer programming, as the need for processing power is significantly lower when using it as opposed to other methods.

True

False

**Feedback**

The correct answer is 'True'.

**Graded Quiz Unit 6**

**Question 1**

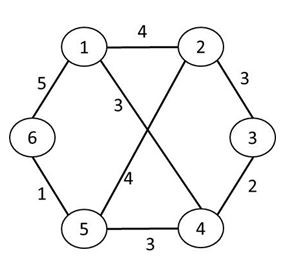
Correct

Mark 1.00 out of 1.00

Flag question

**Question text**

Using Prim’s Algorithm, determine the minimum spanning tree of the following graph.  When you have identified the MST, add together the path weights and submit as your answer.



Please enter a **numerical**answer only; do not enter any letters or words.

Answer: 12

**Feedback**

The correct answer is: 12

**Question 2**

Correct

Mark 1.00 out of 1.00

Flag question

**Question text**

Using Prim’s Algorithm, determine the minimum spanning tree of the following graph.

A diagram of a tree

Description automatically generated

Which edge, written in the format of: (startnode, endnode), is NOT included in the minimum spanning  tree?

Please enter your answer in the following format: (#,#)

Answer:

**Feedback**

The correct answer is: (1, 8)

**Question 3**

Correct

Mark 1.00 out of 1.00

Flag question

**Question text**

Using Prim’s Algorithm, determine the minimum spanning tree of the following graph.

A diagram of a tree

Description automatically generated

What is the weight of the minimum spanning tree (the sum of the weights of the edges included in the minimum spanning tree)?

Please enter a **numerical**answer only; do not enter any letters or words.

Answer:Question 3

**Feedback**

The correct answer is: 22

**Information**

Flag question

**Information text**

For the following questions, please read this problem statement:

A computer manufacturer must determine what product mix to produce.  A server requires 4 CPU’s and 8 Memory modules.  A desktop computer requires 1 CPU and 4 Memory modules.   Each server is sold for $1850 and each desktop is sold for $925.   The manufacturer must produce a quantity of both units to keep both lines in production so the quantity of servers and desktops produced must both be greater than 0.  
  
The manufacturer can only get a supply of 1250 CPU’s and 3800 memory modules due to shortages in the supply chain.  Using the Simplex algorithm, determine the number of servers and desktops that should be built to maximize the profits of the manufacturer and determine how much revenue will be generated.

Please enter a **numerical**answer only; do not enter any letters or words. If the answer is a dollar amount, please enter in the following format: $#,###

**Question 4**

Correct

Mark 1.00 out of 1.00

Flag question

**Question text**

How many servers should be built?

Answer:Question 4

**Feedback**

The correct answer is: 150

**Question 5**

Correct

Mark 1.00 out of 1.00

Flag question

**Question text**

How many Desktop computers should be built?

Answer:Question 5

**Feedback**

The correct answer is: 650

**Question 6**

Correct

Mark 1.00 out of 1.00

Flag question

**Question text**

How much Revenue (money in dollars received by selling the desktops and servers) will be generated?

Answer: Question 6

**Feedback**

The correct answer is: $878,750.00

**Unit-7**

**Question 1**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: According to our reading assignments, circuit satisfiability is a good example of a problem that we don't know how to solve in polynomial time.

True

False

**Feedback**

The correct answer is 'True'.

**Question 2**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: NP is the set of decision problems that can be solved in polynomial time.

True

False

**Feedback**

The correct answer is 'False'.

**Question 3**

Not answered

Marked out of 1.00

Flag question

**Question text**

According to the Cook-Levin Theorem, Circuit satisfiability is:

Question 3Select one:

a. NP-Complete

b. NP-Hard

c. NP-Easy

d. P

**Feedback**

The correct answer is: NP-Complete

**Question 4**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: A reduction is solving problem A using problem B where an algorithm for B exists (for example redefining an optimization problem as a search problem).

True

False

**Feedback**

The correct answer is 'True'.

**Unit-8**

**Question 1**

Not answered

Marked out of 1.00

Flag question

**Question text**

True or False: Circuit Satisfiability is not a representation for a NP-hard problem as it can be solved in O(n2) time.

True

False

**Feedback**

The correct answer is 'False'.

**Question 2**

Not answered

Marked out of 1.00

Flag question

**Question text**

The Class of P problems are (select the best answer):

a. Problems that can all be solved quickly in O(n) time.

b. Are not included in the set of NP problems.

c. The set of problems that can be solved in polynomial time.

d. All of these responses.

**Feedback**

Your answer is incorrect.

The correct answer is: The set of problems that can be solved in polynomial time.

**Question 3**

Not answered

Marked out of 1.00

Flag question

**Question text**

True or False: NP-complete problems are a subset that is the intersection between NP problems and NP-Hard problems.

True

False

**Feedback**

The correct answer is 'True'.

**Question 4**

Not answered

Marked out of 1.00

Flag question

**Question text**

True or False: The Cook-Levin Theorem states that Circuit satisfiability is NP-complete.

Question 4Select one:

True

False

**Feedback**

The correct answer is 'True'.

**Question 5**

Not answered

Marked out of 1.00

Flag question

**Question text**

Which of the following is NOT an NP-Complete, Hard problem?

a. Traveling Salesman Problem

b. Knapsack

c. Integer Linear Programming

d. Minimum Spanning Tree

**Feedback**

Your answer is incorrect.

The correct answer is: Minimum Spanning Tree

**Question 6**

Not answered

Marked out of 1.00

Flag question

**Question text**

Which of the following is NOT a P (polynomial), easy problem?

a. Shortest Path

b. Linear Programming

c. Longest Path

d. Euler Path

**Feedback**

Your answer is incorrect.

The correct answer is: Longest Path

**Question 7**

Not answered

Marked out of 1.00

Flag question

**Question text**

True or False: All P problems are included in the set of problems that are considered to be NP (nondeterministic polynomial).

True

False

**Feedback**

The correct answer is 'True'.

**Question 8**

Not answered

Marked out of 1.00

Flag question

**Question text**

The Knapsack, Minimum Spanning Tree, Shortest Path, and Traveling Salesperson are all what kind of problem from an algorithms perspective?

a. Search

b. Sort

c. Matrix Multiplication

d. Fast Fournier Transform

**Feedback**

Your answer is incorrect.

The correct answer is: Search

**Review Quiz**

**Question 1**

Not answered

Marked out of 1.00

Flag question

**Question text**

In a linear programming problem, a statement such as max x1 + 6x2 represents:

Question 1Select one:

a.

A constraint function

b.

The Objective function

c.

The maximization function

d.

The feasible function

**Feedback**

The correct answer is: The Objective function

**Question 2**

Not answered

Marked out of 1.00

Flag question

**Question text**

Which of the following is NOT one of the steps used in a Divide-and-conquer algorithm to solve a problem?

Question 2Select one:

a. Breaking the problem into subproblems that are themselves smaller instances of the same type of problem

b. Recursively solving the subproblems

c. Appropriately combining the answers of the solved subproblems

d. Exhaustively searching every potential path of the problem to identify all solution  candidates

**Feedback**

The correct answer is: Exhaustively searching every potential path of the problem to identify all solution  candidates

**Question 3**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: Recursive routines cannot be used in Dynamic Programming algorithms?

Question 3Select one:

True

False

**Feedback**

The correct answer is 'True'.

**Question 4**

Not answered

Marked out of 1.00

Flag question

**Question text**

Suppose you have a directed graph representing all the flights that an airline flies and the flying times for each connection. What algorithm might be used to find the best sequence of connections from one city to another to minimize the overall time of the flight?

Question 4Select one:

a. Breadth first search.

b. Depth first search.

c. A cycle-finding algorithm.

d. A shortest-path algorithm.

**Feedback**

The correct answer is: A shortest-path algorithm.

**Question 5**

Not answered

Marked out of 1.00

Flag question

**Question text**

How much Revenue (money in dollars received by selling the desktops and servers) will be generated?

Answer: Question 5

**Feedback**

The correct answer is: $878,750.00

**Question 6**

Not answered

Marked out of 1.00

Flag question

**Question text**

Using Prim’s Algorithm, determine the minimum spanning tree of the following graph.  When you have identified the MST, add together the path weights and submit as your answer.

A diagram of a hexagon with numbers and circles

Description automatically generated

Please enter a **numerical**answer only; do not enter any letters or words.

Answer:Question 6

**Feedback**

The correct answer is: 12

**Question 7**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False:  The running time of an algorithm is the number of instructions it executes when run on a particular instance.

True

False

**Feedback**

The correct answer is 'True'.

**Question 8**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: Let T be a minimum spanning tree of G. Then, for any pair of vertices s and t, the shortest path from s to T is G is the path from s to t in T.

True

False

**Feedback**

The correct answer is 'False'.

**Question 9**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: In linear programming a constraint must be represented as a inequality.

True

False

**Feedback**

The correct answer is 'False'.

**Question 10**

Not answered

Marked out of 1.00

Flag question

**Question text**

A process that is designed to visit every vertex in a graph is known as a:

a. Graph traversal

b. Graph search

c. Binary search

d. Enumeration

**Feedback**

The correct answer is: Graph traversal

**Question 11**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: A Boolean variable can take on only 1 value.

True

False

**Feedback**

The correct answer is 'False'.

**Question 12**

Not answered

Marked out of 1.00

Flag question

**Question text**

According to the Cook-Levin Theorem, Circuit satisfiability is:

Question 12Select one:

a. NP-Complete

b. NP-Hard

c. NP-Easy

d. P

**Feedback**

The correct answer is: NP-Complete

**Question 13**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: A graph with edges that have no directional indication as in the following diagram is called a uni-directed graph.

A diagram of a network

Description automatically generated

True

False

**Feedback**

The correct answer is 'False'.

**Question 14**

Not answered

Marked out of 1.00

Flag question

**Question text**

What will be the Big-Oh complexity to search a balanced binary tree?

a. O(n)

b. O(log n)

c. O(n2)

d. O(2n)

**Feedback**

The correct answer is: O(log n)

**Question 15**

Not answered

Marked out of 1.00

Flag question

**Question text**

In a linear programming problem assuming the Simplex Method the following is known as:

A white background with black text

Description automatically generated

a. The Constraints

b. The Solution definition

c. The Problem definition

d. The Tableau

**Feedback**

The correct answer is: The Tableau

**Question 16**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: A graph with edges that point in such a way that one could follow such directed edges and visit the same vertex again, as is illustrated in the following diagram is a graph that is said to have or be:

A diagram of a diagram

Description automatically generated

Question 16Select one:

a. Directed

b. Cyclic or cycles

c. Free tree

d. Acyclic

**Feedback**

The correct answer is: Cyclic or cycles

**Question 17**

Not answered

Marked out of 1.00

Flag question

**Question text**

What is the big-o complexity of the purple line?

Question 17Select one:

a. O(n)

b. O(log n)

c. O(n²)

d. O(2n)

**Feedback**

The correct answer is: O(n²)

**Question 18**

Not answered

Marked out of 1.00

Flag question

**Question text**

What is the Big-Oh complexity of the selection sort?

Question 18Select one:

a. O(n)

b. O(log n)

c. O(n2)

d. O(2n)

**Feedback**

The correct answer is: O(n2)

**Question 19**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: A reduction is solving problem A using problem B where an algorithm for B exists (for example redefining an optimization problem as a search problem).

True

False

**Feedback**

The correct answer is 'True'.

**Question 20**

Not answered

Marked out of 1.00

Flag question

**Question text**

[3^{n}+12](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=3%5E%7Bn%7D%2B12)

Question 20Select one:

a. Θ([3^{n}](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=3%5E%7Bn%7D))

b. Ω([3^{n}](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=3%5E%7Bn%7D))

c. Ο([2^{n}](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=2%5E%7Bn%7D))

d. Ο([3^{n}](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=3%5E%7Bn%7D))

**Feedback**

The correct answer is: Θ([3^{n}](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=3%5E%7Bn%7D))

**Question 21**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: In a dynamic programming algorithm, we can use a table to store results of sub-problems and then refer to this table to ensure that we don't recomputed those sub-problems.

True

False

**Feedback**

The correct answer is 'True'.

**Question 22**

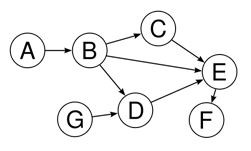
Not answered

Marked out of 1.00

Flag question

**Question text**

What term best describes this graph?



Question 22Select one:

a. Directed Graph

b. Undirected Graph

c. Tree

d. Directed Acyclic Graph

**Feedback**

The correct answer is: Directed Acyclic Graph

**Question 23**

Not answered

Marked out of 1.00

Flag question

**Question text**

Breadth first search \_\_\_\_\_\_\_\_\_\_.

Question 23Select one:

a. Scans each incident node along with its children.

b. Scans all incident edges before moving to other node.

c. Is same as backtracking.

d. Scans all the nodes in random order.

e. Scans all the nodes in pre-order manner.

**Feedback**

The correct answer is: Scans all incident edges before moving to other node.

**Question 24**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: Dynamic programming is less complex asymptotically but is substantially more complex from a programming perspective?

True

False

**Feedback**

The correct answer is 'False'.

**Question 25**

Not answered

Marked out of 1.00

Flag question

**Question text**

True/False: An algorithm is a well-defined sequence of steps used to solve a well-defined problem in finite time.

True

False

**Feedback**

The correct answer is 'True'.

**Question 26**

Not answered

Marked out of 1.00

Flag question

**Question text**

Which method of traversal does not use stack to hold nodes that are waiting to be processed?

Question 26Select one:

a. Depth First

b. Breadth first

c. Back-tracking

d. Bounding

**Feedback**

The correct answer is: Breadth first

**Question 27**

Not answered

Marked out of 1.00

Flag question

**Question text**

Which of the following is NOT a property of logarithms?

Question 27Select one:

a. log(nm) = log n + log m

b. log(n/m) = log n - log m

c. [ \log \left(n^{r}\right)=r log n ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20%5Clog%20%5Cleft%28n%5E%7Br%7D%5Cright%29%3Dr%20log%20n%20)

d. [ log_{b} n=log_{n}b \ log_{a}b ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20log_%7Bb%7D%20n%3Dlog_%7Bn%7Db%20%5C%20log_%7Ba%7Db%20)

**Feedback**

The correct answer is: [ log_{b} n=log_{n}b \ log_{a}b ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20log_%7Bb%7D%20n%3Dlog_%7Bn%7Db%20%5C%20log_%7Ba%7Db%20)

**Question 28**

Not answered

Marked out of 1.00

Flag question

**Question text**

Consider: A farmer can plant up to 8 acres of land with wheat and barley. He can earn $5,000 for every acre he plants with wheat and $3,000 for every acre he plants with barley. His use of a necessary pesticide is limited by federal regulations to 10 gallons for his entire 8 acres. Wheat requires 2 gallons of pesticide for every acre planted and barley requires just 1 gallon per acre. Problem: What is the maximum profit he can make? Assumptions: let x = the number of acres of wheat and let y = the number of acres of barley. Which of the following is a valid constraint for this problem?

Question 28Select one:

a. y <= 8 - 2x

b. x <= 0

c. x <= 8-x

d. y <= 10 - 2x

**Feedback**

The correct answer is: y <= 10 - 2x

**Question 29**

Not answered

Marked out of 1.00

Flag question

**Question text**

Using Prim’s Algorithm, determine the minimum spanning tree of the following graph.

A diagram of a tree

Description automatically generated

Which edge, written in the format of: (startnode, endnode), is NOT included in the minimum spanning  tree?

Please enter your answer in the following format: (#,#)

Answer:

**Feedback**

The correct answer is: (1, 8)

**Question 30**

Not answered

Marked out of 1.00

Flag question

**Question text**

Consider the following figure:

A diagram of a person with numbers and text

Description automatically generated with medium confidence

a. Pivot column

b. The Vertex

c. Objective Value

d. Optimal point

**Feedback**

The correct answer is: Pivot column

**Question 31**

Not answered

Marked out of 1.00

Flag question

**Question text**

What is the big-o complexity of the blue line?

A graph of different colored lines

Description automatically generated

a. O(n)

b. O(log n)

c. O(n2)

d. O(2n)

**Feedback**

The correct answer is: O(2n)

**Question 32**

Not answered

Marked out of 1.00

Flag question

**Question text**

What will be the Big-Oh complexity to traverse a linked list?

Question 32Select one:

a. O(n)

b. O(1)

c. O(n2)

d. O(2n)

**Feedback**

The correct answer is: O(n)