How many undirected graphs can be construced ..... 2^(n(n-1)/2)

Specify ALL THE APPLICABLR Big-Oh

$$500n + 100n^{1.5} + 50n\log_{10}n$$

n^1.5

n^3.5

n^1.75

Which of the following is an advantage of adjacency list representation over adjacency matrix representation of a graph?

In adjacency list representation, space is saved for sparse graphs.

DFS and BSF can be done in O(V+E) time for adjacency list representation, These operations take O(V^2) time in adjacency matrix representation. Here is V and E are number of Vertices and edges respectively.

Adding a vertex in adjacency list representation is easier than adjacency matrix representation.

x. The degree sequence of a simple graph is the sequence of the degrees of the nodes in the decreasing order. Which of the following sequences cannot be the degree sequence of any graph?

1. 7, 6, 5, 4, 4, 3, 2, 1

2. 6, 6, 6,

31. Let G be the graph with 100 vertices numbered 1 to 100. Two verices I and j are adjacent iff abs(i-j)=8 or abs(i-j)=12. The number of connected components in G is:

25

8

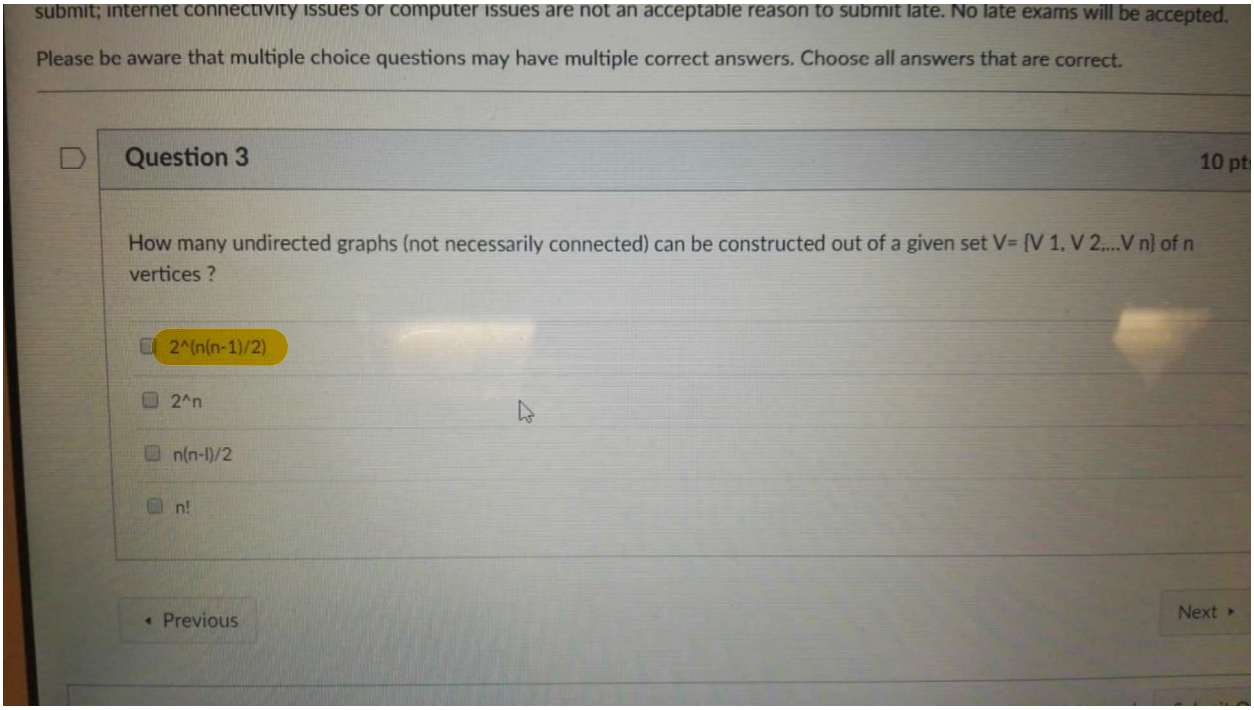
12

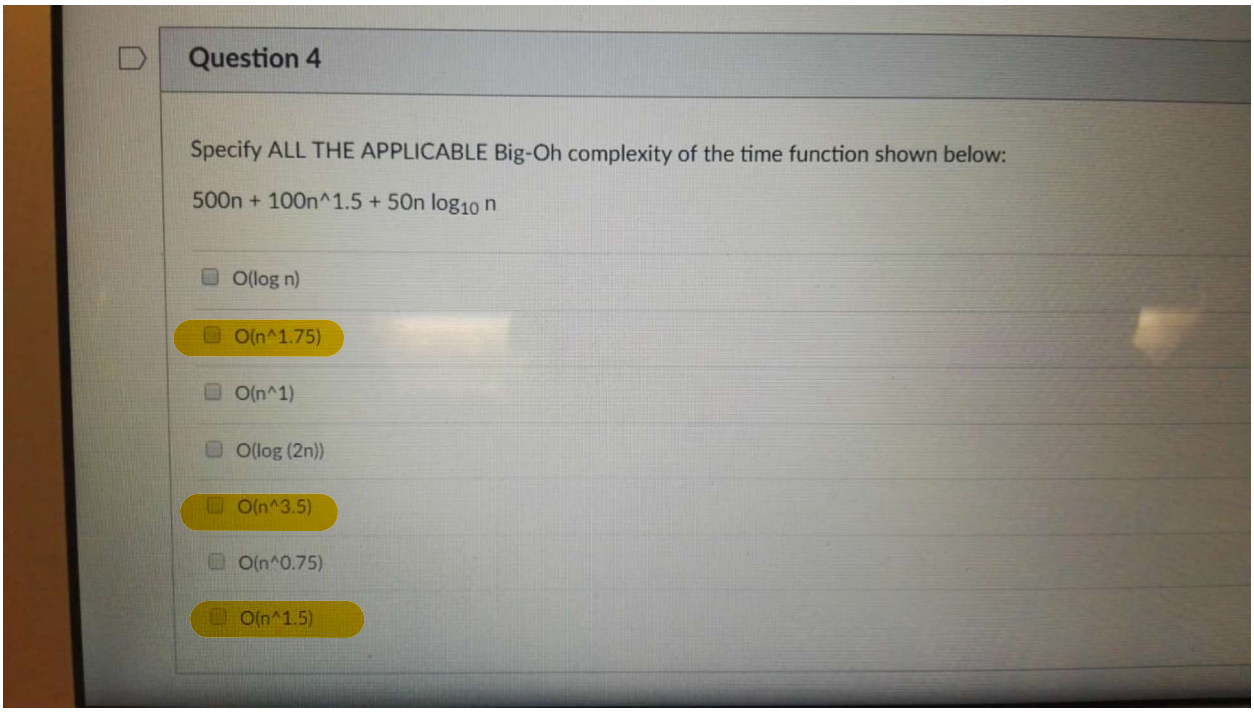
4

32. Work out the computational complexity of the following piece of code assuming that n = 2m.

```
for (int i = n; i > 0; i--){

}
```





ase be aware that multiple choice questions may have multiple correct answers. Choose all answers that are correct.

Question 5

10

Which of the following is an advantage of adjacency list representation over adjacency matrix representation of a graph?

- [ ] In adjacency list representation, space is saved for sparse graphs.
- [ ] DFS and BSF can be done in O(V + E) time for adjacency list representation. These operations take O(V^2) time in adjacency matrix representation. Here is V and E are number of vertices and edges respectively.
- [ ] Adding a vertex in adjacency list representation is easier than adjacency matrix representation.

Previous

Next

Not saved

Subm

Question 6

Specify the lowest Big-Oh complexity of the time function shown below:

$n^2 * \log_2(n) + n(\log_2(n))^2$

- [ ] O(n(log (n))^2)
- [ ] O(n log (n))
- [ ] O(n^2 log (n))
- [ ] O(log (n))

Previous

ıce you begin work on the exam, you will have 2:30 hours to complete it. Be sure to leave extra time at the end to check your work and bmit; internet connectivity issues or computer issues are not an acceptable reason to submit late. No late exams will be accepted.

ease be aware that multiple choice questions may have multiple correct answers. Choose all answers that are correct.

Question 7

10 pts

Consider an undirected unweighted graph G. Let a breadth-first traversal of G be done starting from a node r. Let d(r, u) and d(r, v) be the lengths of the shortest paths from r to u and v respectively, in G. If u is visited before v during the breadth-first traversal, which of the following statements is correct?

- [ ] d(r, u) > d(r, v)
- [ ] d(r, u) <= d (r, v)
- [ ] d(r, u) < d (r, v)

◂ Previous

Next ▸

nce you begin work on the exam, you will have 2:30 hours to complete it. Be sure to leave extra time at the end to check your work and ubmit; internet connectivity issues or computer issues are not an acceptable reason to submit late. No late exams will be accepted.

lease be aware that multiple choice questions may have multiple correct answers. Choose all answers that are correct.

Question 8

10 pts

Let G be the graph with 100 vertices numbered 1 to 100. Two vertices i and j are adjacent iff |i−j|=8 or |i−j|=12. The number of connected components in G is:

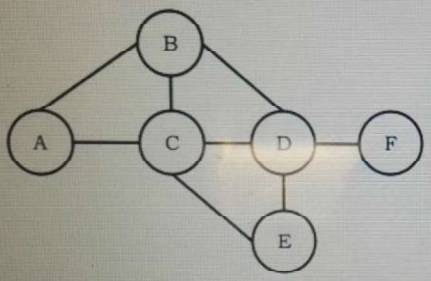
- 12
- 25
- 8
- 4

◂ Previous

Next ▸

Question 9

In the graph below, the edge DF can never be considered a back edge



- False
- True

Question 10

For Huffman coding, what might cause the letter 'E' to have an encoding of 0?

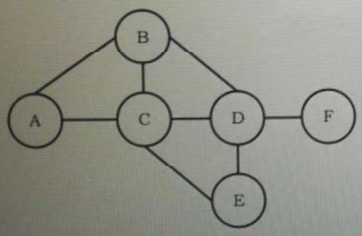
- [ ] There is only 1 letter in the alphabet
- [ ] E has an incredibly common frequency
- [ ] There are 2 letters in the alphabet
- [ ] E does not exist in the given alphabet

‹ Previous

Question 11 — 10 pts

Consider a simple graph with unit edge costs. Each node in the graph represents a router. Each node maintains a routing table indicating the next hop router to be used to relay a packet to its destination and the cost of the path to the destination through that router. Initially, the routing table is empty. The routing table is synchronously updated as follows. In each updation interval, three tasks are performed.

1. A node determines whether its neighbors in the graph are accessible. If so, it sets the tentative cost to each accessible neighbor as 1. Otherwise, the cost is set to ∞.
2. From each accessible neighbor, it gets the costs to relay to other nodes via that neighbor (as the next hop).
3. Each node updates its routing table based on the information received in the previous two steps by choosing the minimum cost.



For the graph given above, possible routing tables for various nodes after they have stabilized, are shown in the following

For the graph given above, possible routing tables for various nodes after they have stabilized, are shown in the following options. Identify the correct table.

Table for node A

A	-	-
B	B	1
C	C	1
D	B	3
E	C	3
F	C	4

Table for node B

A	A	1
B	-	-
C	C	1
D	D	1
E	C	2
F	D	2

Table for node C

Table for node C

A	A	1
B	B	1
C	-	-
D	D	1
E	E	1
F	E	3

Table for node D

A	B	3
B	B	1
C	C	1
D	-	-
E	E	1
F	F	1

- Table D
- Table A
- Table B
- Table C

Question 12

Which of the following statements is/are TRUE for an undirected graph?

P: Number of odd degree vertices is even

Q: Sum of degrees of all vertices is even

- [ ] P
- [ ] Q

Previous

Please be aware that multiple choice questions may have multiple correct answers. Choose all answers that ar

Question 13

Which of the following are true about the case sensitivity of Huffman coding?

- [ ] Case sensitivity depends on the strategy used for counting frequency
- [ ] Huffman coding is case insensitive
- [ ] Huffman coding is case sensitive

Previous

Question 14

Which of the below statements is true?

- [ ] Both a breadth-first search and a depth-first search as best implemented using a stack
- [ ] A depth-first search is a stack; a breadth-first search is a queue
- [ ] A depth-first search is a queue; a breadth-first search is a stack
- [ ] Both a breadth-first search and a depth-first search as best implemented using a queue
- [ ] None of the other answers is true

Work out the computational complexity of the following piece of code:

```
for( int i = n; i > 0; i /= 2 ) {
        for( int j = 1; j < n; j *= 2 ) {
                for( int k = 0; k < n; k += 2 ) {
                        ... // constant number of operations
                }
        }
}
```

- [ ]
- [ ] O (n(log n)^2)
- [ ] O(n^2 log (n))
- [ ]
- [ ] O(log (n))
- [ ]

Question 16

Specify ALL THE APPLICABLE Big-Oh complexity of the time function shown below:

5 + 0.001n^3 + 0.025n

- [ ] O(log (2n))
- [x] O(n^4.25)
- [ ] O(n^1.75)
- [ ] O(log n)
- [x] O(n^3.5)
- [ ] O(n^1)
- [x] O(n^3)

ase be aware that multiple choice questions may have multiple correct answers. Choose all answers that are correct.

Question 17

10 pts

A sorting method with "Big-Oh" complexity O(n log n) spends exactly 1 millisecond to sort 1,000 data items. Assuming that time T(n) of sorting n items is directly proportional to n log n, that is, T(n) = cn log n, derive a formula for T(n), given the time T(N) for sorting N items, and estimate how long this method will take to sort 1,000,000 items.

- [ ] 2,500 ms
- [ ] 1,500 ms
- [x] 2,000 ms
- [ ] 1,000 ms

◂ Previous

Next ▸

Question 18

10 pts

Which of the following are true when running the same alphabet and frequencies through 2 different implementations of the Huffman coding algorithm?

- [ ] All symbols in the alphabet will have the same length encoding
- [ ] The length of the coded message will be the same
- [ ] All encodings will have a unique prefix
- [ ] Symbols will have either the same encoding or the bitwise not of the encoding (1101 and 0010)
- [ ] All symbols in the alphabet will have the same encoding
- [ ] The entire coding will be identical

Previous

Next

Not saved

Submit Quiz

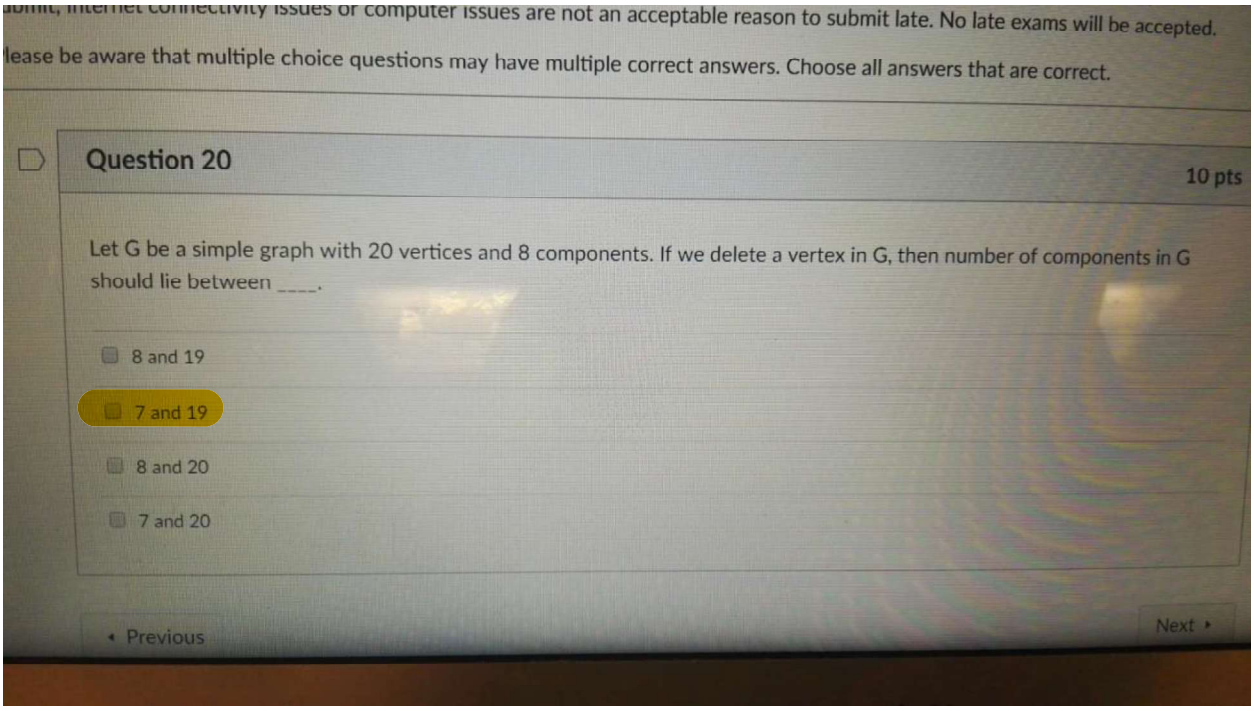
Question 19

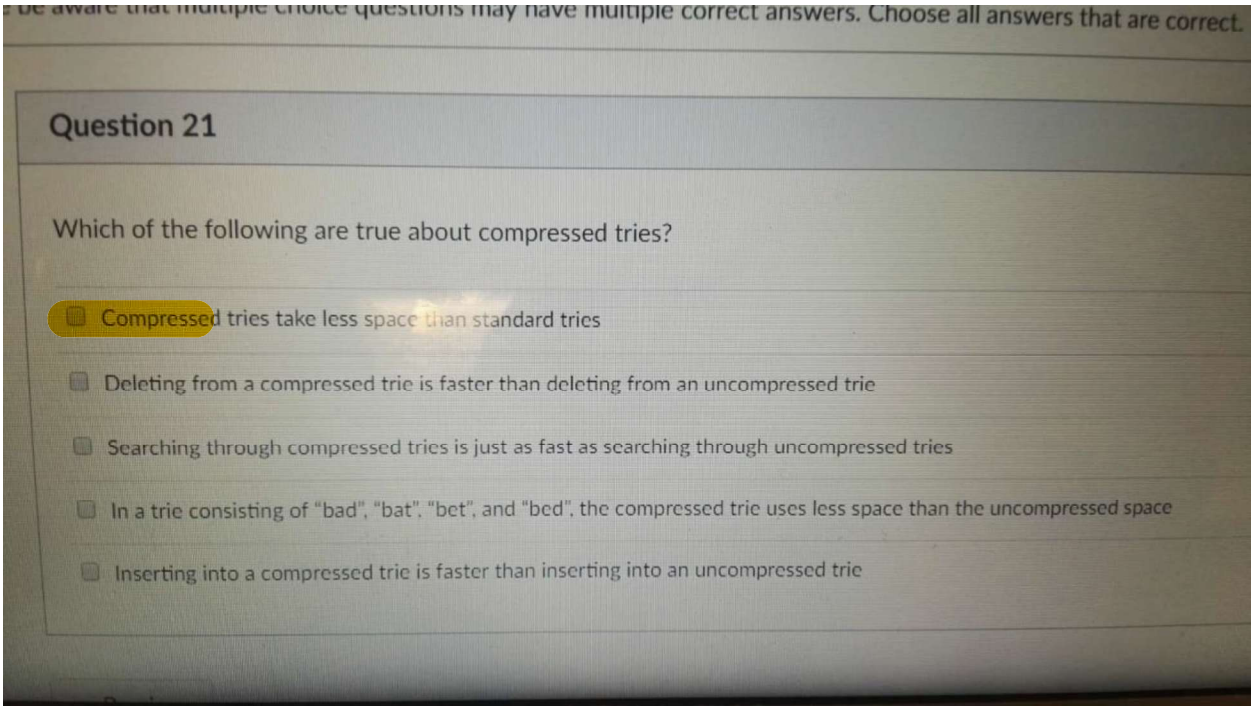
Specify the lowest Big-Oh complexity of the time function shown below:

$0.01n \log_2 (n) + n (\log_2 (n))^2$

- [ ] O(n log (n))
- [ ] O(n^2 log (n))
- [ ] O(n(log (n))^2)
- [ ] O(log (n))

Previous


connectivity issues or computer issues are not an acceptable reason to submit late. No late exams will be accepted.
Please be aware that multiple choice questions may have multiple correct answers. Choose all answers that are correct.
Question 20
10 pts
Let G be a simple graph with 20 vertices and 8 components. If we delete a vertex in G, then number of components in G should lie between ____.
8 and 19
7 and 19
8 and 20
7 and 20
Previous
Next


Be aware that multiple choice questions may have multiple correct answers. Choose all answers that are correct.
Question 21
Which of the following are true about compressed tries?
Compressed tries take less space than standard tries
Deleting from a compressed trie is faster than deleting from an uncompressed trie
Searching through compressed tries is just as fast as searching through uncompressed tries
In a trie consisting of "bad", "bat", "bet", and "bed", the compressed trie uses less space than the uncompressed space
Inserting into a compressed trie is faster than inserting into an uncompressed trie

lease be aware that multiple choice questions may have multiple correct answers. Choose all answers that are correct.

Question 22

10 pts

The degree sequence of a simple graph is the sequence of the degrees of the nodes in the graph in decreasing order. Which of the following sequences cannot be the degree sequence of any graph?

1. 7, 6, 5, 4, 4, 3, 2, 1
2. 6, 6, 6, 6, 3, 3, 2, 2
3. 7, 6, 6, 4, 4, 3, 2, 2
4. 8, 7, 7, 6, 4, 2, 1, 1

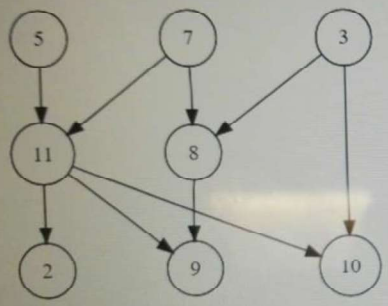
- [ ] 3 and 4
- [ ] 1 and 2
- [ ] 4 only
- [ ] 2 and 4

Next ▸

Question 23

10 pts

Given the graph shown, which of the following are topological orderings of the graph?



- [ ] 7, 3, 8, 9, 5, 11, 2, 10
- [ ] 2, 3, 5, 7, 8, 9, 10, 11
- [ ] The graph is not acyclic
- [ ] 5, 7, 11, 2, 3, 10, 8, 9
- [ ] 3, 7, 8, 5, 11, 10, 2, 9

Question 24

Specify the lowest Big-Oh complexity of the time function shown below:

0.3n + 5n^1.5 + 2.5n^1.75

- [x] O(n^1.75)
- [ ] O(log (2n))
- [ ] O(n^0.75)
- [ ] O(n^1.5)
- [ ] O(n^3.5)
- [ ] O(n^1)
- [ ] O(log n)

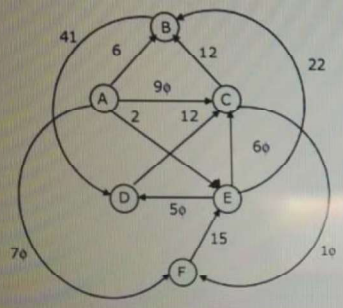
◂ Previous

Ne

Question 25

10 pts

Let G be the directed, weighted graph shown in below figure. *We are interested in the shortest paths from A.*



Write down the sequence of vertices that form the shortest path from A to F, using capital letters and no spaces or other delimiter between nodes (example: ABCDEF)

ABDCF

What is the cost of the shortest path from A to F?

69

ıse be aware that multiple choice questions may have multiple correct answers. Choose all answers that are correct.

Question 26

10 pts

Given an undirected graph G with V vertices and E edges, the sum of the degrees of all vertices is:

- 2V
- V
- E
- 2E

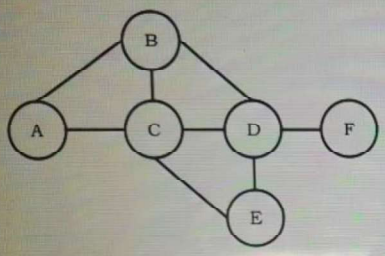
« Previous

Next »

Not saved

Submit Qu

Starting with E as the root with a DFN of 1, identify possible DFN values for A using the graph below:



- 1
- 6
- 7
- 3
- 2
- 4

Work out the computational complexity of the following piece of code assuming that n = 2m:

```
for( int i = n; i > 0; i-- ) {
    for( int j = 1; j < n; j *= 2 ) {
        for( int k = 0; k < j; k++ ) {
            ... // constant number C of operations
        }
    }
}
```

- [ ] O(n^2 log (n))
- [ ] O(log (n))
- [ ] O (n^2)
- [ ] O (n(log n)^2)
- [ ] O(n(log (n))^2)

ase be aware that multiple choice questions may have multiple correct answers. Choose all answers that are correct.

Question 29

10 pts

Which of the following are true about Huffman coding?

- [ ] Huffman coding will yield the best compression possible when compared to other compression algorithms that operate on a single character at a time
- [ ] Huffman coding is a variable width encoding
- [ ] Huffman coding will have an encoding scheme for letters that are not present in the presented alphabet
- [ ] Huffman coding will produce the best compression possible for a given input
- [ ] Huffman coding is able to treat sequences of more than one character as members of the coding alphabet

◂ Previous

Next ▸

se be aware that multiple choice questions may have multiple correct answers. Choose all answers that are correct.

Question 31

10 pts

A quadratic algorithm with processing time T(n) = cn^2 spends T(N) seconds for processing N data items. How much time will be spent for processing n = 5000 data items, assuming that N = 100 and T(N) = 1ms?

- [ ] 1,000 ms
- [ ] 1,500 ms
- [ ] 2,000 ms
- [ ] 2,500 ms

◂ Previous

Next ▸

Not saved

Submit Quiz

Question 32

Trinary tries work on the principle of a binary search tree to store data

- [ ] True
- [ ]
- [ ]
- [ ] False

◂ Previous