

Maximum Instruction Time : 0 1
Sub-Section Number : 64065395155
Sub-Section Id : No null
Question Shuffling Allowed :
Is Section Default? :


Question Number : 85 Question Id : 640653668525 Question Type : MCQ Is Question
Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction
Time : 0
Correct Marks : 0
Question Label : Multiple Choice Question


THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : PROGRAMMING, DATA
STRUCTURES AND ALGORITHMS USING PYTHON (COMPUTER BASED EXAM)"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

(IF IT IS NOT THE CORRECT SUBJECT, PLS CHECK THE SECTION AT THE TOP FOR THE SUBJECTS
REGISTERED BY YOU)

Options :

6406532239754.  YES

6406532239755.  NO

Sub-Section Number : 2
Sub-Section Id : 64065395156
Question Shuffling Allowed : Yes
Is Section Default? : null

Question Number : 86 Question Id : 640653668526 Question Type : MCQ Is Question
Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction
Time : 0
Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following functions:

$$f(n) = n \log \log n$$

$$g(n) = n(\log n)^2$$

Which of the following is true?

Options :

6406532239756. $f(n)$ is $O(g(n))$ and $g(n)$ is $O(f(n))$

6406532239757. $f(n)$ is $O(g(n))$, but $g(n)$ is not $O(f(n))$

6406532239758. $f(n)$ is not $O(g(n))$ and $g(n)$ is not $O(f(n))$

6406532239759. $g(n)$ is $O(f(n))$, but $f(n)$ is not $O(g(n))$

Question Number : 87 Question Id : 640653668527 Question Type : MCQ Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following two implementations to calculate the factorial of n :

A. `factorial(n)` using iteration below:

```
1 def factorial(n):
2     f = 1
3     for i in range(2, n + 1):
4         f = f * i
5     return f
```

B. `factorial(n)` using recursion below:

```
1 def factorial(n):
2     if n == 1 or n == 0:
3         return 1
4     else:
5         return (n * factorial(n - 1))
```

Which of the following option represent the correct complexity for both implementation?

Options :

6406532239760. $A - O(n), B - O(n^2)$

6406532239761. $A - O(n), B - O(\log n)$

6406532239762. $A - O(n^2), B - O(n^2)$

6406532239763. $A - O(n), B - O(n)$

Sub-Section Number :

3

Sub-Section Id :

64065395157

Question Shuffling Allowed :

Yes

Is Section Default? :

null

Question Number : 88 Question Id : 640653668528 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Short Answer Question

Given the following sorted list:

[16, 53, 59, 81, 94, 99, 121, 150, 162, 170]

If we use binary search algorithm to search for element 105 in the given list, then the number of comparisons of searching element 105 with list elements done in this process is__.

Note: Assume here that binary search will compute the midpoint by using $(First\ index + Last\ index)/2$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes **Answers**

Type : Equal **Text Areas :**

PlainText **Possible Answers :**

Sub-Section Number :	4
Sub-Section Id :	64065395158
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 89 Question Id : 640653668529 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following **Selection sort** algorithm :

```
1 def selectionsort(L):
2     n = len(L)
3     if n < 1:
4         return(L)
5     for i in range(n):
6         minpos = i
7         for j in range(i+1,n):
8             if L[j] < L[minpos]:
9                 minpos = j
10        (L[i],L[minpos]) = (L[minpos],L[i])
11    return(L)
```

Which of the following statement(s) is/are true about the given Selection sort algorithm?

Options :

6406532239765. It is considered an unstable sorting algorithm.
6406532239766. It is considered a stable sorting algorithm.
6406532239767. It has the same time complexity irrespective of the sequence of elements in the input.
6406532239768. It is efficient for larger data sets.
6406532239769. It is sorted in place.

Sub-Section Number : 5

Sub-Section Id : 64065395159

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 90 Question Id : 640653668530 Question Type : MCQ Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following **Insertion sort** algorithm:

```
1 def insertionsort(L):
2     n = len(L)
3     if n < 1:
4         return(L)
5     for i in range(n):
6         j = i
7         while(j > 0 and L[j] < L[j-1]):
8             (L[j],L[j-1]) = (L[j-1],L[j])
9             j = j - 1
10    return(L)
```

Given an input list L of size n . What are the minimum and maximum number of swapping operations (Line-8) possible between elements to sort the input list L ?

Options :

6406532239770. Minimum: 0, Maximum: $n(n + 1)/2$

6406532239771. Minimum: $n - 1$, Maximum: $n(n + 1)/2$

6406532239772. Minimum: 0, Maximum: $n(n - 1)/2$

6406532239773. Minimum: $n - 1$, Maximum: $n(n - 1)/2$

6406532239774. Minimum: 0, Maximum: n^2

Question Number : 91 Question Id : 640653668532 Question Type : MCQ Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

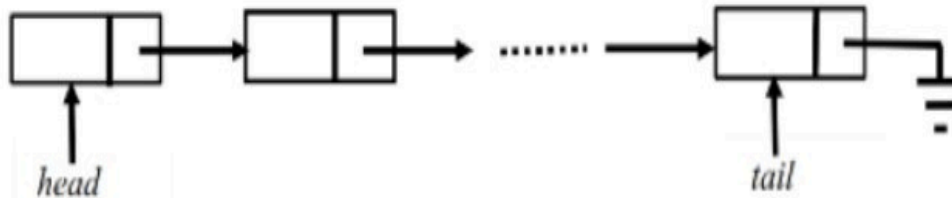
Question Label : Multiple Choice Question

```

1 class Node:
2     def __init__(self, data):
3         self.data = data
4         self.next = None

```

Consider the following linked list structure, where each node is an object of class `Node` and it has a `head` pointer that points to the first node of the linked list and a `tail` pointer that points to the last node of the linked list.



Which of the following operations on a given linked list requires traversal of the entire list?

Options :

- 6406532239779. Insert a new node at the beginning
- 6406532239780. Delete a node from the end
- 6406532239781. Insert a new node at the end
- 6406532239782. Delete a node from the beginning

Question Number : 92 Question Id : 640653668533 Question Type : MCQ Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

A doctor sees patients in his consulting room every evening. A certain number of appointments are given for each evening. Patients can also take a chance and come without an appointment. Appointments are not for a fixed time. The receptionist allows patients in to see the doctor in the order in which they arrive, with the provision that any patient with an appointment goes in before any patient without an appointment. What would be a good data structure for the receptionist to keep track of the waiting patients?

Options :

- 6406532239783.

Single stack

6406532239784. Two stacks

6406532239785. Single queue

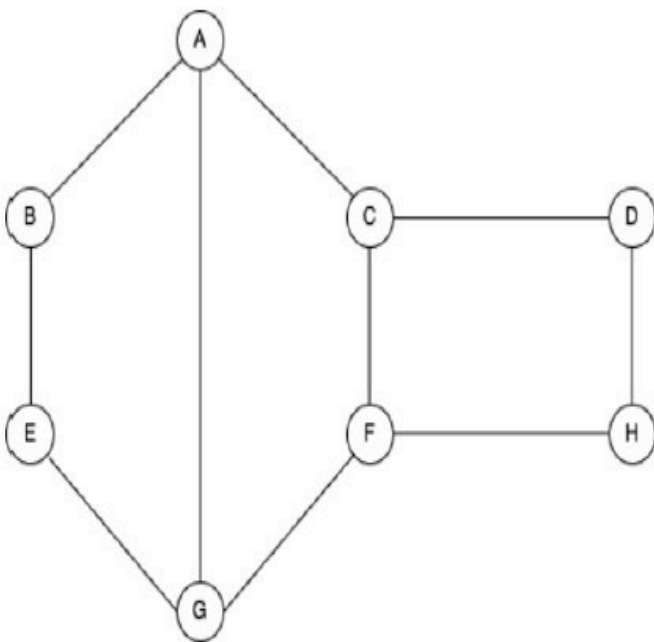
6406532239786. Two queues

Question Number : 93 Question Id : 640653668537 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following graph:



If we run Breadth First Search(BFS) on the given graph starting from vertex A, which of the following is the order of visiting the nodes?

Note: Assume that when a node has multiple neighbours, BFS visits them alphabetically.

Options :

6406532239793. A B C G E F D H

6406532239794. A B C G E D F H

6406532239795. A B C E F G D H

6406532239796. A B C G D E F H

Sub-Section Number :	6
Sub-Section Id :	64065395160
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 94 Question Id : 640653668531 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the following implementation for merge two sorted list and return one sorted merged list:

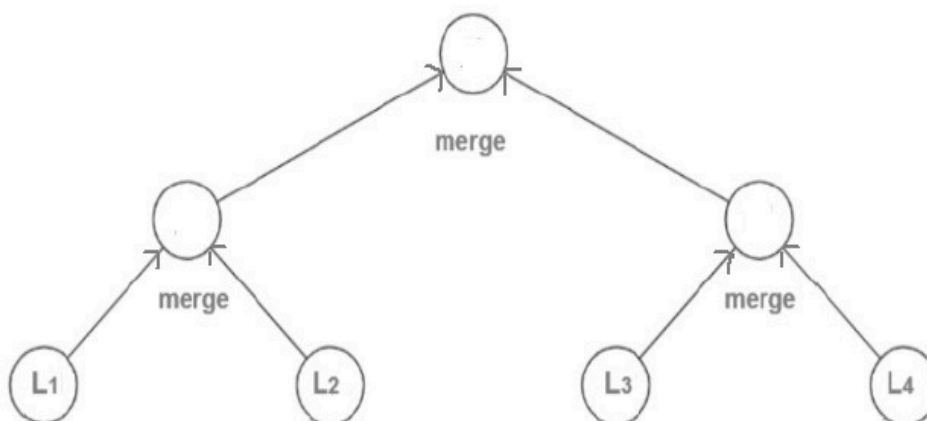
```

1 def merge(A,B): # Merge two sorted list A and B
2     (m,n) = (len(A),len(B))
3     (c,i,j) = ([],0,0)
4     #Case 1 :- When both lists A and B have elements for comparing
5     while i < m and j < n:
6         if A[i] <= B[j]: #Compare the elements
7             c.append(A[i])
8             i += 1
9         else:
10            c.append(B[j])
11            j += 1
12
13    #Case 2 :- If list B is over, shift all elements of A to C
14    while i < m:
15        c.append(A[i])
16        i += 1
17
18    #Case 3 :- If list A is over, shift all elements of B to C
19    while j < n:
20        c.append(B[j])
21        j += 1
22
23    # Return sorted merged list
24    return c

```

If 4 sorted lists L_1, L_2, L_3 and L_4 each of length $n/2$ are merged into a single sorted list of elements using two-way merging by given `merge` function. What will be the minimum and maximum number of element comparisons needed for this process?

Two-way merge:



Options :

6406532239775. Minimum: $2n$, Maximum: $4n - 3$

6406532239776. Minimum: $2n$, Maximum: $4n - 1$

6406532239777.

Minimum: $2n - 1$, Maximum: $4n - 3$

6406532239778. Minimum: $2n - 1$, Maximum: $4n + 1$

Question Number : 95 Question Id : 640653668534 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Let s be a stack and q be a queue supporting the following operations:

Stack operation:

- `Push(d)` : Insert element d in stack
- `Pop()` : Remove the element from the stack and return the removed element

Queue Operation:

- `Enqueue(d)` : Insert element d in queue
- `Dequeue()` : Remove the element from the queue and return the removed element

Consider the following function:

```
1 def fun(s,q):
2     if (not s.isempty()):
3         q.Enqueue(s.Pop())
4         fun(s,q)
5         s.Push(q.Dequeue())
```

What operation is performed by the above function `fun(s,q)` ? Suppose initially stack s has n elements and queue q is empty.

Options :

6406532239787. Leaves the stack S unchanged

6406532239788. Reverses the order of the elements in the stack S

6406532239789. Swap the top and bottom element of the stack S , keeping the other elements in the same order

6406532239790. Empties the stack S

Sub-Section Number : 7

Sub-Section Id : 64065395161

Question Shuffling Allowed : Yes

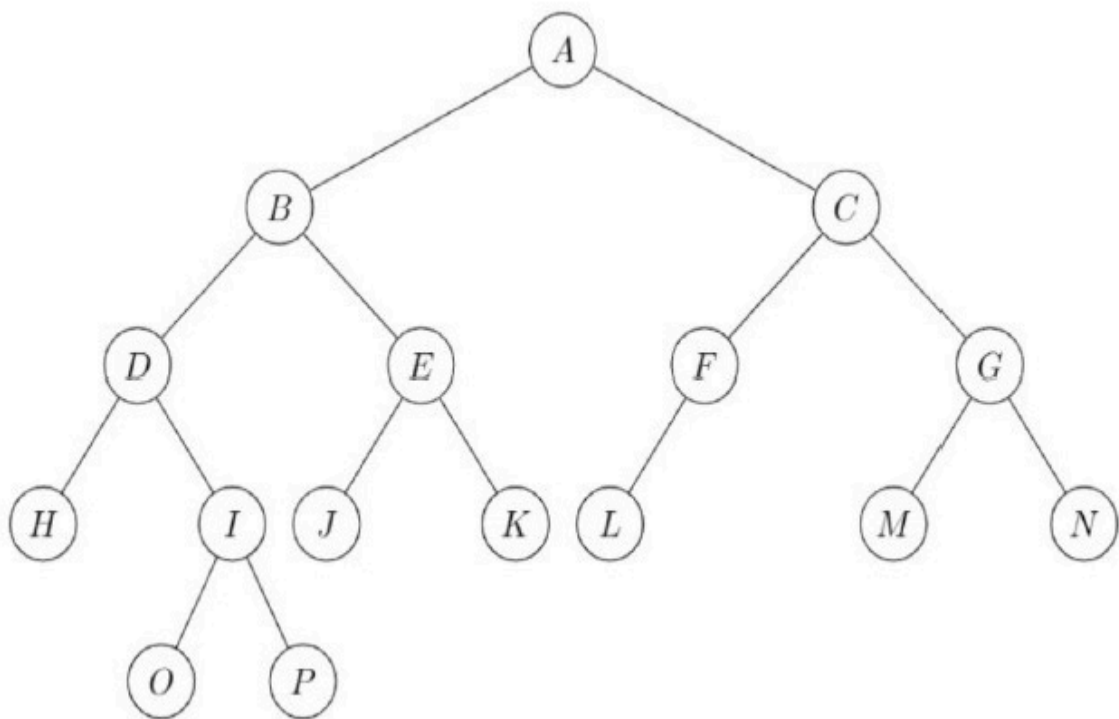
Is Section Default? : null

Question Number : 96 Question Id : 640653668538 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Suppose we obtain the following DFS tree rooted at node A for an undirected graph with vertices {A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P}.



Which of the following cannot be an edge/edges in the original graph?

Options :

6406532239797. (A, K)

6406532239798. (H, J)

6406532239799. (M, N)

6406532239800. (B, O)

6406532239801. (P, E)

6406532239802. (C, M)

Sub-Section Number :	8
Sub-Section Id :	64065395162
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 97 Question Id : 640653668535 Question Type : SA Calculator : None
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Correct Marks : 4

Question Label : Short Answer Question

Linear probing is an open addressing scheme in computer programming for resolving hash collisions in hash tables. Linear probing takes the original hash index and increments the value by 1 until a free slot is found.

A hash table contains 13 buckets(indexed from 0 to 12) and uses linear probing to resolve collisions. The key values are integers and the hash function used is `key mod 13` . If key values 14, 55, 144, 83, 122, 131 are inserted into the table, in what index would the key value 131 be inserted?

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes **Answers**
Type : Equal **Text Areas :**
PlainText Possible Answers :

Question Number : 98 Question Id : 640653668539 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Short Answer Question

Suppose, in a depth-first traversal of an undirected graph G with 12 vertices, 9 edges are marked as tree edges. The number of connected components in G is ____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes Answers

Type : Equal Text Areas :

PlainText **Possible Answers :**

Sub-Section Number :	9
Sub-Section Id :	64065395163
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 99 Question Id : 640653668536 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Short Answer Question

Consider a directed graph G with 65 edges. What is the minimum number of vertices in G ?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes Answers

Type : Equal Text Areas :

PlainText **Possible Answers :**

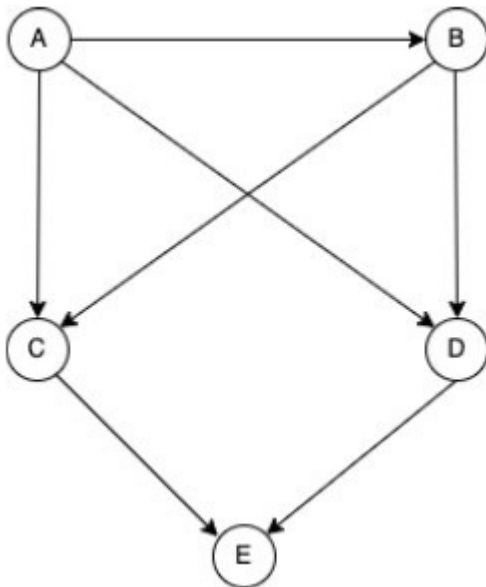
Question Number : 100 Question Id : 640653668540 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Short Answer Question

Consider the following Directed Acyclic Graph(DAG):



The number of possible topological order(s) for the given graph is_____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

AppDev1

Section Id :	64065344901
Section Number :	7
Section type :	Online