Options :

6406532866888. ✖

Table 1: **Employee** $(Emp\_ID, Associate\_Name)$
Table 2: **Projects** $(Project\_ID, Project\_Name)$
Table 3: **Departments** $(Department\_ID, Department\_Name, Salary)$
Table 4: **Salary** $(Department\_ID, Emp\_ID)$

6406532866889. ✖

Table 1: **Employee** $(Emp\_ID, Associate\_Name)$
Table 2: **Projects** $(Project\_ID, Project\_Name)$
Table 3: **Departments** $(Department\_ID, Department\_Name, Project\_Name)$
Table 4: **Salary** $(Department\_ID, Salary)$

6406532866890. ✖

Table 1: **Employee** $(Emp\_ID, Associate\_Name, Project\_ID)$
Table 2: **Projects** $(Project\_ID, Project\_Name)$
Table 3: **Departments** $(Department\_ID, Department\_Name, Project\_Name)$
Table 4: **Salary** $(Department\_ID, Emp\_ID, Salary)$

6406532866891. ✔

Table 1: **Employee** $(Emp\_ID, Associate\_Name)$
Table 2: **Projects** $(Project\_ID, Project\_Name)$
Table 3: **Departments** $(Department\_ID, Department\_Name, Project\_ID)$
Table 4: **Salary** $(Department\_ID, Emp\_ID, Salary)$

PDSA

Section Id :	64065360924
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	17
Number of Questions to be attempted :	17
Section Marks :	50
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes

Maximum Instruction Time : 0
Sub-Section Number : 1
Sub-Section Id : 640653126828
Question Shuffling Allowed : No

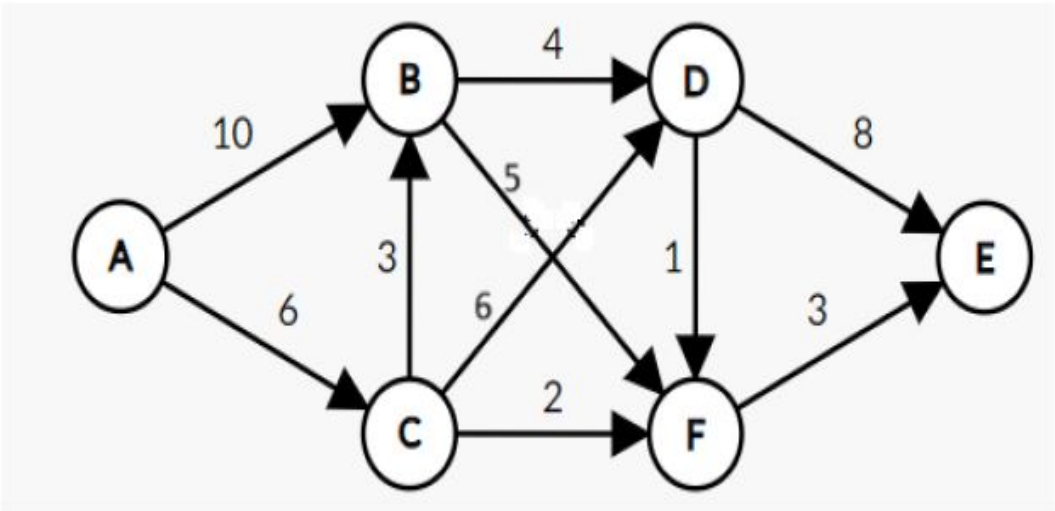
Question Number : 16 Question Id : 640653852340 Question Type : MCQ
Correct Marks : 0
Question Label : Multiple Choice Question
THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : PROGRAMMING, DATA STRUCTURES AND ALGORITHMS USING PYTHON (COMPUTER BASED EXAM)"

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 :
6406532866892. ✔ YES
6406532866893. ✖ NO

Sub-Section Number : 2
Sub-Section Id : 640653126829
Question Shuffling Allowed : Yes

Question Number : 17 Question Id : 640653852341 Question Type : MCQ
Correct Marks : 4
Question Label : Multiple Choice Question
Consider the following graph



If the **Dijkstra** algorithm is used with **A** as the source vertex, then what is the order in which all other vertices are visited?

Options :
6406532866894. ✔ A, C, F, B, E, D

6406532866895. ✖ A, C, F, B, D, E

6406532866896. ✖ A, C, B, F, E, D

6406532866897. ✖ A, C, B, F, D, E

Question Number : 18 Question Id : 640653852356 Question Type : MCQ

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the following recurrences and choose the correct option.

1. $T_1(n) = 3T_1(n/3) + O(n)$
2. $T_2(n) = 4T_2(n/2) + O(n)$

Consider base case:- $T_1(1) = T_2(1) = 1$

Options :

6406532866947. ✖ $T_1 = O(n)$ and $T_2 = O(n^2)$

6406532866948. ✔ $T_1 = O(n\ log\ n)$ and $T_2 = O(n^2)$

6406532866949. ✖ $T_1 = O(n)$ and $T_2 = O(n\ log\ n)$

6406532866950. ✖ $T_1 = O(n^2)$ and $T_2 = O(n^2)$

Sub-Section Number : 3

Sub-Section Id : 640653126830

Question Shuffling Allowed : Yes

Question Number : 19 Question Id : 640653852342 Question Type : MCQ

Correct Marks : 3

Question Label : Multiple Choice Question

Consider a directed graph **G** with equal edge weights. Which of the following algorithms is **most efficient** to compute the shortest distance between every pair of nodes in **G**?

Options :

6406532866898. ✔ Run BFS once on every node

6406532866899. ✖ Run Dijkstra's algorithm once on every node

6406532866900. ✖ Run Bellman Ford's algorithm once on every node

6406532866901. ✖ Run Floyd-Warshall algorithm

Question Number : 20 Question Id : 640653852344 Question Type : MCQ

Correct Marks : 3

Question Label : Multiple Choice Question

Consider an undirected connected graph G with V vertices, where all edge costs are distinct.
Which of the following statement(s) is/are **true**?

1. Let V be partitioned into two non-empty sets X and Y. Let $e = (s, t)$ be the minimum cost edge, with s belonging to X and t belonging to Y. Then edge e must definitely belong to the minimum cost spanning tree of G.
2. Let C be any cycle in G, and let edge $e = (u, v)$ be the most expensive edge belonging to C. Then edge e does not belong to the minimum spanning tree of G.

Options :

6406532866903. ✖ Only 1

6406532866904. ✖ Only 2

6406532866905. ✔ Both 1 and 2

6406532866906. ✖ Neither 1 nor 2

Question Number : 21 Question Id : 640653852346 Question Type : MCQ
Correct Marks : 3

Question Label : Multiple Choice Question

If we perform the following operations in the given order on the **min-heap** `[1, 7, 13, 11, 9, 16, 21, 26, 19]` then the resulting min-heap would be__.

```
1 delete_min()
2 insert(6)
```

Options :

6406532866908. ✔ [6, 7, 13, 9, 19, 16, 21, 26, 11]

6406532866909. ✖ [6, 7, 13, 9, 19, 16, 21, 11, 26]

6406532866910. ✖ [6, 7, 13, 9, 19, 21, 16, 26, 11]

6406532866911. ✖ [6, 7, 13, 9, 19, 21, 16, 11, 26]

Question Number : 22 Question Id : 640653852348 Question Type : MCQ
Correct Marks : 3

Question Label : Multiple Choice Question

Which one of the following is a possible sequence of elements in root-to-leaf paths in a top-down fashion in a binary search tree?

Options :

6406532866916. ✖ 50, 10, 36, 40, 31, 46

6406532866917. ✖ 50, 90, 75, 88, 62, 68

6406532866918. ✖ 45, 50, 49, 48, 44, 47

6406532866919. ✔ 45, 50, 46, 49, 47, 48

Question Number : 23 Question Id : 640653852349 Question Type : MCQ

Correct Marks : 3

Question Label : Multiple Choice Question

While inserting the elements 45, 75, 15, 55, 5, 40, 62, 25, and 85 in an empty binary search tree in the sequence shown, the elements at maximum depth from root are_____.

Options :

6406532866920. ✖ 40, 85

6406532866921. ✖ 25, 40

6406532866922. ✖ 62, 85

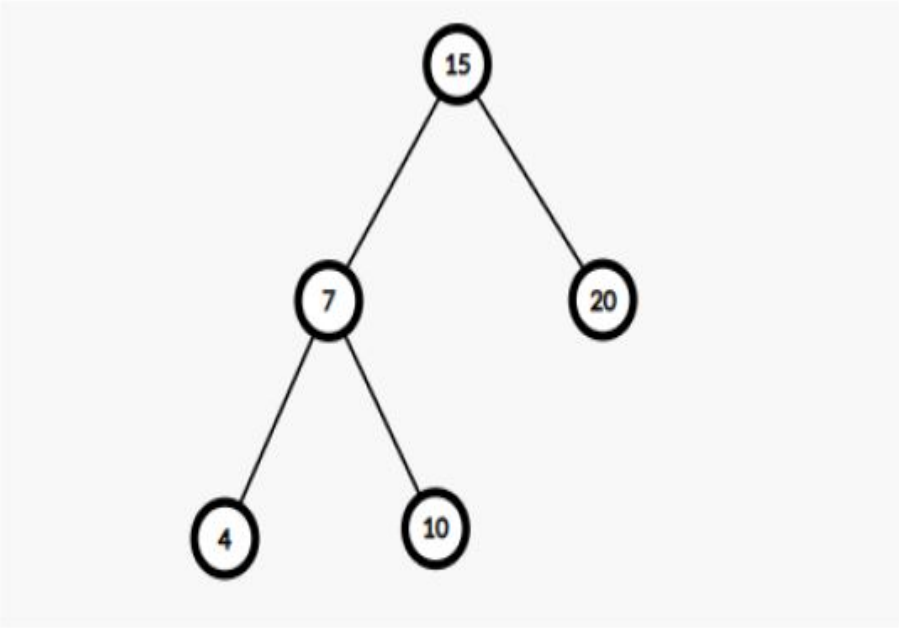
6406532866923. ✔ 25, 62

Question Number : 24 Question Id : 640653852350 Question Type : MCQ

Correct Marks : 3

Question Label : Multiple Choice Question

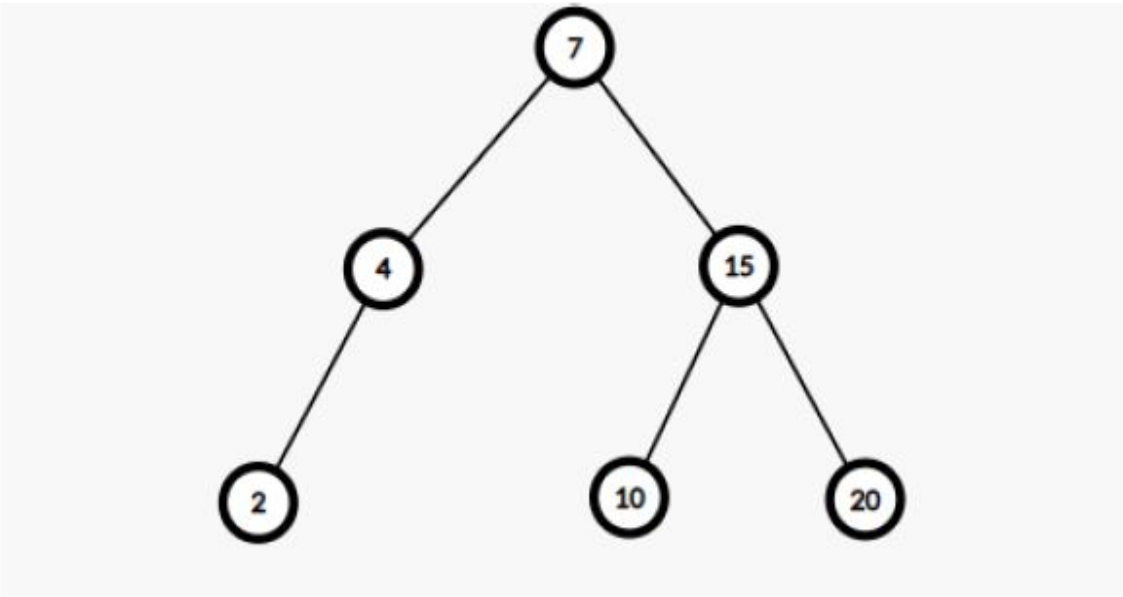
Consider the following AVL Tree.

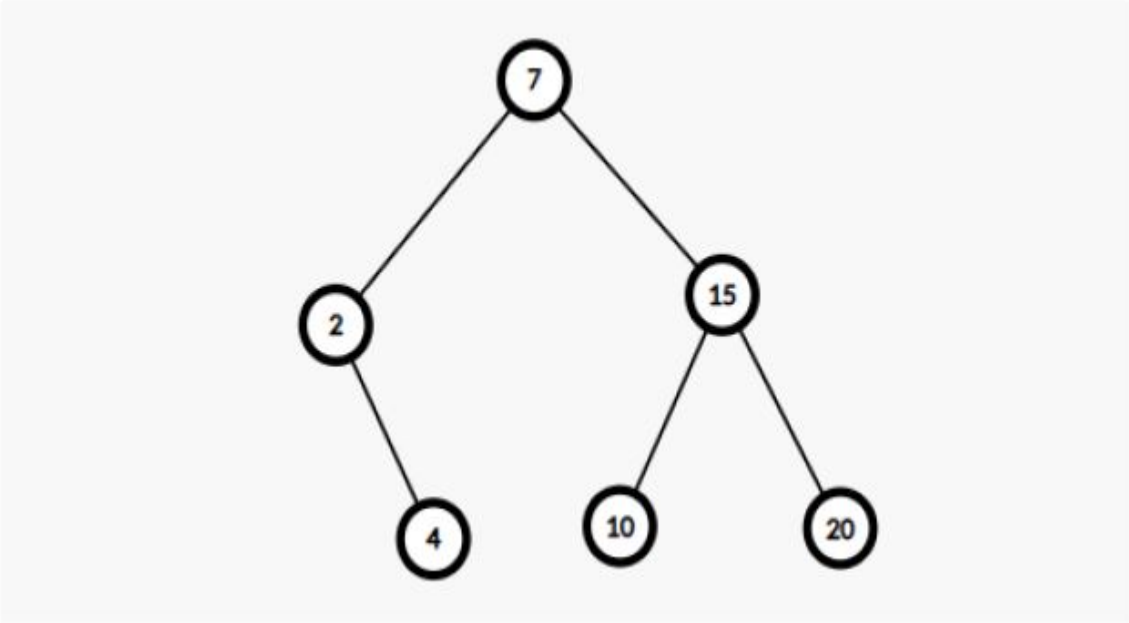


Which of the following is the resultant AVL tree after inserting a new element 2 in the given AVL tree?

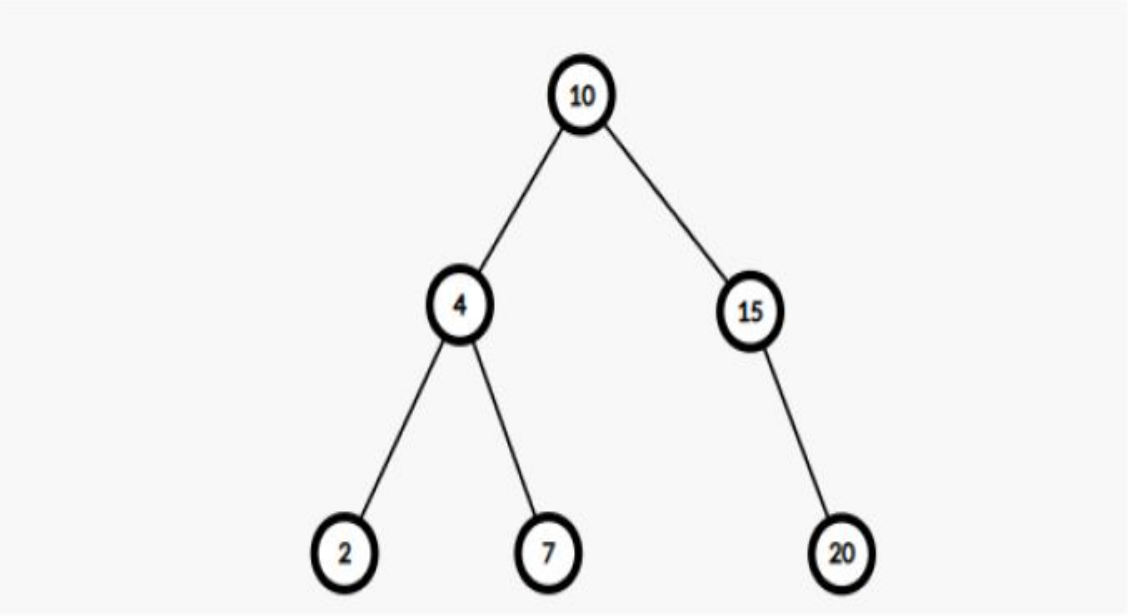
Options :

6406532866924. ✔



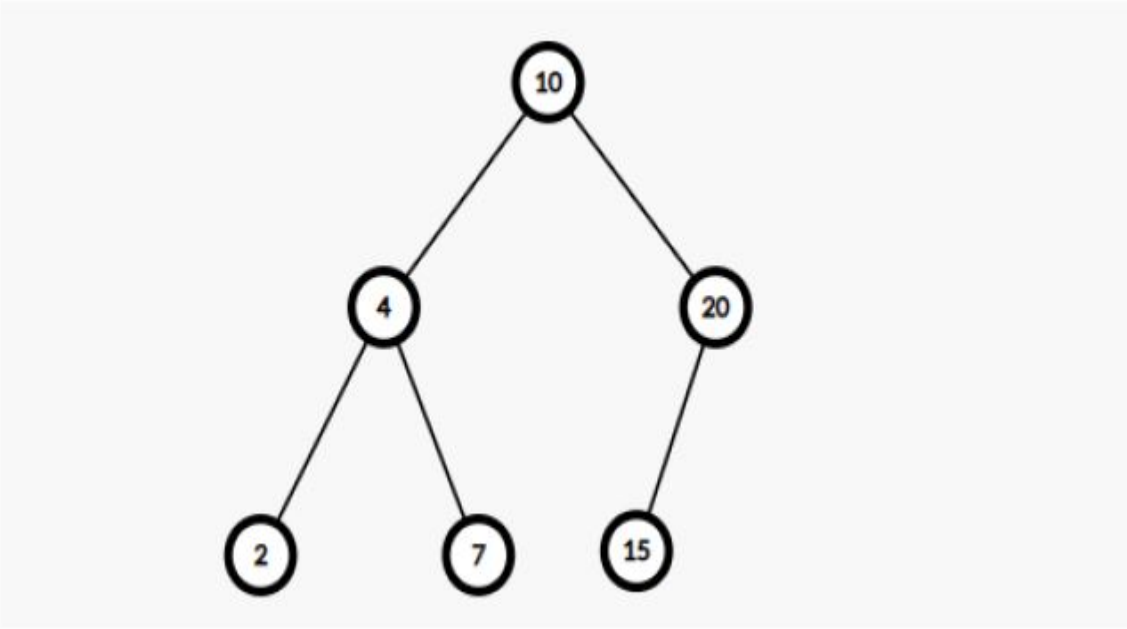


6406532866925. ✖



6406532866926. ✖

6406532866927. ✖



Question Number : 25 Question Id : 640653852352 Question Type : MCQ Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following activities $A_1, A_2, .. A_6$.

Task	A_1	A_2	A_3	A_4	A_5	A_6
Activity Duration(T)	4	2	1	4	3	2
Deadline(D)	6	7	8	12	14	5

We can execute one activity at a time. Each activity A_i has activity duration T_i which represents the time required to complete and a deadline D_i. Consider the initial start time 0 to start the first activity.

The lateness of each job i is defined as follows:

$$L(i) = \left\{ \begin{array}{cc} Finish\ Time(Fi) - Deadline(Di) & if\ \ Finish\ Time(Fi) > Deadline(Di) \\ 0 & else \end{array} \right\}$$

Suppose M_L is the maximum lateness of all activities lateness:-

$$M_L = Max(L_1, L_2 \ldots L_n)$$

What will be minimum possible value of M_L?

Options :

6406532866933. ✖ 4

6406532866934. ✖ 3

6406532866935. ✔ 2

6406532866936. ✖ 1

Question Number : 26 Question Id : 640653852355 Question Type : MCQ
Correct Marks : 3
Question Label : Multiple Choice Question

Which of the following is the correct recurrence relation for the **Quick Select** algorithm to find the k^{th} smallest element in a list with `n` distinct elements, where the `Median of Median(MoM)` algorithm is used to find the median element?

Options :

6406532866943. ✖ $T(n) = T(n-1) + O(n)$

6406532866944. ✔ $T(n) = T(n/2) + O(n)$

6406532866945. ✖ $T(n) = 2T(n/2) + O(n)$

6406532866946. ✖ $T(n) = T(n/2) + O(1)$

Sub-Section Number : 4
Sub-Section Id : 640653126831
Question Shuffling Allowed : Yes

Question Number : 27 Question Id : 640653852343 Question Type : SA
Correct Marks : 3
Question Label : Short Answer Question

Let *G* be a complete undirected graph with 5 vertices and 10 edges with weights of 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10. The maximum possible weight that a minimum weight spanning tree of *G* can have is _____.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
14

Question Number : 28 Question Id : 640653852345 Question Type : SA
Correct Marks : 3
Question Label : Short Answer Question

What is the minimum number of elements possible in a **binary heap** with a height of `9`?
Consider the height of the empty binary heap is `0`.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
256

Question Number : 29 Question Id : 640653852354 Question Type : SA
Correct Marks : 3
Question Label : Short Answer Question

For an integer list `L` of length `n` which represents a permutation of numbers from `1` to `n`, the **number of inversions** is the number of the different pairs `(i, j)` where:

- `0 <= i < j < n`
- `L[i] > L[j]`

Consider the following list:

```
L = [7, 2, 5, 6, 1, 3, 4, 8]
```

The total number of inversions for the given list `L` is _____

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
13

Sub-Section Number : 5
Sub-Section Id : 640653126832
Question Shuffling Allowed : Yes

Question Number : 30 Question Id : 640653852347 Question Type : MSQ
Correct Marks : 3 Max. Selectable Options : 0
Question Label : Multiple Select Question
Which of the following statements is/are **true** for **Heap sort**?
Options :

6406532866912. ✔ The complexity of Heap sort is $O(n\ log\ n)$ irrespective of the sequence of elements.

6406532866913. ✖ The complexity of Heap sort is $O(n^2)$ in worst case and $O(n\ log\ n)$ in best case.

6406532866914. ✔ Heap Sort is an in-place sorting algorithm.

6406532866915. ✖ Heap Sort is not a stable sorting algorithm because it does not maintain the relative order of equal elements.

Question Number : 31 Question Id : 640653852351 Question Type : MSQ

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

For a set of symbols with probabilities of occurrence, which of the following statement(s) is/are **true** about the **Huffman algorithm**?

Options :

6406532866928. ✖ Symbols with lower probabilities value are generally closer to the root of the Huffman tree.

6406532866929. ✔ The Huffman tree is always a strict binary tree (each node has two children, except leaf nodes).

6406532866930. ✔ It generates prefix codes (no code is a prefix of another).

6406532866931. ✔ If probability values are distinct, then two symbols with the lowest probabilities always have the same code length.

6406532866932. ✖ There is always at least one symbol with a code of length one.

Question Number : 32 Question Id : 640653852353 Question Type : MSQ

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Let `coins` be a list of `k` coin denominations (positive integers) that are available in as much quantity as you want. You want to pay a sum of Rupees `x` using as few coins as possible from the coin denominations given in the list `coins`.

Consider the following greedy strategy:

Sort the coin denominations in descending order, and then repeatedly choose the largest coin denomination that is less than or equal to the remaining amount `x`. We subtract the chosen coin value from `x` and continue this process until `x` becomes zero.

Which of the following is/are counter-example(s) that prove that a given greedy strategy is not optimum?

Options :

6406532866937. ✔ coins=[1, 2, 8, 9, 5, 10] and x = 13

6406532866938. ✖ coins=[10, 1, 2, 5] and x = 25

6406532866939. ✖ coins=[6, 1, 5, 7] and x = 15

6406532866940. ✔ coins = [1, 6, 7, 10, 15] and x = 35

6406532866941. ✖ coins = [1, 2, 5, 10, 25] and x = 40

AppDev1

Section Id :	64065360925
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	15
Number of Questions to be attempted :	15
Section Marks :	50
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653126833
Question Shuffling Allowed :	No

Question Number : 33 Question Id : 640653852357 Question Type : MCQ

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : MODERN APPLICATION DEVELOPMENT I (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 :

6406532866951. ✔ YES

6406532866952. ✖ NO

Sub-Section Number :	2
Sub-Section Id :	640653126834
Question Shuffling Allowed :	Yes

Question Number : 34 Question Id : 640653852358 Question Type : MCQ