

CS & IT ENGINEERING

Algorithms

Greedy Method

DPP

(Discussion Notes)



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TOPICS TO BE COVERED

01 Question

02 Discussion

Q.1



Consider the following statements

~~S₁: Given a weighted directed graph with the distinct weight, the shortest path among any two vertices will be unique.~~

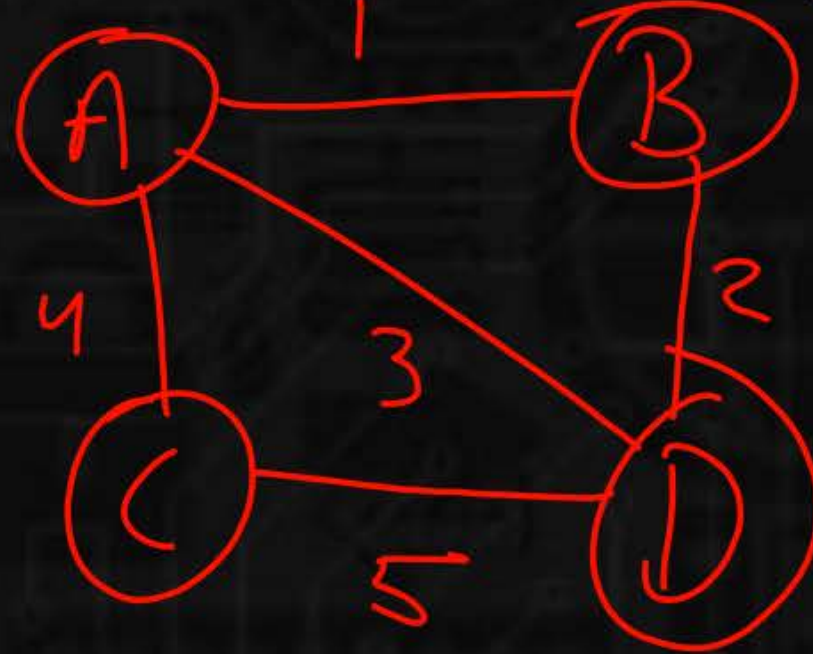
S₂: A minimum spanning tree can contain negative edges.

[MCQ]

Choose the correct statements.

Which of the following statement is/are True?

- A. Only S₁ is true
- ☒ B. Only S₂ is true
- C. Both S₁ and S₂ are true
- D. neither S₁ nor S₂ is true



Q.2

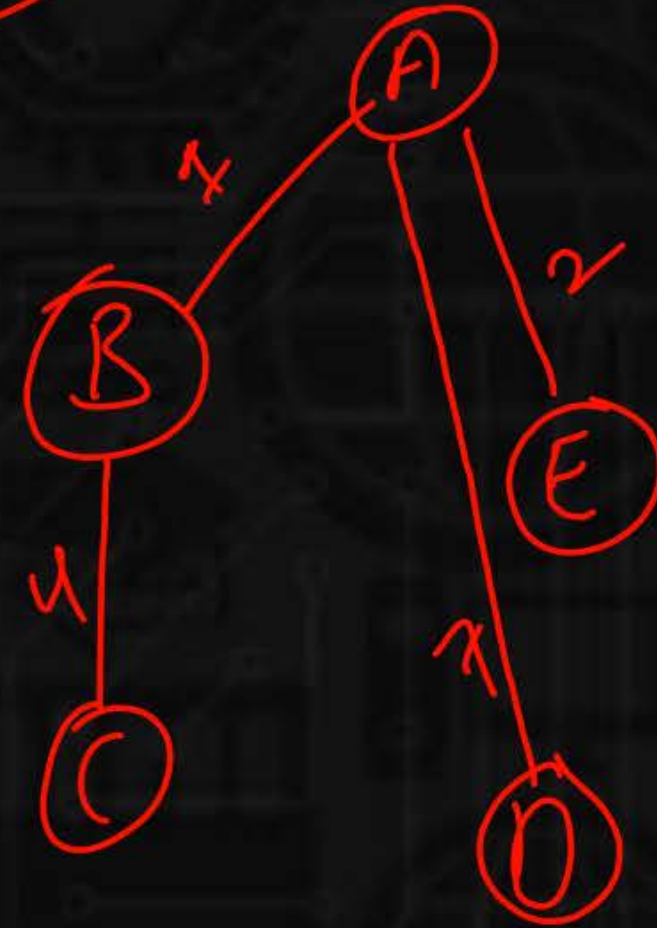
Suppose K_5 is a complete graph with weights being 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10, and P be the value of maximum possible weight of minimum spanning tree of K_5 graph. Then value of P will be _____

[NAT]



MST
 \Rightarrow

$$P = 14$$



Total cost
of MST = 14

Q.3

Consider the following instances of the job for-scheduling problem with deadlines (Note: every Job takes one unit time)



Job	J ₁	J ₂	J ₃	J ₄	J ₅	J ₆	J ₇
Deadline	1	3	4	3	2	1	2
Profit	3	5	20	18	1	6	30

Consider the following instances of the job for-scheduling problem with deadlines (Note: every Job takes one unit time)

what is the maximum profit?

[NAT]

Job-1	Job-2	Job-4	Job-3
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1

2

3

4



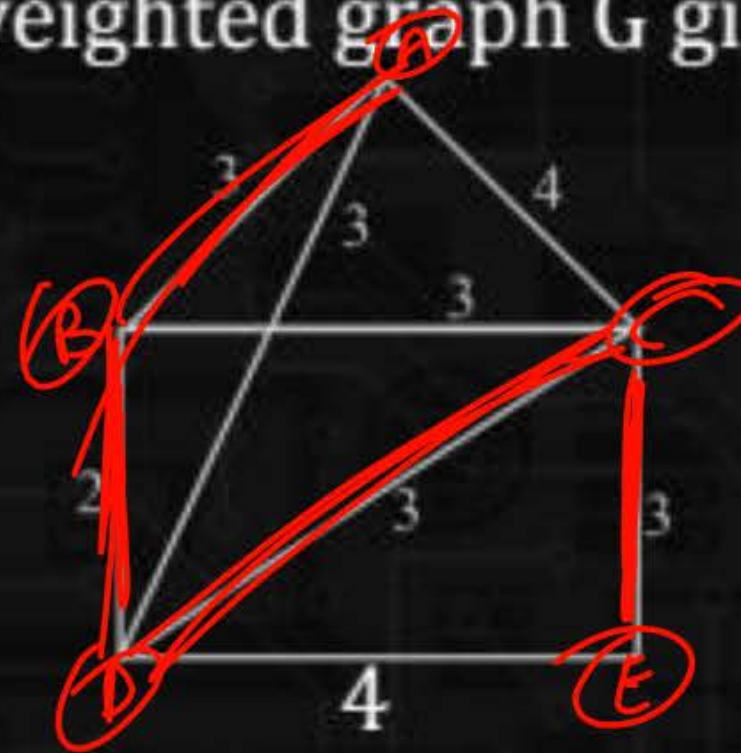
$$\text{Profit} = 20 + 18 + 30 + 6$$

$$= 74$$

Q.4

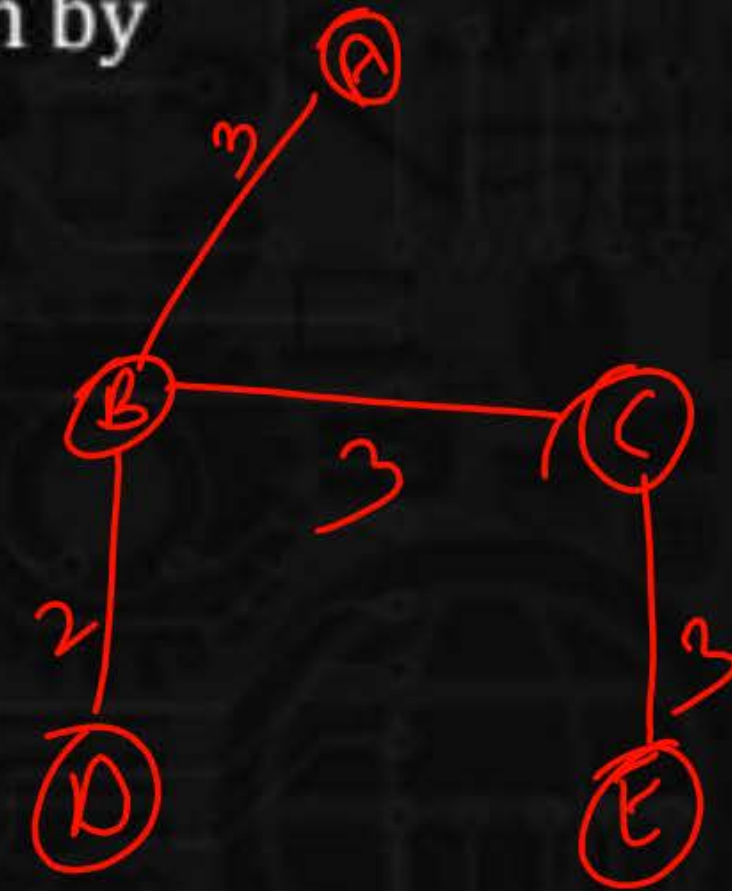
Consider is the weighted graph G given by

[NAT]

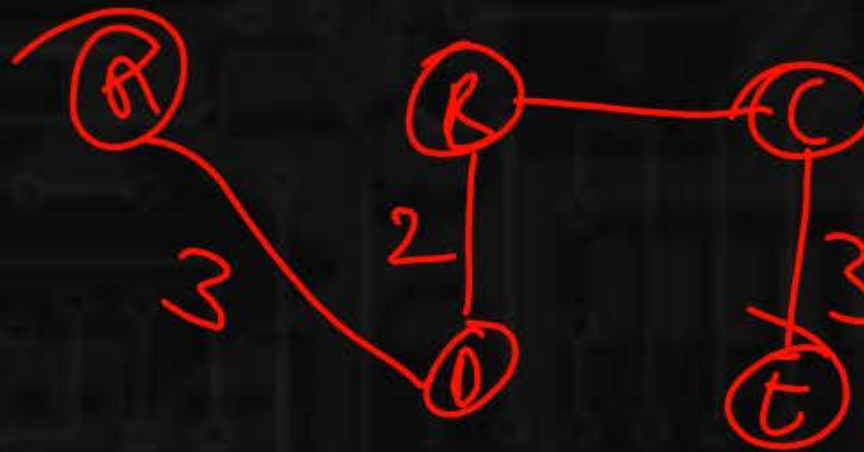


2

How many MST does G Have?



$2 \times 3 + 3 + 3$



Q.5



Let's suppose, we want to merge some sorted files where the number of records in each file is given below. (15, 18, 20, 21, 24, 28, 30, 32, 35, 40, 45, 50) then what is the minimum number of comparisons required to merge the following files? **[MCQ]**

A. 1200

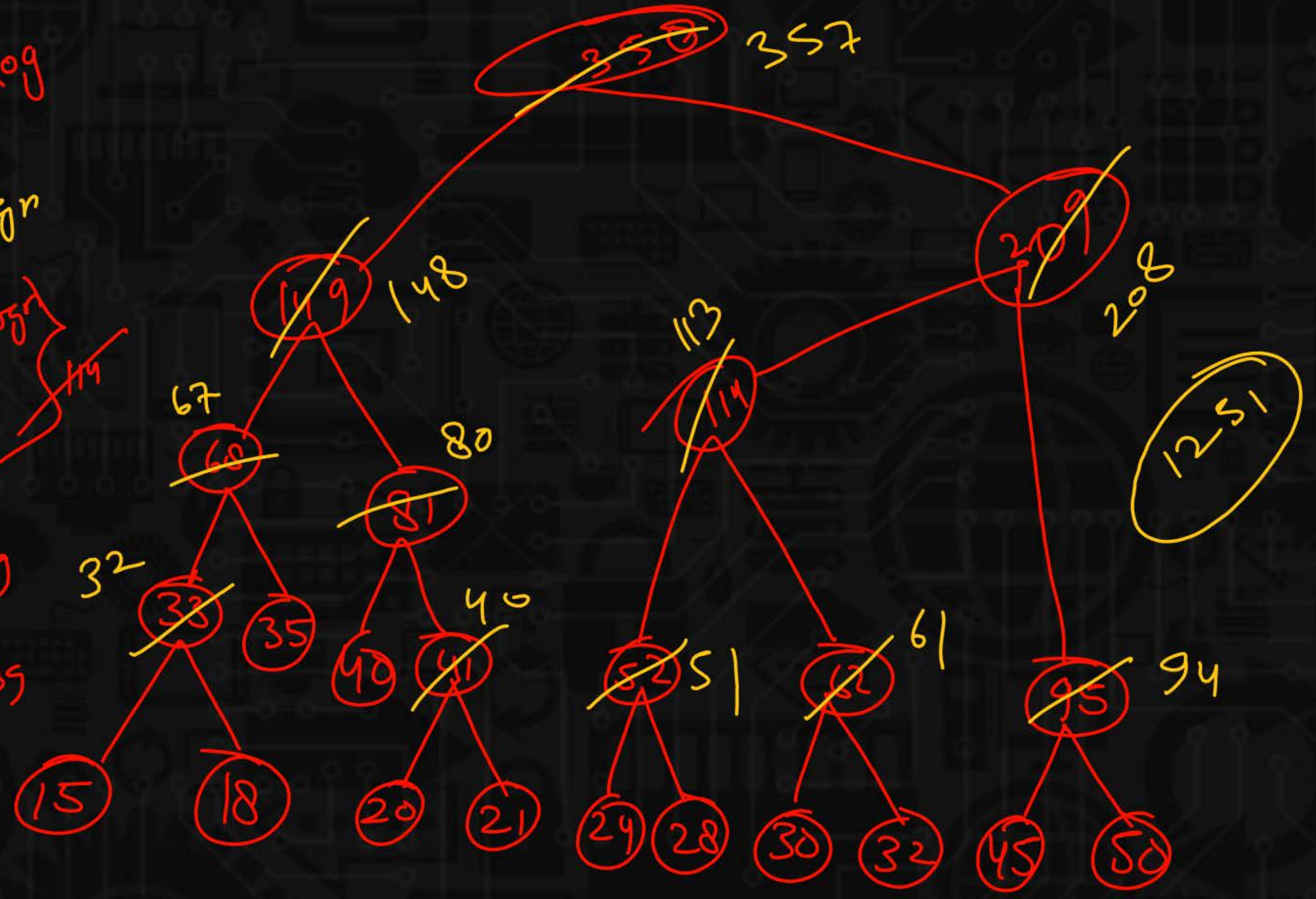
C. 1251

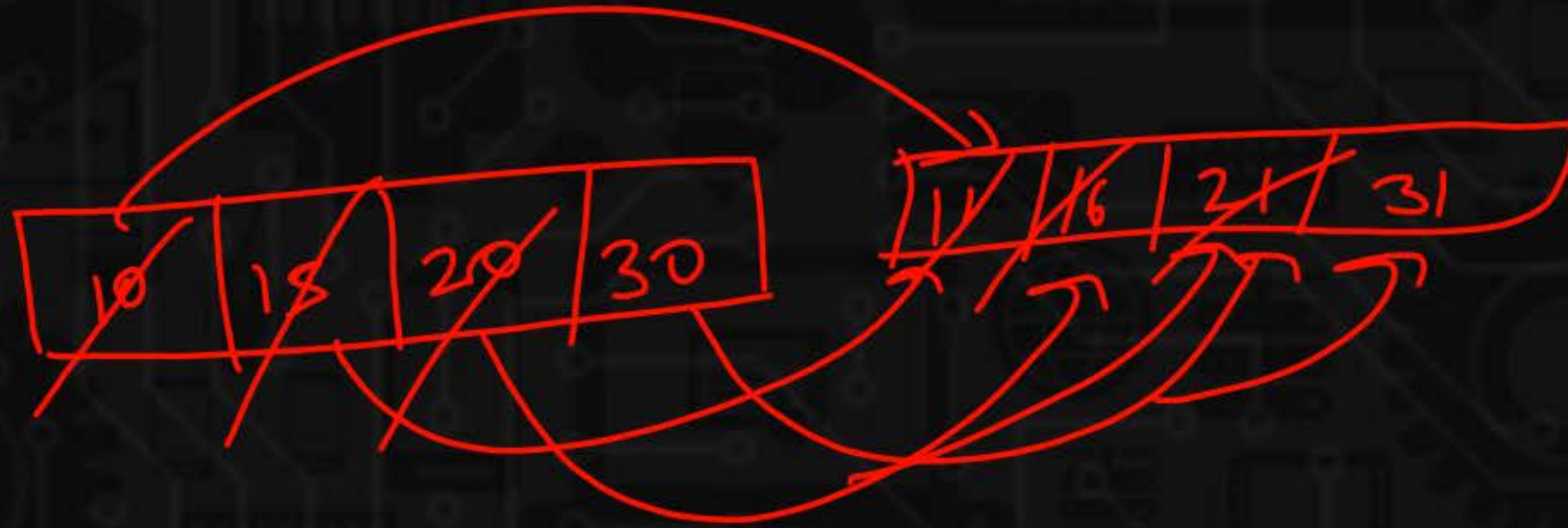
B. 1225

D. 1255

$m+n-1$

~~15~~ $\log n$ \log
~~18~~ \log
~~20~~ \log
~~21~~ \log
~~24~~ \log
~~28~~ \log
~~30~~ \log
~~32~~ \log
~~35~~ \log
~~40~~ \log
~~45~~ \log
~~50~~ \log





$$(10, 11) = 10$$

$$(15, 16) = 15$$

$$(20, 21) = 20$$

$$(30, 31) = 30$$

$$(10, 11) = 11$$

$$(15, 16) = 16$$

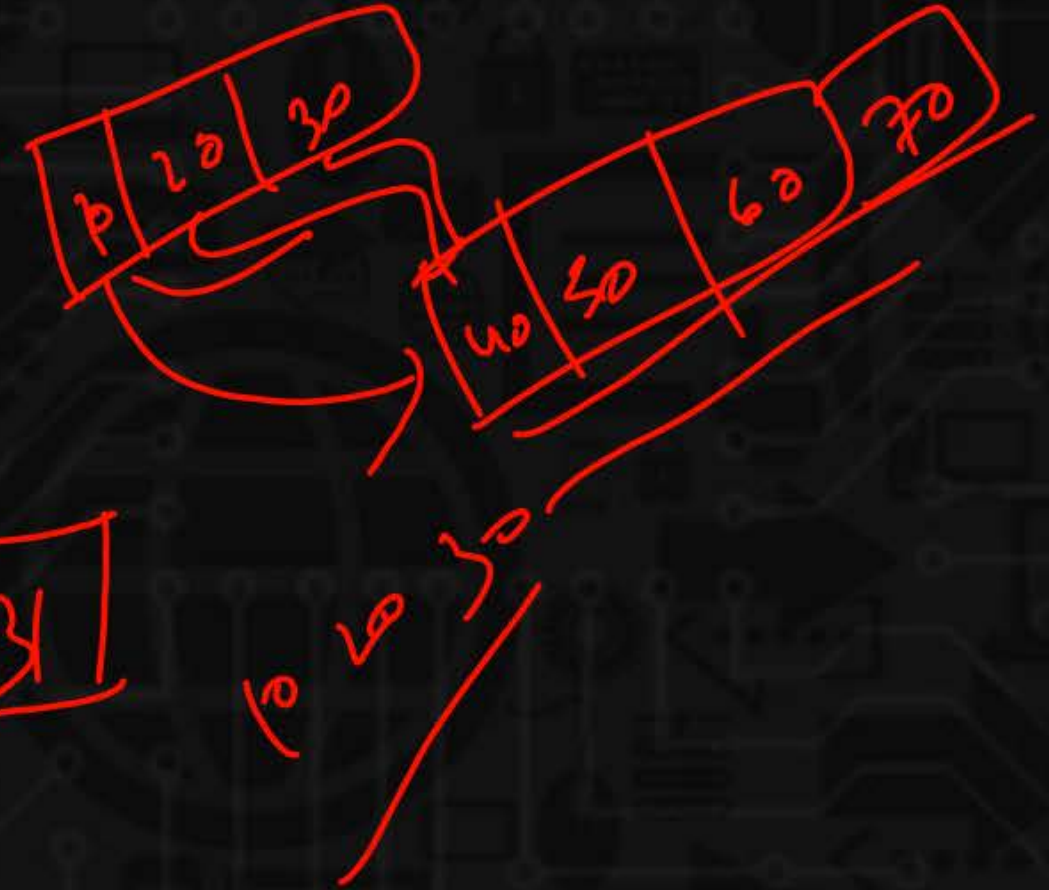
$$(20, 21) = 21$$

$$(30, 31) = 31$$



7

$$4 + 4 - 1 = 7$$



Q.6

Greedy algorithm fails to give an optimal solution to which of the following problems? **[MCQ]**



- (p) Travelling salesman problem
- (q) Job scheduling with deadlines and penalty
- (r) Shortest path algorithm
- (s) optimal merge pattern
- (t) Huffman encoding

~~A.~~

p, q, r

B.

r, s, t

C.

p, q, r, s, t

D.

All of the above

