CS & IT ENGINEERING

Data Structure

Tree

DPP-06 (Discussion Notes)

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01 Question

02 Discussion

Q.1 The maximum number of comparisons to find the maximum element in a min heap of 1024 elements is 511 [NAT]

leaf nodes

n elements $\quad \left\lceil \frac{n}{2} \right\rceil$

$\left\lceil \frac{3}{2} \right\rceil = \lceil 1.5 \rceil = 2$

$\left\lceil \frac{4}{2} \right\rceil = 2$

$n=6 \quad \left\lceil \frac{6}{2} \right\rceil = 3$

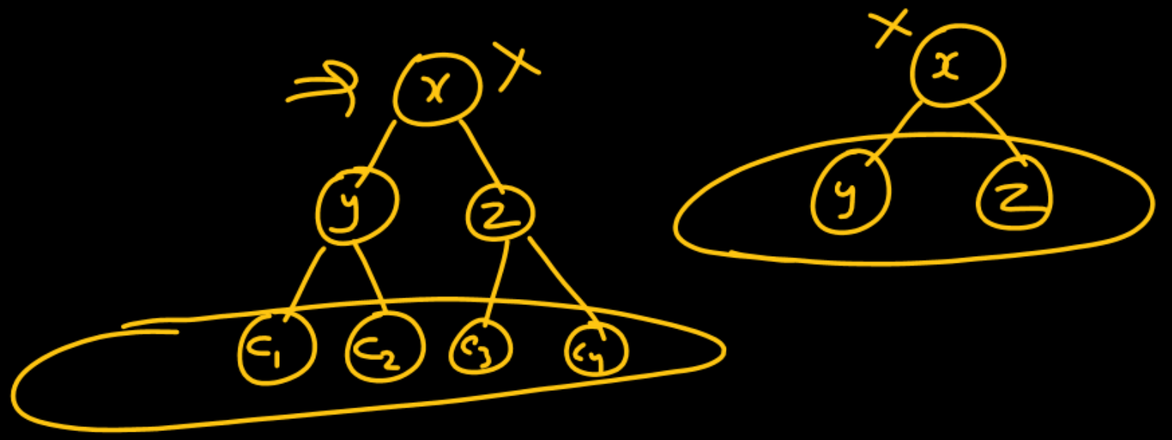
$\left\lceil \frac{7}{2} \right\rceil = \lceil 3.5 \rceil = 4$

1024

$$\#\text{leaf} = \left\lceil \frac{1024}{2} \right\rceil$$

$$= 512$$

element



$c_1, c_2 > y$

$c_3\ c_4 > z$

$y, z \Rightarrow$ can not be largest

9

512 − 1

= 511

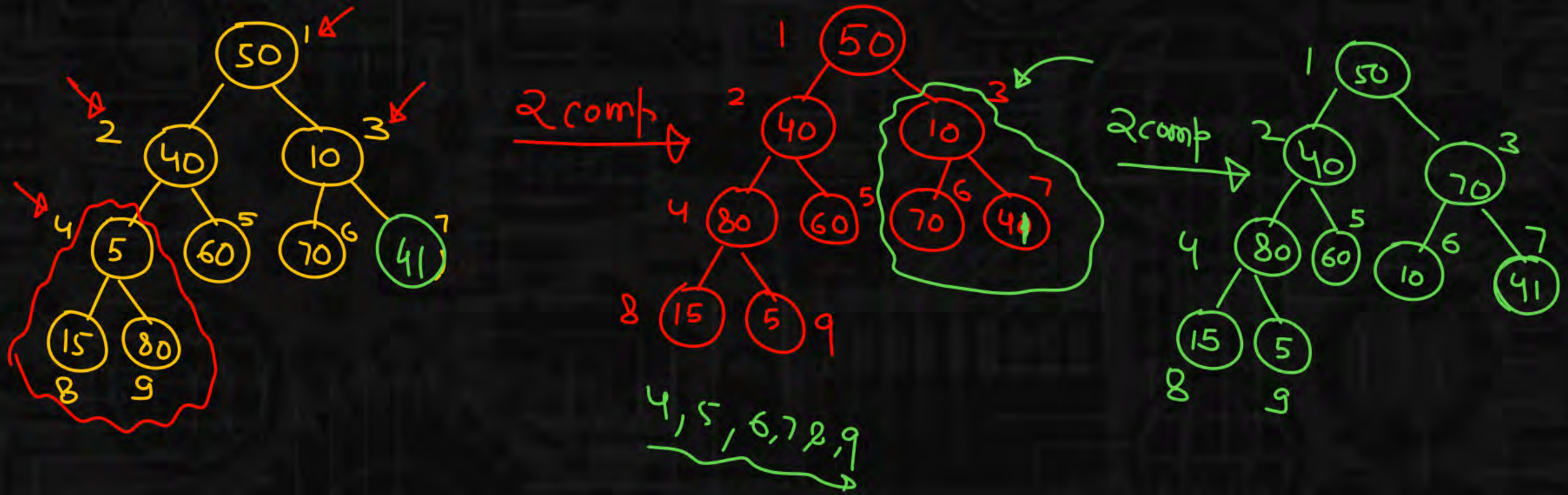
Q.2

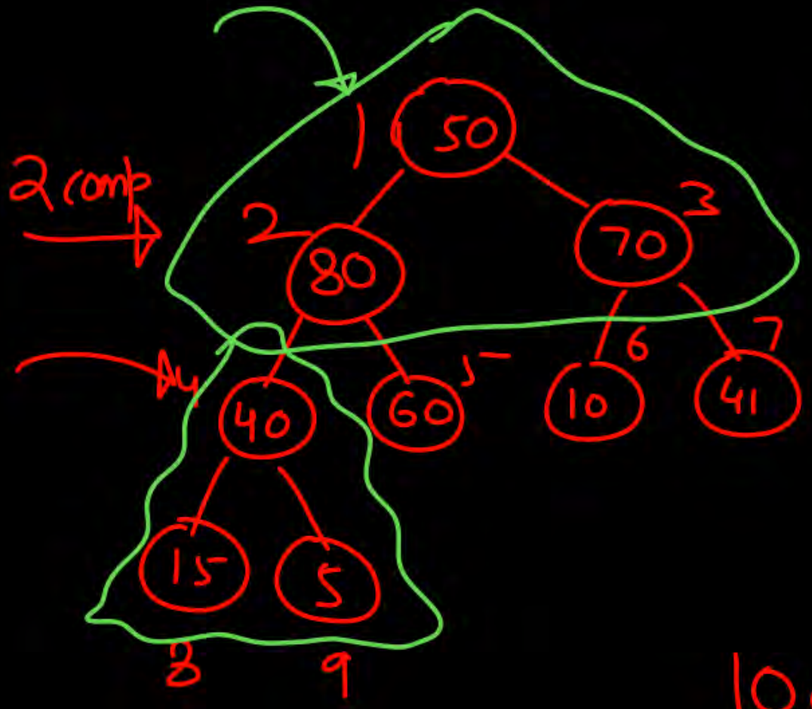
[NAT]

Consider the array given below:

50	40	10	5	60	70	40	15	80

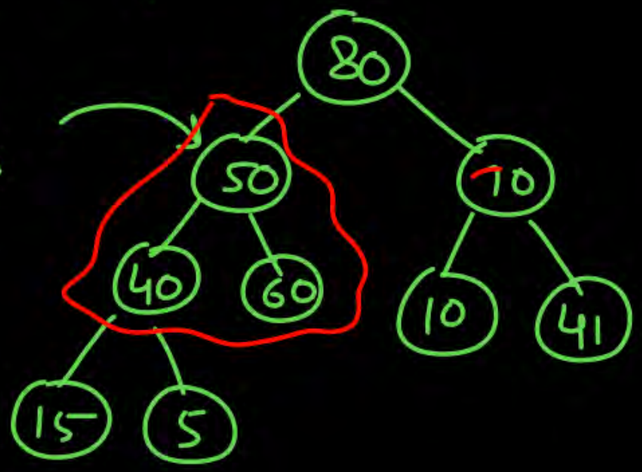
The minimum number of comparisons required to convert the above array into max heap is 10





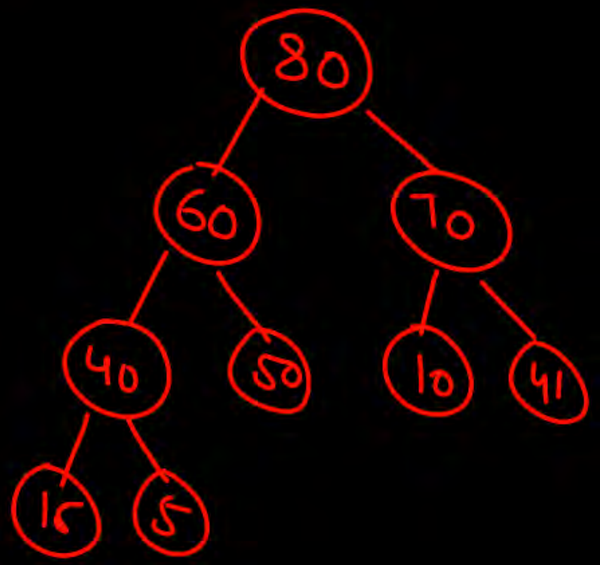
element comp.

2 comp



10 comp.

2 comp



Q.3 Consider the array given below: **[NAT]**

50	40	10	5	60	70	4	15		80

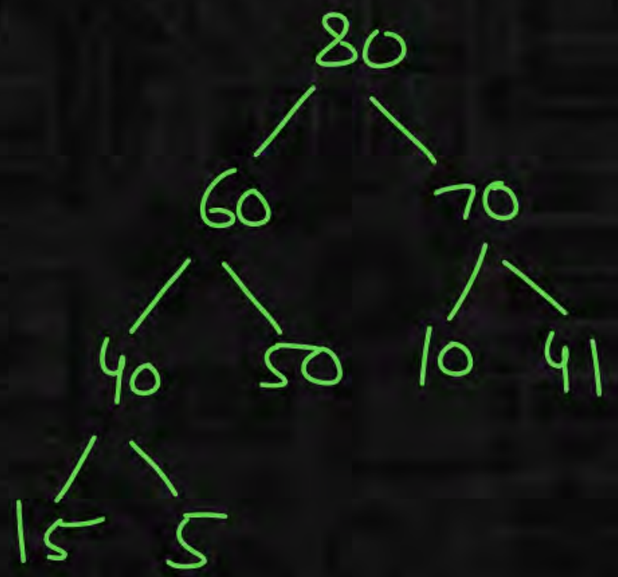
The minimum number of swap operations required to convert the above array into max-heap is _____.

Q.3 [NAT]

Consider the array given below:

50	40	10	5	60	70	41	15		80

The minimum number of swap operations required to convert the above array into max-heap is 5.



Q.4

[MCQ]

Consider the array given below:

50	40	10	5	60	70	4(	15	80

The resultant max-heap using bottom-up approach of build heap is-

A. 80, 60, 70, 40, 50, 10, 4(, 15, 5

B. 80, 70, 60, 50, 40, 10, 4(, 5, 15

C. 80, 70, 60, 50, 40, 4(, 15, 10, 5

D. None of the above

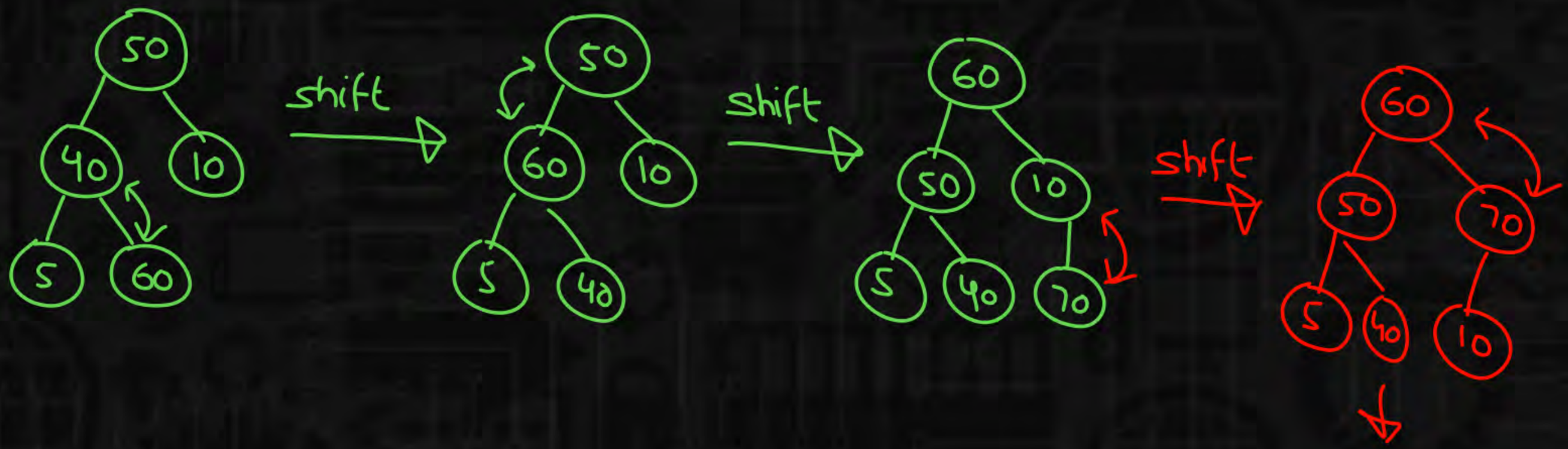
A

Q.5 [NAT]

Consider a sequence of elements are inserted into a max-heap one after another as-

50, 40, 10, 5, 60, 70, 4(), 15, 80

The number of shift operations required in building the heap one element at a time is _____.



Q.5 [NAT]

Consider a sequence of elements are inserted into a max-heap one after another as-

50, 40, 10, 5, 60, 70, 41, 15, 80

The number of shift operations required in building the heap one element at a time is 8.

Q.6

[MCQ]

Consider a sequence of elements are inserted into a max-heap one after another as-

50, 40, 10, 5, 60, 70, 4(, 15, 80

The resultant max-heap using bottom-up approach of build heap is-

A. 80, 60, 70, 40, 50, 10, 4(, 15, 5

B. 80, 70, 60, 50, 40, 10, 4(, 5, 15

C. 80, 70, 60, 50, 40, 4(, 15, 10, 5

D. None of the above

(B)

Q.7 [MCQ]

Consider the following two statements:

P: The number of comparisons required to find the minimum element in a min heap of n elements is n – 1.

Incorrect

return A[1]

Q: Only one comparison is required to find the minimum element in a max heap of n elements.

Incorrect

$\lceil \frac{n}{2} \rceil - 1$

Which of the following is/are CORRECT?

A. P only

B. Q only

C. Both P and Q

D. Neither P nor Q


THANK YOU GW
SOLDIERS !