

Name - Md. Al Gaddafy
ID - 011191212

Pg-1

Answer-1(a)

$x = 13$, $y = 16$, $z = 29$, $p = 45$, $r = 15$, $t = 50$

∴ Given array to be sorted is:

16	45	29	13	15	50
l		m		h	

16	45	29
l		m / h

13	15	50
l		m / h

16	45	29
l		h

13	15	30
l		h

45	16	29
----	----	----

13	15	30
----	----	----

45	16	29
----	----	----

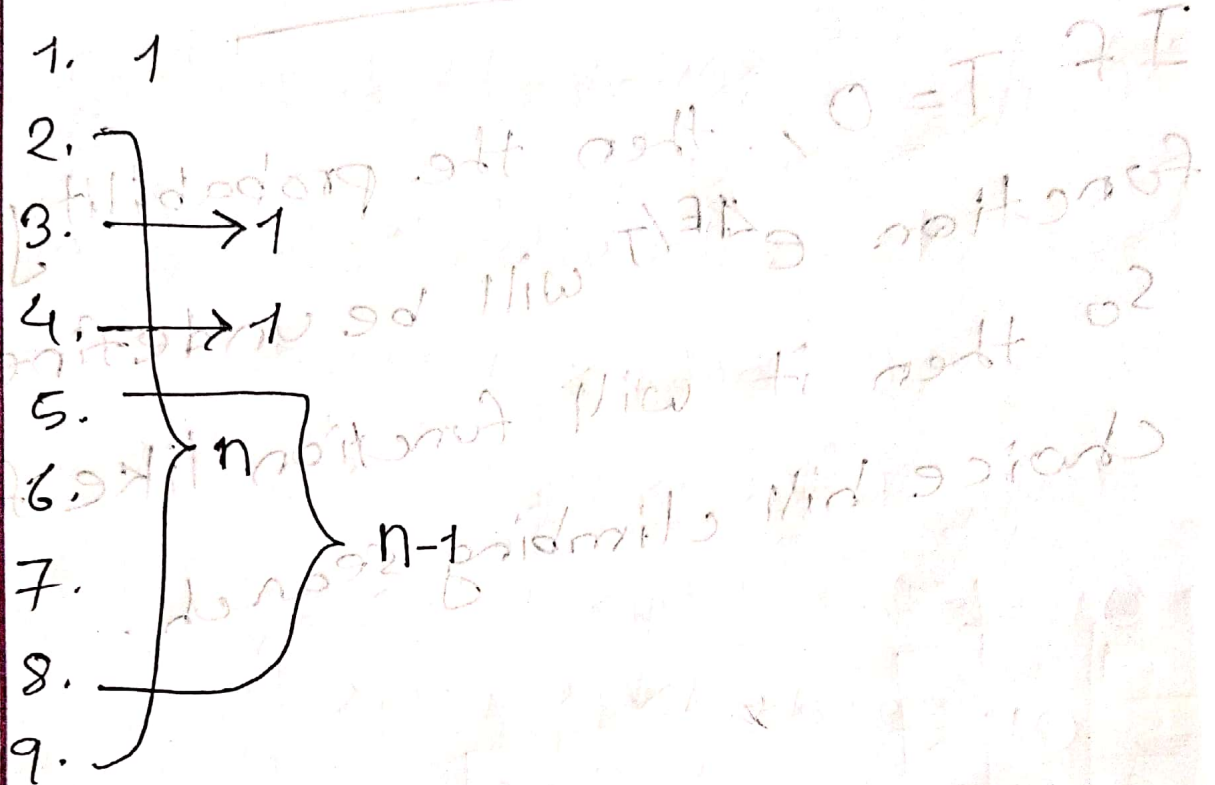
15	13	50
----	----	----

45	29	16
----	----	----

50	15	13
----	----	----

50	45	29	16	15	13
l		m		h	

1. Required sorted array
using descending order merge sort.

Answer-1(b)

∴ Time complexity = ~~$O(1+1+1)$~~

$$= O(1 + n(n-1))$$

$$= O(n^2 - n)$$

$$= O(n^2)$$

(Ans)

Answer-3 (a)

$P=19, q=21, r=40, s=38, t=78$.

- a) $\text{head} \rightarrow \text{next} \rightarrow \text{value} = 21$
- b) $\text{last} \rightarrow \text{prev} \rightarrow \text{value} = 38$
- c) $\text{temp} \rightarrow \text{next} \rightarrow \text{next} \rightarrow \text{next} = \text{null}$
- d) $\text{temp} \rightarrow \text{prev} \rightarrow \text{next} \rightarrow \text{value} = 40$
- e) $\text{last} \rightarrow \text{prev} \rightarrow \text{prev} \rightarrow \text{value} = 40$

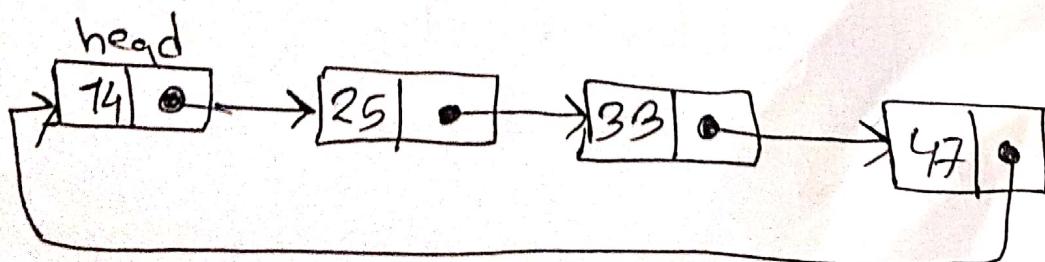
Answer-3 (b)

To make the given ~~link~~ linked list into a Circular linked list, it is required to traverse the whole linked list by a pointer name ~~temp~~ and until $\text{temp} \rightarrow \text{next} \neq \text{null}$. When the last node is found it is required to

Set $\text{temp} \rightarrow \text{next} = \text{head}$ and thus a single list can be made to circular linked list.

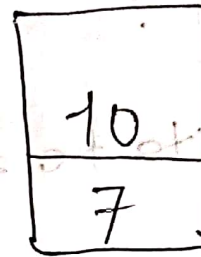
The code will be:

```
Void circular () {  
    Node *temp  
    Node *x  
    x = head  
    temp = head  
    while (tempnext != NULL)  
    {  
        temp → next = temp  
    }  
    temp → next = x  
}
```



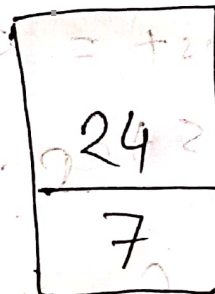
Answer - 4(a)

$$x=3, y=4, z=6$$



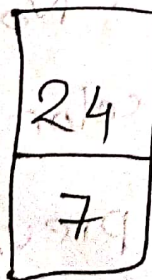
Push($x+y$)
or, Push(7)

Push($y+z$)
or, Push(10)



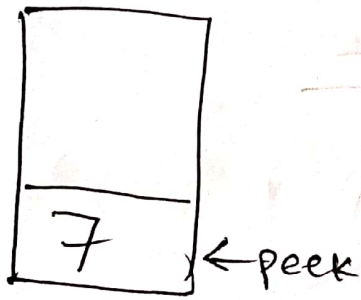
Pop()

Push($y*z$)
or, push(24)

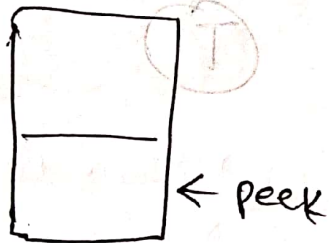


Push($x*y$)
or, Push(12)

This is not possible because the stack is full.



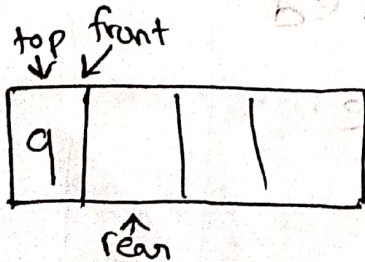
Pop()



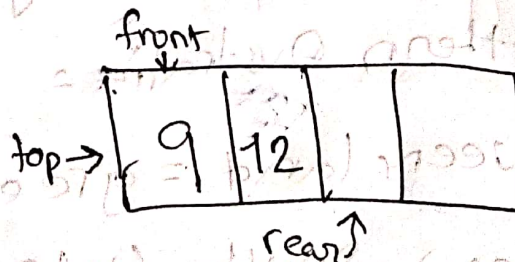
Pop() [Not possible because the stack is empty]

Answer - 4(b)

$$x = 4, y = 5, z = 7$$

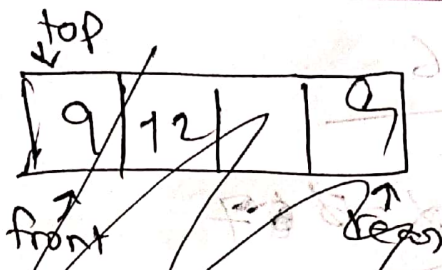


Enqueue(x+y)
or, enqueue(9)

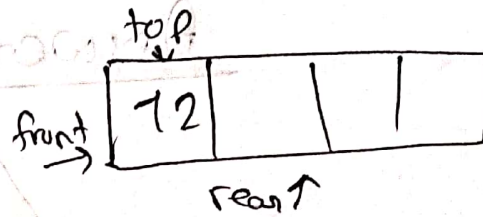


Enqueue(y+z)

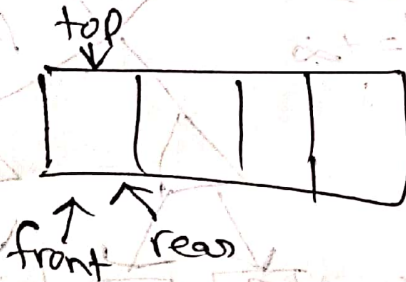
or, enqueue(12)



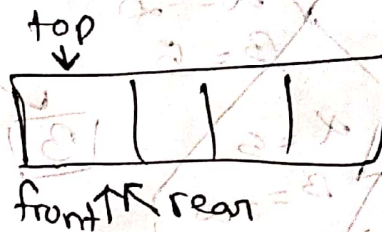
Enqueue



Dequeue()



Dequeue()



Dequeue()

Not possible since
queue is empty.

Answer-4(c)

$$a = 5, b = 6, c = 11, d = 1$$

Given expression:

$$ab + cd / -$$

$$\text{or, } 5 \cdot 6 + 11 / -$$

$$(2 > 0) \text{ and } (2 \leq 2) \text{ or } (2 > 0) \text{ and } (2 \leq 2)$$

6
5

11

calculate, push

$push(S+G) = (11)$

11
11

A hand-drawn diagram of a 3x3 grid. The top row contains the number '1'. The middle row contains the number '11'. The bottom row contains the number '11'. The grid is drawn with thick black lines, and the numbers are written in black ink.

A hand-drawn diagram of a 2x2 grid. Each of the four cells contains the number '11'. The grid is drawn with thick black lines, and the numbers are also written in thick black ink.

pop()

A hand-drawn diagram of a container, possibly a bottle or a can, with a curved bottom and a small circle inside, representing a liquid level or a specific part of the container.

or Push (11)

pop()

Push (11-11)

or, $\text{Push}(0)$

Answer-2 (b)

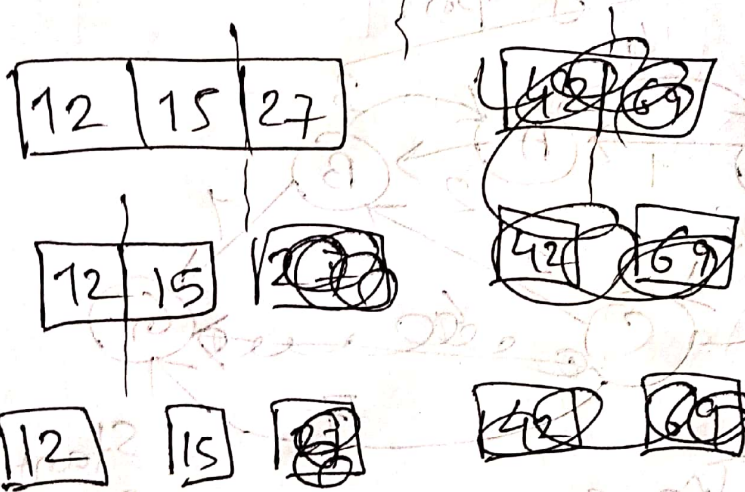
$x = 12, y = 15, z = 27, p = 42,$

$r = 69$

Input Data : $\begin{matrix} x & y & z & p & r \\ 12 & 15 & 27 & 42 & 69 \end{matrix}$

Search key = $x = 12$

12	15	27	42	69
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→ Key found!

So, the binary search algorithm works by dividing repeatedly in half the portion that could contain the item, until it is narrowed down the possible location to just one.

The total number of element comparisons needed in this case is 12,

Answer - 2(c)

$$k = 7$$

$$\therefore f(n) = 7n^2 + 3n - 2$$

Assuming $n > 1$, then

$$\frac{f(n)}{g(n)} = \frac{7n^2 + 3n - 2}{n^2} < \frac{7n^2 + 3n^2 - 2n^2}{n^2} = 8$$

Choosing $c = 8$, note that $3n < 3n^2$ and $-2 < -2n^2$

Thus, $7n^2 + 3n - 2$ is $O(n^2)$ because

$$7n^2 + 3n - 2 \leq 8n^2 \text{ whenever } n > 1.$$

$$\therefore f(n) = O(n^2)$$

Proved