Important for Gate Exam

ESP→ • Data Structure (DSA)
• Design and Algorithm (DAA)
• OS
• COA

1. Consider the following operation along with Enque and Dequeue operations on queues, where k is a global parameter.

```
MultiDequeue(Q)
{
  m=k;
  while (Q is not empty) and (m>0)
  {
    Dequeue(Q);
    m= m-1
  }
}
```

Worst Case Time Complexity - (a) $\Theta(n)$ (c) $\Theta(nk)$
(b) $\Theta(n+k)$ (d) $\Theta(n^2)$

~~For 1 Dequeue operation will be done~~

2. A hash table of length 10 uses open addressing with hash function $h(k) = k \cdot \text{mod} 10$, and linear probing. After inserting 6 values into an empty hash table, the table is as shown below.

0	
1	
2	→ 42
3	→ 23
4	→ 34
5	→ 52
6	→ 46
7	→ 33
8	
9	

Q. which one of the following choices gives a possible order in which ~~of~~ possible order in which the key values could have been inserted in the table?

(A) 46, 42, 34, 52, 23, 33
(B) 34, 42, 23, 52, 33, 46
✓(C) 46, 34, 42, 23, 52, 33
(D) 42, 46, 33, 23, 34, 52

→ $h(k) = k \bmod 10$

$h(2) = 42 \bmod 10$

$= 2$

$h(3) = 423 \bmod 10$

$= 3$

$h(4) = 34 \bmod 10$

$= 4$

$h(5) = 52 \bmod 10$

$= 2$

$h(6) = 46 \bmod 10$

$= 6$

$h(7) = 33 \bmod 10$

$= 3$

2 2 3 3

2 3 3 7 2 6

3 3 7 2 5

Topics to cover-

(*) a) Complexity Analysis [From Code Snippet]

- factors
- infinitness / Finiteness

b) Multidimensional Array.

c) Push and Pop operation

d) Priority queue and double ended queue.

e) Circular linked list, double edge linked list

f) Sorting with complexity analysis

g) Binary Search Tree, Prims and Kruskal Algo.

h) B-tree and B^+ Tree, AVL Tree, Red-Black Tree

i) Hashing with collision methodologies

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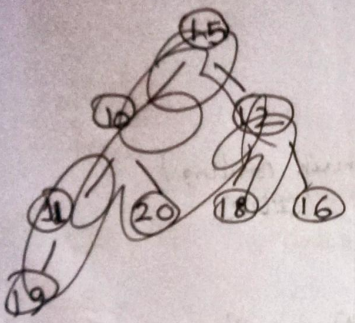
3. Which one of the following hash function on integers will distribute keys most uniformly over 10 buckets numbered 0 to 9 in ranging from 0 to 2020?

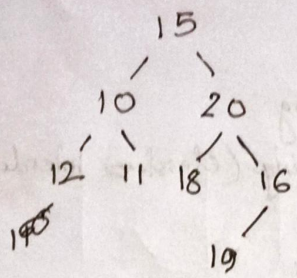
→ h(i)

h(i) = $(11 \cdot i^2) \bmod 10$

4. The pre-order traversal of a binary search tree 15, 10, 12, 11, 20, 18, 16, 19 the following is the post order traversal of tree?

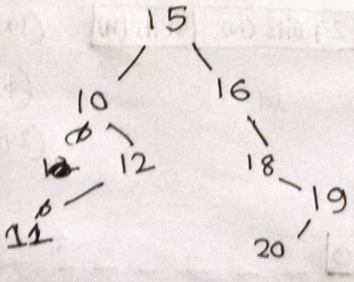
(A) 10, 11, 12, 15, 16, 18, 19, 20
(B) 20, 19, 18, 16, 15, 12, 11, 10
(C) 11, 12, 10, 16, 19, 18, 20, 15
(D) 10, 16, 18, 20, 11, 12, 10, 15





10, 11, 12, 15, 16, 18, 19, 20

↑ root



Right

▶ A program P reads in 500 integers in the range [0, 100], representing the scores of 500 students. It then prints the frequency of each score above 50. What would be the best way for P to store the frequency.

a) An array of 50 numbers
b) An array of 100 numbers.
c) An array of 500 numbers.
d) A dynamically allocated array of 550 numbers.