

Experiment-04

Q. Write a 'C' program to sort data from given array using.

i) insertion sort.

```
#include <stdio.h>
int main()
{
    int a[100], n, i, j, k, n = 1;
    printf("Enter no. of element: ");
    scanf("%d", &n);
    printf("\n Enter elements of array: ");
    for (i = 0; i < n; i++);
    scanf("%d", &a[i]);
    for (i = 1; i < n; i++)
    {
        for (j = 0; j < i; j++)
        {
            if (a[j] < a[i])
            {
                k = a[i];
                for (j = i - 1; j >= 0; j--)
                {
                    a[j + 1] = a[j];
                }
                a[j] = k;
            }
        }
        printf("\n Array after pass %d:", i);
    }
```

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```

    for (i=0; i < n; i++)
    {
        printf("%d ", a[i]);
    }
    ++p;
}
printf("\n\nSorted array in ascending,
        or descending:);
    for (i=0; i < n; i++)
    {
        printf("%d ", a[i]);
    }
    return 0;
}
  
```

Output:-

Enter no. of elements in array: 5

Enter Elements:-

9000

569

8589

6

3456

Array after pass 1:- 569, 9000, 8589, 6, 3456

Array after pass 2:- 569, 8589, 9000, 6, 3456

Array after pass 3:- 6, 569, 8589, 9000, 3456

Array after pass 4:- 6, 569, 3456, 8589, 9000

Q2) What is the output of insertion sort after the 2nd iteration given following 7, 3, 5, 1, 9, 8, 4, 6

7 3 5 1 9 8 4 6

1st iteration

7 3 1 9 4 8 6

3 7 1 9 4 8 6

2nd iteration

3 7 1 9 4 8 6

1 3 7 9 4 8 6

After 2nd iteration the result.

1, 3, 7, 9, 4, 8, 6

Q3) Sort the following.

1) 100 2 25 390 4130 956 99

	0	1	2	3	4	5	6	7	8	9
100	100									
225						225				
370		390								
4130	4130									
956							956			
99										99
5431		5431								

	0	1	2	3	4	5	6	7	8	9
100	100									
225		225								
390										390
4130			4130	4130						
966							966			
99										99
5431				5431						

	0	1	2	3	4	5	6	7	8	9
100		100								
225			225							
390				390						
4130		4130								
966										966
99										99
5431				5431						

	0	1	2	3	4	5	6	7	8	9
100	100									
225	225									
390	390									
4130				4130						
966	966									
99	99									
5431					5431					

→ 99, 100, 225, 390, 966, 4130, 5431

2) 25, 6, 99, 145, 239, 20, 18

	0	1	2	3	4	5	6	7	8	9
25						25				
6							6			
99										99
145						145				
239										239
20	20									
18									18	

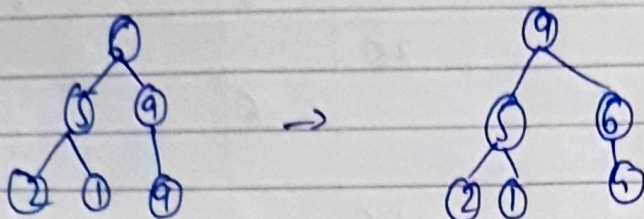
20			20							
25										
145					145					
6	06									
18		18								
99								99		99
239				239						

	0	1	2	3	4	5	6	7	8	9
06	06									
18	18									
20	20									
25	25									
239			239							
145		145								
99	99									

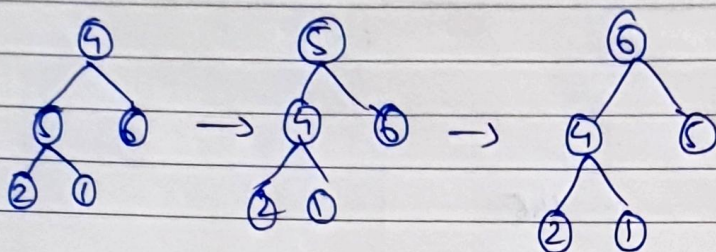
3 6, 18, 20, 25, 239, 145, 99

Q4) Sort following element using heap sort.

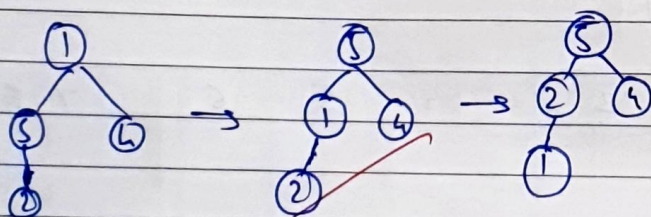
1) [6, 5, 9, 2, 1, 4]



9, 5, 6, 2, 1, 4
= 4, 5, 6, 2, 1, 9

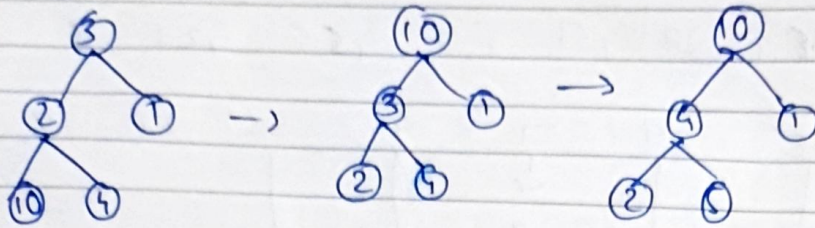


6, 5, 4, 2, 1, 9
= 1, 5, 4, 2, 6, 9

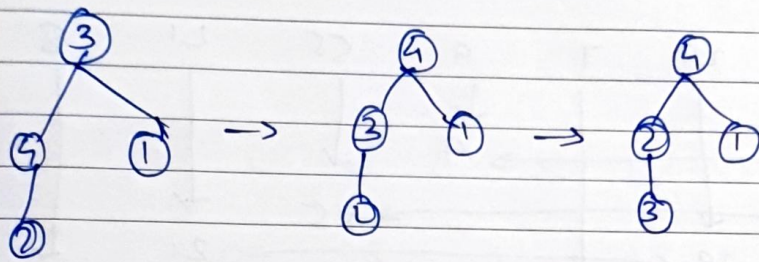


5, 2, 4, 1, 6, 9
= 1, 2, 4, 5, 6, 9

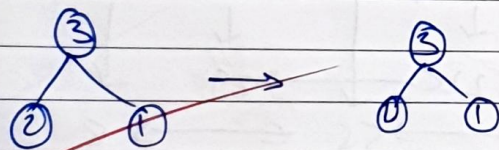
2) [3, 2, 1, 10, 4]



10 4 1 2 3
 = 3 4 1 2 10



4 2 1 3 10
 3 2 1 4 10

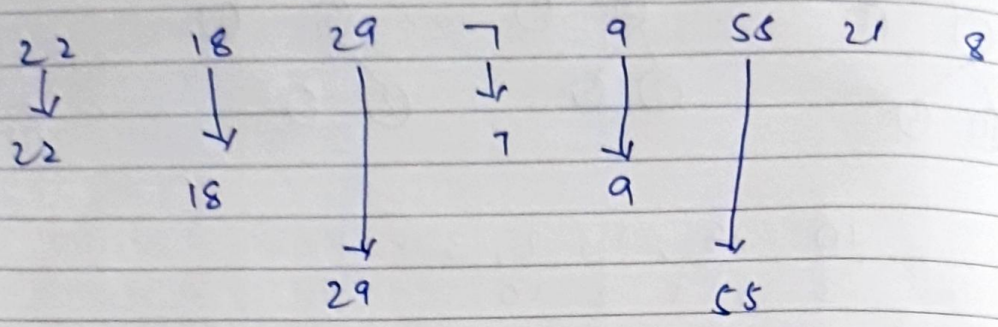


3 2 1 4 10
 2 1 3 4 10

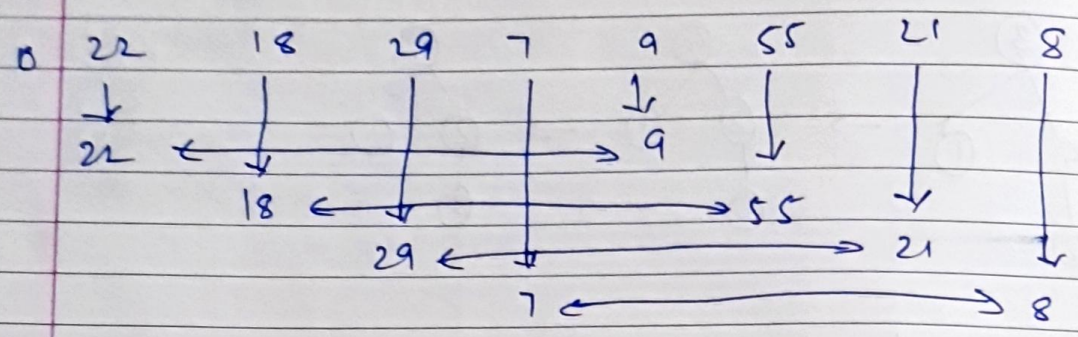
⇒ 1 2 3 4 10

Q.5) Sort following using shell sort

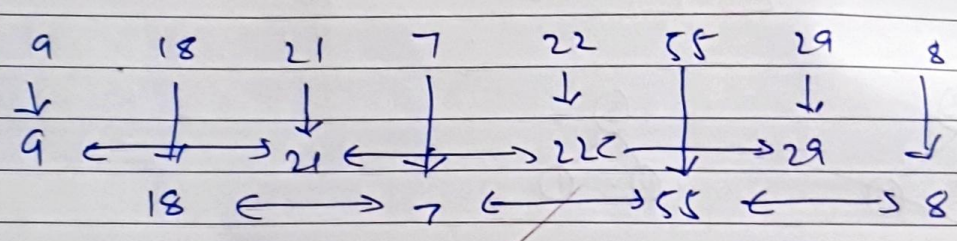
1) 22, 18, 29, 7, 9, 55, 21, 8



$\times/2$



$\times/2$



7 7 21 8 22 18 29 55
 7 9 21 8 22 18 29 55
 7 9 21 8 22 18 29 55
 7 8 9 21 22 18 29 55
 7 8 9 21 22 18 29 55
 7 8 9 18 21 22 29 55

2) [3, 10, 15, 12, 1, 5, 2, 6]

3 10 15 12 1 5 2 6
 ↓ ↓ ↓ ↓ ↓ ↓ ↓
 3 10 15 12 1 5 2 6

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1 5 2 6 3 10 15 12
 ↓ ↓ ↓ ↓ ↓ ↓ ↓
 1 2 3 15 12
 5 6 10 12