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1. Bubble Sort

Aim:

To Sort the given array of values using c ++ program.

program Coding:

```
#include<iostream.h>
#include<conio.h>
void main()
{
   clrscr();
   int a[10], i, j, n, t;
   cout<<"Enter total number of element:";
   cin>>n;
   cout<<"\n Enter array element:";
   for(i=1;i<=n;i++)
   cin>>a[i];
   for(i=1;i<=n;i++)
   for(j=i+1;j<=n;j++)
```

Output:

```
Enter total number of element : 3

Enter array element:

90
85
65

Sorted data:

65
85
90
```

```
if (a[i] > a[j])
{
    t = a[i];
    a[i] = a[j];
    a[j] = t;
}
cout << "\n Sorted data";
for (i=1; i<=n; i++)
cout << a[i] << "\n";
getch ();
}
```

Result:

Thus the given array of value is sorted.

2. Merge Sort

Aim:

To array the given number using Merge Sort.

Program Coding:

```
# Include <iostream.h>
# Include <conio.h>
void ms (int, int);
void merge (int, int, int);
int a[10], n, i, j;
void main()
{
    clrscr();
    Cout << " Enter Number of Element:";
    Cin >> n;
    Cout << " \n Enter array elements:";
    for (i=1; i<n; i++)
    Cin >> a[i];
    ms(1,n);
```

```
cout << "\n Sorting order:";
for (i=1;i<=n;i++)
cout << "\n" << a[i];
getch();
}
void ms (int low, int high)
{
if (low < high)
{
int mid = (low +high) / 2 ;
ms (low, mid);
ms (mid +1, high);
merge (low, mid, high);
}
}
void merge (int low, int mid, int high)
{
int h= low, i= mid +1, k= low, b [10];
while (h <= mid && i <= high)
if (a [h] <= a [i])
```

```
        b [k++] = a [h++];
    else
        b [k++] = a [i++];
    if (h > low)
        for (int j = i; j <= high; j++)
        b [k++] = a [j];
    else if (i > h)
        for (int j=h; j <= mid ; j++)
        b [k++] = a [j];
        for (int j = low; j <= high ; j++)
         a [i] = b [j];
}
```

Output:

```
Enter number of Element :
5
Enter array element:
20
40
500
700
30
Sorted order:
20
30
40
500
700
```

Result:

Thus the given numbers are Sorted using merge Sort.

3- Bfhary Search

Aim :

To Search the given number using binary Search method.

program Coding:

```
#Include < &Postream.h>
#Include <& Conio.h>
Void main ()
{
 Pnt a [100], n, i, beg, end, mid, data;
  ClrScr ();
  Cout << " Enter number of element-";
  Cin >> n;
  Cout << " In Enter array element In Sorted
                                order :";
  for (i=1; i<=n ; i++)
  Cin >> a [i];
  Cout << " In Enter data want to Search-";
  cin >> data;
```

```
beg = 1;
end = n;
mid = n/2;
while ((beg < end) && (a[mid] != data))
{
if (a[mid] > data)
{
   end = mid - 1;
}
else
 {
  beg = mid + 1;
 }
  mid = (beg + end)/2;
}
if (a[mid] == data)
  cout << " In Data is found";
else
  cout << " In Data is not found";
  getch ();
}
```

Output:

Enter number of element = 4

Enter array element in Sorted order:

7
8
9
10

Enter data want to Search = 7

Data is found

Result:

Thus the given number is Searched using binary Search method.

4. Linear Search

Aim:

To Search the given number using Linear Search method.

program Coding:-

```
#Include< Io Stream.h>
#Include< Conio.h>
#Include< process.h>
Void main ()
{
Int a [10], se, i, n;
clrscr ();
Cout <<" Enter number of element -";
cin >>n;
Cout <<" In Enter array element :";
for (i=1;i <n; i++)
cin >> a [i];
cin >> a [i][j];
```

Output:

Enter number of element -3

Enter array element :

79

30

100

Enter Search element :

30

Element is found.

```
cout << "\n Enter Search element :";
cin >> se;
for (i=1; i<=n; i++)
{
  if(a [i] == se)
  {
   cout << "\n "Element is found.";
    getch ();
    exit (0);
  }
}
  cout << "\n Element is not found.";
   getch ();
}
```

Result:

Thus the given number is Searched using linear Search method.

5. Depth first Search

Aim:

To Search the given number using depth first Search method.

Program Coding:

```
#Include <iostream.h>
#Include <conio.h>
class graph
{
 Int a [10] [10];
 Int V[10];
 Int n;
 Public:
  Void getgraph ()
  {
   Cout << " Enter number of nodes - ";
   cin >> n;
   for (int i = 1; i <= n; i++)
```

```
for (int j=1; j<n; j++)
cin >> a[i][j];
for (i=1; i<n; i++)
  v[i]=0;
  dfs(i);
}
void dfs(int x)
{
 cout<<" \n visit:"<<x<<"\n";
  v[x]=1;
  for(int i=1; i<=n; i++)
  if (a[x][i]==1)
  if (!v[i])
  {
    dfs(i);
  }
 }
};
void main()
{
  clrscr();
```

Depth First Search

Output :-

Enter the number of nodes - 6

0 1 1 1 0 0

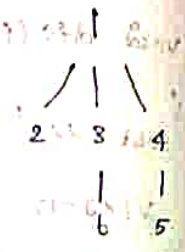
1 0 0 0 0 0

1 0 0 0 0 1

1 0 0 0 1 0

0 0 0 1 0 0

0 0 1 0 0 0



Visit : 1

Visit : 2

Visit : 3

visit : 6

Visit : 4

Visit : 5

```
graph g;
g.getGraph();
getch();
}
```

Result:

Thus the given number is Searched using depth first search method.

6. Stack using pointer

Aim:

To implement a stack as a linked list using pointer.

Program Coding:

```
#include<iostream.h>
#include<conio.h>
#include<stdlib.h>
Class node
{
  int data;
  node * next;
  Public;
     node ()
   {
    data =0; next =0;
   }
   friend Class Stack;
};
```

```
class stack
{
 node* top;
 public:
   Stack ()
    {
     top = 0;
    }
    void push (int x);
    void pop ();
     void display ();
};
void stack :: push (int x)
 {
  node * temp = new node;
  temp -> data = x;
  if (top == 0)
  top = temp;
  else {
     temp -> next = top;
     top = temp; }
  }
```

```
void stack :: pop ()
{
if (top ==0)
  cout << "\n Stack empty.";
  else
  {
  cout << "\n popped =" << top ->data;
  top = top ->next;
  }
}
void stack :: display ()
{
for (node* temp =top; temp = 0; temp = temp->next)
cout <<temp -> data << "\n";
}
void main ()
{
  int item c;
    clrscr ();
    Stack s;
    do
    {
```

```
Cout << "\n 1. push  2. pop  3. display  4. exit.-";
cin >> c;
Switch (c)
{
 Case 1:
    Cout << "\n Enter Item =";
     cin >> Item;
     s. push (Item);
      break;
   Case 2:
       s. pop ();
       break;
   case 3:
       s. display ();
       break;
     default:
        Exit (0);
}
getch ();
}
while (1);
}
```

Output:

1. push 2. pop 3. display 4. exit - 1

Enter Item = 100

1. push 2. pop 3. display 4. exit - 1

Enter Item = 200

1. push 2. pop 3. display 4. exit - 2

Poffed = 200

1. push 2. pop 3. display 4. exit - 3

100

Result:

Thus the Stack is implemented as a linked list using pointer.

7. Stack using Array

Aim:

To Implement a stack as a linked list using to create, push, pop a stack using Array.

Program Coding:

```
#include <iostream.h>
#include <conio.h>
#include<stdlib.h>
int top=0,a[10],i,n, data;
class stack
 {
  public:
    void push()
     {
      if (top >=5)
      {
      cout <<" In Stack is full";
      }
     else
     {
```

```
    cout << "\n  Enter data ;
    cin >> data;
    a [top] = data;
    top ++;
  }
}
void pop ()
 {
  if (top <= 0)
    cout << "\n Stack is empty.";
  else
    -- top;
    cout << a [top];
  }
void display ()
 {
  if (top == 0)
   cout << "\n No data in the stack.";
  else
  {
   for (i=top -1; i >= 0; i --)
```

```
        cout << a [i] << "\n";
    }
  }
};

void main ()
{
  clrscr ();
  Stack s;
  do
  {
    cout << "\n Enter choice:";
    cout << "\n 1. push 2. pop s. display:";
    cin >> n;
    Switch (n)
    {
      case 1:
        s. push ();
        break;
      case 2:
        s. pop ();
        break;
      case 3 :
        s. display ();
```

Output :-

Enter choice :

1. push 2. pop 3 display 1

Enter item 50

Enter choice : 1

1. push 2. pop 3. display 1

Enter item 100

Enter choice : 2

1. push 2. pop 3. display 2

popped 100.

Enter choice: 3

1. push 2. pop 3. display 3 :

50.

```
        break;
    case 4:
        exit(0);
    }
}
while(n!=4)
    getch();
}
```

Result:

Thus the stack operation using array is got.

8. Queue using pointer

Aim:

To Implement the Queue operation using pointer.

program coding:

```
#include <iostream.h>
#include <conio.h>
#include <stdio.h>
class node
 {
   int data {
    node* next;
   public:
    node ()
    {
     data =0; next=0
    }
     friend class queue;
};
```

```
class Queue
{
  node* front; *rear;
  public:
    Queue ()
    {
     front =rear =0;
     }
    void insert (int x);
    void remove ();
     void display ();
};
void Queue :: insert (int x)
  {
   node* temp = new node;
   temp->data =x;
   if (rear ==0)
     front =rear =temp;
   else
   {rear->next =temp;
     rear =temp;
     }
 }
```

```
void Queue :: remove ()
{
 if (front ==0)
  cout << "\n Queue is empty.";
 else
 {
  cout << "Deleted" << front->data;
   front = front->next;
  }
}
void queue :: display ()
 {
 for(node *temp=front ;temp!= 0;temp= temp->next)
   cout << temp->data << "\n";
  }
 Void main ()
  {
   Int item, c;
    clrscr ();
    Queue q;
    do
   {
   cout << "\n1.Insert 2. delete 3. display
                                  4 end ";
```

Output

1. Insert 2. delete 3. display 4. exit 1

Enter item 700

1. Insert 2. delete 3. display 4. exit 1

Enter item 800

1. Insert 2. delete 3. display 4. exit 2

deleted 700

1. Insert 2. delete 3. display 4. exit 3

800.

```
cin >> c;
Switch (c)
{
 case 1:
  cout << "\n Enter item";
  cin >> item;
    q.insert (item);
    break;
 case 2:
    q.remove ();
    break;
 case 3:
    q.display ();
     break;
 default:
      exit (0);
 }
 getch ();
}
 while (1);
}
```

Result :

Thus the queue operations using pointer is implemented.

9. Queue using Array

Aim:

To implement the Queue operations using array.

program coding:

```
#include<iostream.h>
#include<conio.h>
#include<stdlib.h>
class Queue
{
  int front,rear;
  int q[5];
  public:
   Queue()
   {
     front=rear=0;
   }
   void Enqueue(int x)
   {
    if(year>4)
```

```
cout << "\n Queue is full";

else
   q [rear ++] =x;
 }
void dequeue ()
 {
   if
   cout <<"\n Queue is empty";
   else
    cout <<" \n Deletid
 }
Void display ()
 {
   for (int i = front ; i
    cout <<"\n
   }
}
Void main ()
{
 int item , ch, n;
 clrscr ();
 Queue q;
```

```
do
{
cout << "\n 1. Enqueue 2. dequeue 3. display
      4. exit";
cin >> ch;
Switch (ch)
{
 Case 1:
   cout << "\n Enter Item to Insert";
   cin >> Item;
   q. Enqueue (Item);
   break;
 Case 2:
   q. dequeue ();
   break;
 Case 3:
   q. display ();
   break;
 Case 4:
   exit (0);
}
 while (n != 4);
```

Output:

1. Enqueue. 2. deleted 3. Display 4. exit 1

Enter Item to Insert 300

1. Enqueue 2. deleted 3. display 4. exit 1

Enter Item to Insert 750.

1. Enqueue 2. deleted 3. display 4. exit 2

Deleted 300.

1. Enqueue 2. deleted 3. display 4. exit 3

750.

getch();

Result:

Thus the queue operations using array is Implemented.

10. Inorder Traversal

Aim:

To traverse the binary tree using Inorder Traversal.

Program Coding:

```
#Include<iostream.h>
#Include<conio.h>
Class node
{
  Public :
    node* LE;
    Int dab;..
    node* rc;
    node ()
    {
      Lc = rc = 0;
    }
};
Void Inorder (node* t)
  {
```

```
if (t != 0)
{
Preorder (t->lc);
Cout << t->data << "\t";
Preorder (t->rc);
}
}
void main ()
{
clrscr ();
Cout << "\n Enter the data for root:";
Int data;
Node* root;
root = new node;
Cin >> root->data;
Cout << "\n Enter data for left child:";
Node* temp = new node;
Cin >> temp->data;
root->lc = temp;
Cout << "\n Enter data for right child:";
Node * temp1 = new node;
```

Output:

Enter the data for a root : 70

Enter the data for a left child : 40

Enter the data for a right child : 90

40 70 90.

```
cin >>temp1 = new node;
root ->rc = temp1;
inorder (root);
getch();
}
```

Result:

Thus the binary tree is traversed using Inorder Traversal

11. Preorder Traversal

Aim:

To traverse the binary tree using preorder Traversal.

Program Coding:

```
#include <iostream.h>
#include<conio.h>
Class node
{
 Public:
 node* Lc;
  int data;
  node* rc;
  node()
  {
    Lc=rc=0;
  }
};
Void preorder (node* t)
```

```
{
  if (t != 0)
  {
    cout << t->data << "\t";
    preorder (t->lc);
    preorder (t->rc);
  }
}
void main ()
{
  clrscr ();
  cout << "\n Enter the data for root:";
  int data;
  node *root;
  root = new node;
  cin >> root->data;
  cout << "\n Enter data for left child:";
  node * temp = new node;
  cin >> temp->data;
```

Output:

Enter the data for root : 70

Enter data for left Child : 22

Enter data for right Child : 84

70 22 84.

```
cout << " \n Enter data for deft child:";
node* temp = new node;
cin >> temp -> data;
root -> lc = temp;
cout << " \n Enter data for right child:";
node* temp1 = new node;
cin >> temp1 -> data;
root -> rc = temp1;
preorder (root);
getch();
}
```

Result:

Thus the binary tree is traversed using preorder Traversal.

12. postorder Traversal

Aim:

To traverse the binary tree using postorder Traversal.

Program Coding:

```
#include<iostream.h>
#include<conio.h>
class node
{
public:
node* lc;
int data;
node* rc;
node()
{
lc=rc=0;
}
};
void postorder(node*);
```

```
{
 ff(t!=0)
 {
  postorder(t->LC);
  postorder(t->rc);
  Cout << t->data << "\t";
 }
}
void main()
{
  clrscr();
  Cout << "\n Enter the data for root :";
  Int data;
  node* root;
  root = new node;
  Cin >> root->data;
  Cout << "\n Enter the data for left child :";
  Node * temp = new node;
  Cin >> temp = data;
   root    lc = temp;
  Cout << "\n Enter the data for right
                                child :";
```

Output:

Enter the data for root : 77

Enter the data for left child : 100

Enter the data for right child : 23

100 23 77.

```
node * temp1 = new node;
cin >> temp1 -> data;
root -> rc = temp1;
postorder (root);
getch ();
}
```

Result:

Thus the binary tree is traversal using postorder traversal