

Data Structures

Experiment 1.1

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Branch: BE-CSE

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Section/Group: 21BCS-605(A)

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Subject name: Data Structures

AIM:

Write a menu driven program that implement following operations (using separate functions) on a linear array:

1. Insert a new element at end as well as at a given position.
2. Delete an element from a given whose value is given or whose position is given.
3. To find the location of a given element.
4. To display the elements of the linear array.

CODE:

```
// Write a menu driven program that implement operations on a linear array

#include <iostream>
using namespace std;

int main()
{
    cout<<"Name - Shivam Kumar \n";
    cout<<"UID - 21BCS2124 \n";
    cout<<"Section - 21BCS-605(A) \n";
    bool exit = false;
    char YesNo;
    while (!exit)
    {
        // Menu Driven List
        int n;
        cout << " \n \n1. Insert a new element at end as well as at a given position
\n";
```

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    cout << "2. Delete an element from a given whose value is given or whose
position is given. \n";
    cout << "3. To find the location of a given element. \n";
    cout << "4. To display the elements of the linear array. \n \n";

    cout << "Select between 1 to 4: ";
    cin >> n;

    // Insert a new element at end as well as at a given position.
    if (n == 1)
    {

        int ch;
        cout << " \n Type 0 for inserting element at the end \n";
        cout << "Type 1 for inserting element at specific position \n \n";
        cin >> ch;

        // Inserting element at the end

        if (ch == 0)
        {
            int size;
            int position, num, i;
            cout << "Enter number of elements - " << endl;
            cin >> size;
            int a[size];
            cout << "Enter the elements in the array - " << endl;
            for (int k = 0; k < size; k++)
            {
                cin >> a[k];
            }
            cout << "Enter the element to insert - ";
            cin >> num;
            int l = size;
            a[l] = num;

            cout << "The new array is - " << endl;
            for (int j = 0; j < size + 1; j++)
            {
                cout << a[j] << " ";
            }
        }

        // Inserting elements at specific position

        else if (ch == 1)
        {
            int size;
            int position, number, i;
            cout << "Enter number of elements - " << endl;

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    cin >> size;
    int a[size];
    cout << "Enter the elements in the array - " << endl;
    for (int k = 0; k < size; k++)
    {
        cin >> a[k];
    }
    cout << "Enter the element to insert - ";
    cin >> number;
    cout << "Enter the position at which you want to insert the new
element- ";

    cin >> position;
    if (position > size + 1)
    {
        cout << "Insertion is not possible";
    }
    else
    {
        for (i = size; i >= position; i--)
        {
            a[i] = a[i - 1];
        }
        a[i] = number;
    }

    cout << "The new array is - " << endl;
    for (int j = 0; j < size + 1; j++)
    {
        cout << a[j] << " ";
    }
}
else
{
    cout << "Invalid Input";
}
}

// Delete an element from a given whose value is given or whose position is
given.

else if (n == 2)
{
    int size;
    int position, number, i;
    cout << "Enter number of elements - " << endl;
    cin >> size;
    int a[size];
    cout << "Enter the elements in the array - " << endl;
    for (int k = 0; k < size; k++)
    {

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        cin >> a[k];
    }
    cout << "Enter the position - ";
    cin >> position;

    if (position >= size + 1)
    {
        cout << "Deletion not possible ! " << endl;
    }
    else
    {
        for (int c = position - 1; c <= size - 1; c++)
        {
            a[c] = a[c + 1];
        }
    }

    cout << "The new array is - " << endl;
    for (int k = 0; k < size - 1; k++)
    {
        cout << a[k] << " ";
    }
}

// To find the location of a given element. i.e Searching

else if (n == 3)
{
    int size;
    int position, number, i;
    cout << "Enter number of elements - " << endl;
    cin >> size;
    int a[size], fact = 0;
    cout << "Enter the elements in the array - " << endl;
    for (int k = 0; k < size; k++)
    {
        cin >> a[k];
    }
    cout << "Enter the number you want to search - ";
    cin >> number;
    for (int i = 0; i < size; i++)
    {
        if (number == a[i])
        {
            fact = 1;
            position = i + 1;
        }
    }
    if (fact == 1)
    {

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        cout << "The number is found ! " << endl;
        cout << "It is at the position : " << position << endl;
    }
    else
    {
        cout << "The number is not in the array bro!" << endl;
    }
}
// Display elements of the array
else if (n == 4)
{
    int size;
    int position, number, i;
    cout << "Enter number of elements - " << endl;
    cin >> size;
    int a[size], fact = 0;
    cout << "Enter the elements in the array - " << endl;
    for (int k = 0; k < size; k++)
    {
        cin >> a[k];
    }

    // Display array
    cout << "The new array is - " << endl;
    for (int k = 0; k < size; k++)
    {
        cout << a[k] << " ";
    }
}
else
{
    cout << "Invalid Number";
}

//Wish to continue or not

cout << " \n \n Do you want to continue? (Y or N) \n";
cin >> YesNo;

if (YesNo == 'N' || YesNo == 'n')
{
    exit = true;
}
}

system("pause");
return 0;
}

```

OUTPUT:

```
Name - Shivam Kumar
UID - 21BCS2124
Section - 21BCS-605(A)

1. Insert a new element at end as well as at a given position
2. Delete an element from a given whose value is given or whose position is given.
3. To find the location of a given element.
4. To display the elements of the linear array.

Select between 1 to 4: 1

Type 0 for inserting element at the end
Type 1 for inserting element at specific position

0
Enter number of elements -
4
Enter the elements in the array -
5 6 8 9
Enter the element to insert - 1
The new array is -
5 6 8 9 1

Do you want to continue? (Y or N)
y

1. Insert a new element at end as well as at a given position
2. Delete an element from a given whose value is given or whose position is given.
3. To find the location of a given element.
4. To display the elements of the linear array.

Select between 1 to 4: 3
Enter number of elements -
4
Enter the elements in the array -
8 5 4 2
Enter the number you want to search - 2
The number is found !
It is at the position : 4

Do you want to continue? (Y or N)
n
Press any key to continue . . .
```