```c
/*
Program 1 :
Design, Develop and Implement a menu driven Program in C for the following
array operations:
a. Creating an array of N Integer Elements
b. Display of array Elements with Suitable Headings
c. Inserting an Element (ELEM) at a given valid Position (POS)
d. Deleting an Element at a given valid Position (POS)
e. Exit.
*/

#include <stdio.h>
#include <stdlib.h>

/*
Maximum size of the array is defined as 10.
It Can be changed according to the needs.
*/
#define MAX 10

/*
a[MAX] represents Maximum array size;
pos:position, x:element to be inserted/deleted
*/

int a[MAX],pos,x;

int n = 0;

//defining all the 4 operations to be done as functions.
void create();
void display();
void insert();
void delete();


void main()
{
    int choice;
    while(1)
        {
            printf("\n\n ****MENU****  ");

            printf("\n 1. Create an array of N integers");
            printf("\n 2. Display of array elements");
            printf("\n 3. Insert an element at a given Position");
            printf("\n 4. Delete an element at a given Position");
            printf("\n 5. Exit");

            printf("\n\n Enter your choice: ");
            scanf("%d", &choice);

            switch(choice)
            {
                case 1: create();
                        break;
                case 2: display();
                        break;
                case 3: insert();
                        break;
                case 4: delete();
                        break;
                case 5: exit(1);
                        break;

                default: printf("\n Please enter a valid choice:");
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            }

        }//end of while

}//end of main function

/*
create function -
Takes in number of elements and elements to be inserted as input
*/

void create()
{
    int i;
    printf("\n Enter the number of elements: ");
    scanf("%d",&n);

    printf("\n Enter the elements:");
    for(i=0;i<n;i++)
    {
        scanf("%d",&a[i]);
    }
}

/*
Display function -
First checks if the array is empty.
If not, displays all the elements in the array.
*/

void display()
{
    int i;
    if(n==0)                    //if n is zero, then array is empty.
        {
            printf("\n Array is empty");
            return;
        }

    printf("\n Array elements are: ");
    for(i=0;i<n;i++)
    printf("%d\t",a[i]);    // prints all the elements in the array.
}

/*
insert function-
First checks if the array is full. If yes, array full message is displayed.
If not, it takes the element to be inserted at a prescribed position until
the position is less than the size of the array.
This is done using do-while loop.
*/

void insert()
{
    int i;
    if(n==MAX)
        {
            printf("\n Array is full.Insertion not possible");
            return;
        }


    do
        {
            printf("\n Enter valid position where element to be inserted:");
            scanf("%d",&pos);
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        }
    while(pos>n);

    printf("\n Enter the value to be inserted:");
    scanf("%d",&x);

    for(i=n-1;i>=pos;i--)
    {
        a[i+1] = a[i];
    }
        a[pos] = x;
        n = n+1;
        display();
}

/*
delete function-
It first checks if the array is empty. If yes, array empty message is displayed.
If not, it keeps on taking the element to be deleted at a prescribed position
until the position is less than or equal to the size of the array.
This is done using do-while loop.
*/

void delete()
{
    int i;

    if(n==0)
        {
            printf("\n Array is empty");
            return;
        }

    do
        {
            printf("\n Enter valid position from where element to be deleted:");
            scanf("%d",&pos);
        }
    while(pos>=n);

    x=a[pos];
    printf("\n Deleted element is %d\n",x);

    for(i=pos;i<n-1;i++)
        {
            a[i]=a[i+1];
        }

    n=n-1;
    display();
}
```

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****MENU****
 1. Create an array of N integers
 2. Display of array elements
 3. Insert an element at a given Position
 4. Delete an element at a given Position
 5. Exit

 Enter your choice: 1

 Enter the number of elements: 5

 Enter the elements:10 20 30 40 50



****MENU****
 1. Create an array of N integers
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 5. Exit

 Enter your choice: 3

 Enter valid position where element to be inserted:2

 Enter the value to be inserted:456

 Array elements are: 10 20      456     30      40      50



****MENU****
 1. Create an array of N integers
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 4. Delete an element at a given Position
 5. Exit

 Enter your choice: 3

 Enter valid position where element to be inserted:5

 Enter the value to be inserted:121

 Array elements are: 10 20      456     30      40      121     50



 ****MENU****
```

```
1. Create an array of N integers
2. Display of array elements
3. Insert an element at a given Position
4. Delete an element at a given Position
5. Exit

Enter your choice: 4

Enter valid position from where element to be deleted:1

Deleted element is 20

Array elements are: 10 456     30      40      121     50



****MENU****
1. Create an array of N integers
2. Display of array elements
3. Insert an element at a given Position
4. Delete an element at a given Position
5. Exit

Enter your choice: 4

Enter valid position from where element to be deleted:4

Deleted element is 121

Array elements are: 10 456     30      40      50



****MENU****
1. Create an array of N integers
2. Display of array elements
3. Insert an element at a given Position
4. Delete an element at a given Position
5. Exit

Enter your choice: 4

Enter valid position from where element to be deleted:1

Deleted element is 456

Array elements are: 10 30      40      50
```

```
****MENU****
1. Create an array of N integers
2. Display of array elements
3. Insert an element at a given Position
4. Delete an element at a given Position
5. Exit

Enter your choice: 5
```