

ASSIGNMENT NO-8

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2K20/B17/33

CO LAB (P2)

THEORY

Pointers (pointer variables) are special variables that are used to store addresses rather than values.

Pointer

- *Address of a variable in memory*
- *Allows us to **indirectly** access variables*
- *In other words, we can talk about its **address** rather than its **value***

Declaration

int *p; */* p is a pointer to an int */*

A **pointer** in **C** is always a pointer to a particular data type:

int*, double*, char*, etc

Operators

***p** -- returns the **value** pointed to by **p**

&z -- returns the **address** of variable **z**

EXAMPLE

`int i;`

Store the value 4 into the memory location
associated with i

`int *ptr;`

`i = 4;`

Store the address of i into the
Memory location associated with ptr

`ptr = &i;`

Read the contents of memory
At the address stored in ptr

`*ptr = *ptr + 1;`

Store the result into memory
At the address stored in ptr

Declaring a pointer

`type *var;`

`type* var;`

Either of these work -- **whitespace** doesn't matter.

Type of variable is **int*** (integer pointer), **char*** (char pointer), etc.

Creating a pointer

&var

Must be applied to a memory object, such as a variable.

In other words, `&3` is not allowed.

Dereferencing

Can be applied to any expression. All of these are legal:

***var** contents of mem loc pointed to by var

****var** contents of mem loc pointed to by
memory location pointed to by var

***3** contents of memory location 3

Value of Thing Pointed by Pointers

To get the value of the thing pointed by the pointers, we use the * operator.

For example:

```
int* pc, c;
```

```
c = 9;
```

```
pc = &c;
```

```
printf("%d", *pc);
```

Output: 9

Array

- *A list of values arranged sequentially in memory*
 - *Example: a list of telephone numbers*
- *Expression **a[4]** refers to the **5th** element of the array **a***

Q1

```
#include <stdio.h>

#include <stdlib.h>

int main()

{

//PARTH JOHRI 2K20/B17/33

int i,n;

int arr[100],ar[100];

printf("ENTER NUMBER OF ELEMENTS\n");

scanf("%d",&n);//TO INPUT THE NUMBER OF ELEMENTS


int *ptr,*ptr1;

ptr=&arr;

ptr1=&ar;

for(i=0;i<n;i++)

{

printf("ENTER %d ELEMENT",(i+1));

printf("\n");

scanf("%d",&*(ptr+i));

printf("\n");

}

printf("\nELEMENTS OF SOURCE ARRAY\n");


for(i=0;i<n;i++)

{printf("%d",*(ptr+i));
```

```
printf("\n");}

for(i=0;i<n;i++)
{
*(ptr1+i)=*(ptr+i);
}

printf("\nAFTER COPYING , ELEMENTS OF COPIED ARRAY\n");
for(i=0;i<n;i++)
{printf("THE %d ELEMENT IN THE COPIED ARRAY IS %d",(i+1),*(ptr1+i));
printf("\n");}

}
```

```

9  #include <stdio.h>
10 #include <stdlib.h>
11 int main()
12 {
13     //PARTH JOHRI 2K20/B17/33
14     int i,n;
15     int arr[100],ar[100];
16     printf("ENTER NUMBER OF ELEMENTS\n");
17     scanf("%d",&n); //TO INPUT THE NUMBER OF ELEMENTS
18
19     int *ptr,*ptr1;
20     ptr=&arr;
21     ptr1=&ar;
22     for(i=0;i<n;i++)
23     {
24         printf("ENTER %d ELEMENT",(i+1));
25         printf("\n");
26         scanf("%d",&*(ptr+i));
27         printf("\n");
28     }
29     printf("\nELEMENTS OF SOURCE ARRAY\n");
30
31     for(i=0;i<n;i++)
32     {printf("%d",*(ptr+i));
33         printf("\n");}
34
35     for(i=0;i<n;i++)
36     {
37         *(ptr1+i)=*(ptr+i);
38     }
39     printf("\nAFTER COPYING , ELEMENTS OF COPIED ARRAY\n");
40     for(i=0;i<n;i++)
41     {printf("THE %d ELEMENT IN THE COPIED ARRAY IS %d",(i+1),*(ptr1+i));
42         printf("\n");}
43
44 }
45

```

ENTER NUMBER OF ELEMENTS

3

ENTER 1 ELEMENT

1

ENTER 2 ELEMENT

2

ENTER 3 ELEMENT

3

ELEMENTS OF SOURCE ARRAY

1

2

3

AFTER COPYING , ELEMENTS OF COPIED ARRAY

THE 1 ELEMENT IN THE COPIED ARRAY IS 1

THE 2 ELEMENT IN THE COPIED ARRAY IS 2

THE 3 ELEMENT IN THE COPIED ARRAY IS 3

...Program finished with exit code 0

Press ENTER to exit console.

```
ENTER NUMBER OF ELEMENTS
2
ENTER 1 ELEMENT
5

ENTER 2 ELEMENT
7


ELEMENTS OF SOURCE ARRAY
5
7


AFTER COPYING , ELEMENTS OF COPIED ARRAY
THE 1 ELEMENT IN THE COPIED ARRAY IS 5
THE 2 ELEMENT IN THE COPIED ARRAY IS 7


...Program finished with exit code 0
Press ENTER to exit console.█
```


Q2

```
#include <stdio.h>
```

```
int main()
```

```
{ int i,n,count=0;
```

```
int* ptr;
```

```
//PARTH JOHRI 2K20/B17/33
```

```
printf("ENTER NUMBER OF ELEMENTS\n");
```

```
scanf("%d",&n);//TO INPUT THE NUMBER OF ELEMENTS
```

```
int arr[n];
```

```
for(i=0;i<n;i++)
```

```
{
```

```
printf("ENTER %d ELEMENT",(i+1));
```

```
printf("\n");
```

```
scanf("%d",&arr[i]);
```

```
printf("\n");
```

```
}
```

```
ptr=&arr;
```

```
printf("\nENTER THE ELEMENT YOU WANT TO SEARCH IN THE ARRAY\n");
```

```
int num;
```

```
scanf("%d",&num);
```

```
for(i=0;i<n;i++)
```

```
{if(num==( *ptr))
```

```
{++count;
```

```
break;
```

```
}
```

```
ptr++;
```

```
}
```

```
if(count==1)
```

```
printf("THE ELEMENT %d IS FOUND IN THE ARRAY",num);
```

```
else if(count==0)
```

```
printf("THE ELEMENT %d IS NOT FOUND IN THE ARRAY",num);
```

```
return 0;
```

```
}
```

```

9  #include <stdio.h>
10
11  int main()
12  { int i,n,count=0;
13    int* ptr;
14    //PARTH JOHRI 2K20/B17/33
15    printf("ENTER NUMBER OF ELEMENTS\n");
16    scanf("%d",&n);//TO INPUT THE NUMBER OF ELEMENTS
17    int arr[n];
18    for(i=0;i<n;i++)
19    {
20      printf("ENTER %d ELEMENT",(i+1));
21      printf("\n");
22      scanf("%d",&arr[i]);
23      printf("\n");
24    }
25    ptr=&arr;
26    printf("\nENTER THE ELEMENT YOU WANT TO SEARCH IN THE ARRAY\n");
27    int num;
28
29    scanf("%d",&num);
30    for(i=0;i<n;i++)
31    {if(num==( *ptr))
32    {++count;
33      break;
34    }
35      ptr++;
36    }
37    if(count==1)
38      printf("THE ELEMENT %d IS FOUND IN THE ARRAY",num);
39    else if(count==0)
40      printf("THE ELEMENT %d IS NOT FOUND IN THE ARRAY",num);
41    return 0;
42  }

```

```
ENTER NUMBER OF ELEMENTS
2
ENTER 1 ELEMENT
45

ENTER 2 ELEMENT
4

ENTER THE ELEMENT YOU WANT TO SEARCH IN THE ARRAY
4
THE ELEMENT 4 IS FOUND IN THE ARRAY

...Program finished with exit code 0
Press ENTER to exit console.█
```

```
ENTER NUMBER OF ELEMENTS
3
ENTER 1 ELEMENT
7

ENTER 2 ELEMENT
9

ENTER 3 ELEMENT
0

ENTER THE ELEMENT YOU WANT TO SEARCH IN THE ARRAY
5
THE ELEMENT 5 IS NOT FOUND IN THE ARRAY

...Program finished with exit code 0
Press ENTER to exit console.█
```