How to return a Pointer from a Function in C

Difficulty Level : Easy ● Last Updated : 19 Aug, 2020

Pointers in C programming language is a variable which is used to store the memory address of another variable. We can pass pointers to the function as well as return pointer from a function. But it is not recommended to return the address of a local variable outside the function as it goes out of scope after function returns.

Program 1:

The below program will give segmentation fault since **'A'** was local to the function:

C

```c
// C program to illustrate the concept of
// returning pointer from a function
#include <stdio.h>

// Function returning pointer
int* fun()
{
    int A = 10;
    return (&A);
}

// Driver Code
int main()
{
    // Declare a pointer
    int* p;

    // Function call
    p = fun();

    printf("%p\n", p);
    printf("%d\n", *p);
    return 0;
}
```

Output:

Below is the output of the above program:

Runtime Errors:

```
Segmentation Fault (SIGSEGV)
```

Output:

Copy

```
No Output
```

Explanation:

The main reason behind this scenario is that compiler always make a stack for a function call. As soon as the function exits the function stack also gets removed which causes the local variables of functions goes out of scope.

Static Variables have a property of preserving their value even after they are out of their scope. So to execute the concept of returning a pointer from function in C you must define the local variable as a static variable.

Program 2:

C

```c
// C program to illustrate the concept of
// returning pointer from a function
#include <stdio.h>

// Function that returns pointer
int* fun()
{
    // Declare a static integer
    static int A = 10;
    return (&A);
}

// Driver Code
int main()
{
    // Declare a pointer
    int* p;

    // Function call
    p = fun();

    // Print Address
    printf("%p\n", p);

    // Print value at the above address
    printf("%d\n", *p);
    return 0;
}
```

Output:

```
0x601038
10
```

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