Sub: Chapter: 12 (Pointers)

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What is pointer?

→ A pointer is a variable that contain address of another variable. Pointers are used to store and manage the addresses of dynamically allocated blocks of memory.

How to declare the pointer variable in programming?

→ For pointer declaration, using the asterisk(*) operator. The declaration of a pointer variable takes the following form:

```
data_type *pt_name;
```

This line tells the compiler three things about the variable pt_name.

1. The asterisk(*) tells that the variable pt_name is a pointer variable.
2. pt_name needs a memory location.
3. pt_name points to a variable of type data_type.

For example,

```
int *p; //integer pointer.
```

Declares the variable p as a pointer variable that points to an integer data type. The type int refers to the data type of the variable being pointed to by p and not the type of the value of the pointer.

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Similarly,

float *x; // float pointer.

declares x as a pointer to a floating-point variable.

There are three types of pointer declaration style and they are:

```
int *   p ; //style 1
int     *p ; // style 2
int     * p ; // style 3
```

Q. What are the rules of pointer operation?

→ The following rules apply when performing operations on pointer variables:

1. A pointer variable can be assigned the address of another variable.
2. A pointer variable can be assigned the value's of another pointer variable.
3. A pointer variable can be initialized with NULL or zero value.
4. A pointer variable can be prefixed ~~and~~ or postfixed with increment or decrement operator.

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5. An integer value may be added or substracted from a pointer variable.
6. When two pointers point to the same array, one pointer variable can be substructed from another.

Q What are the rules for pass by pointers.

→ The following rules -

1. The types of the actual and formal arguments must be same.
2. The actual arguments must be the addresses of variables that are local to the calling function
3. The formal arguments in the function header must be prefixed by the indirection operator (*).
4. In the prototype, the arguments must be prefixed by the symbol (*).
5. To access the value of an actual argument in the called function, we must use the corresponding formal argument prefixed with the indirection operator (*).

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Q. What are the difference between Pass by value and pass by pointers.

→ The technique is to pass data from one function to another is known as perameter passing. Perameter passing can be done in following two ways:

1. Pass by value (also known as call by value)
2. Pass by Pointers (also known as call by pointers)

The difference between pass by value and pass by pointers is that modifications made to arguments passed in by value in the called function cannot effect the calling function whereas modifications made to arguments passed in by pointers (contain memory address) in the called function have effect the calling function. Use pass by pointers, if we want to modify the argument value in the calling function. Otherwise, use pass by value to pass arguments.

Pass by pointers method is often used when manipulating arrays and strings. This method is also used when we require multiple values to be returned by the called function.

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