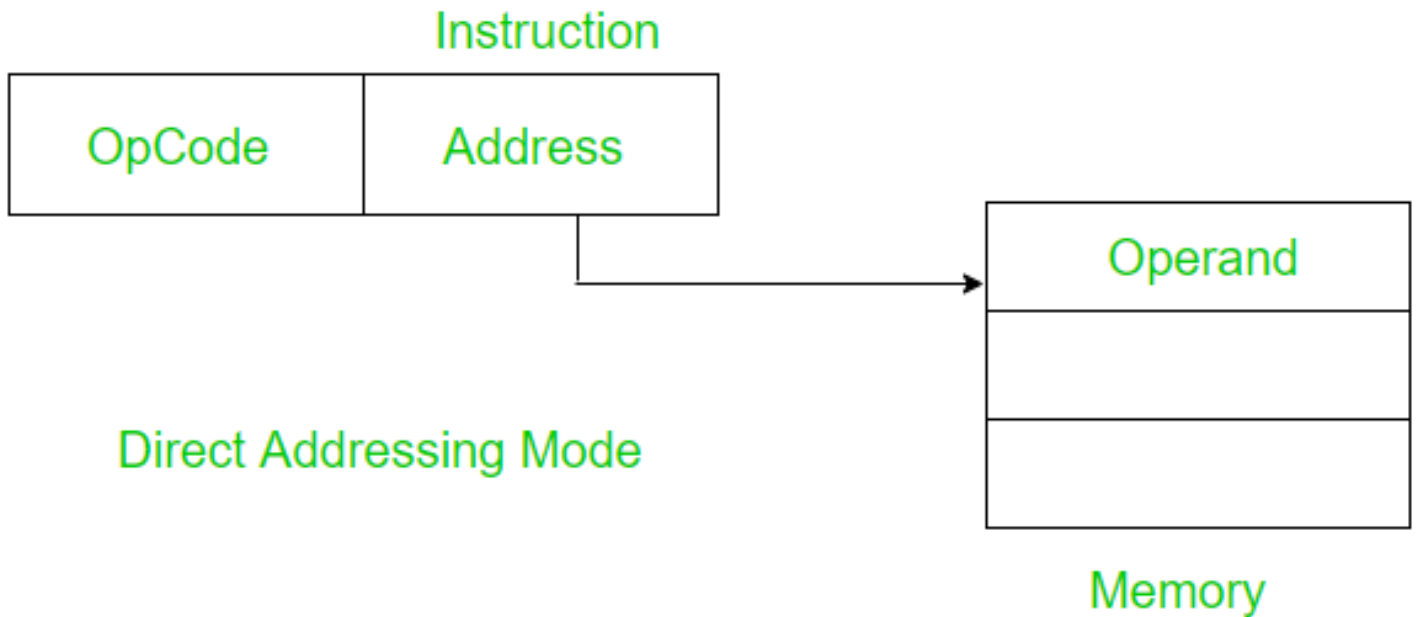
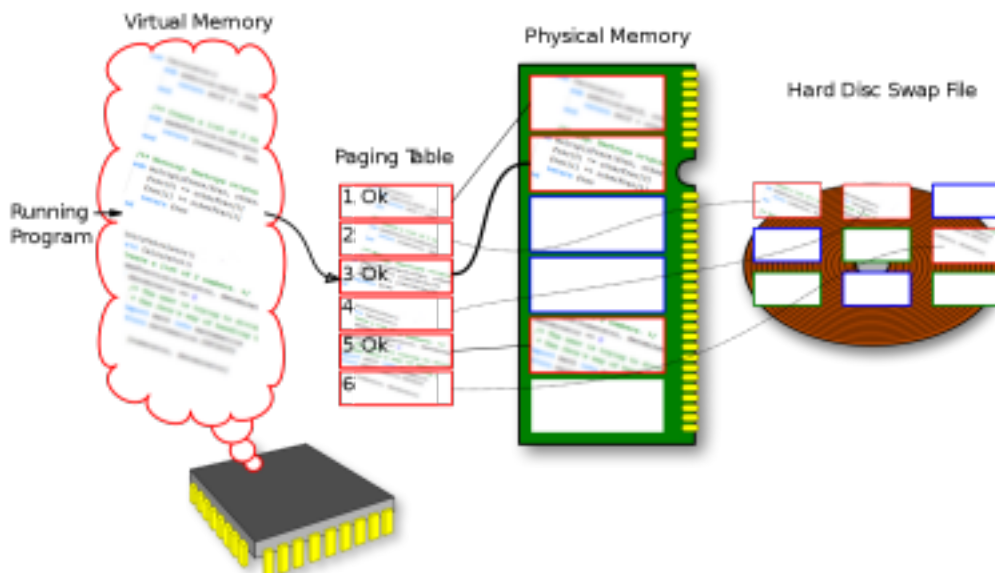


# Direct Addressing

**Direct addressing** is a memory addressing mode in which the operand of an instruction is the address of the data to be operated on. This means that the CPU can access the data directly, without having to perform any additional calculations.



Direct addressing is the simplest and most efficient addressing mode, but it has some limitations. One limitation is that the **address of the data must be known** at compile time. This means that direct addressing cannot be used to access data that is stored dynamically, such as data that is read from a file.



Another limitation of direct addressing is that it can **only be used to access data that is within the address space of the CPU**. This means that direct addressing cannot be used to access data that is stored in external memory, such as memory on a hard disk drive.



Despite its limitations, direct addressing is a widely used addressing mode. It is often used to access data that is stored in static memory, such as global variables and constants.

Here are some examples of direct addressing in assembly language:

```
;Load the content of memory address 100 to register R1.  
LOAD R1, 100
```

```
;Load the content of register R2 to register R1.  
LOAD R1, R2
```

```
;Store the content of register R1 to memory address 200.  
STORE R1, 200
```

Direct addressing can also be used in high-level programming languages. For example, the following C code uses direct addressing to access an element of an array:

```
int main() {  
    int array[10] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10};  
  
    ;Load the element at index 5 of the array to the register EAX.  
    EAX = array[5];  
  
    ;Return the value in register EAX.  
    return EAX;  
}
```

The second line loads the element at index 5 of the array to the register EAX.

Only a **single memory reference** is required to access data. So no additional calculations are required to work out the effective address.

Disadvantage: The direct addressing mode will provide very limited space for the address.

Direct addressing is a powerful and versatile addressing mode, but it is important to be aware of its limitations.