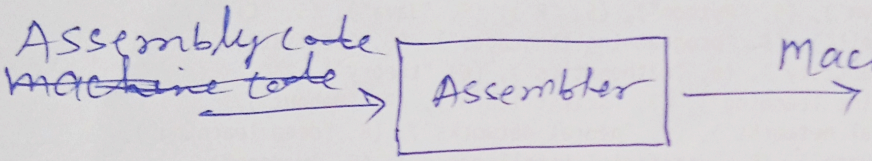
Assembler :- An Assembler is a program for converting instructions written in low level assembly code into relocatable machine code and generating along information for the loader.



Types of Assembler :- There are two types of assembler

(1) Single-Pass Assembler: If an assembler does all its work in one scan then it is called sing-Pass Assembler.

(2) Two-Pass Assemble (Multiple-Pass Assembler)

If an assembler does its work in two pass is called Two-Pass Assembler

Working of two-Pass Assembler :-

Assembler devides task into two passes.

Pass-1

(i) Define symbol and literals and remember them in the symbol table and literal table respectively

(ii) Keep track of the location counter.

(iii) Process pseudo-operations.

(iv) Defines a program that assign the memory addresses to the variable and translate the source code into machine code

Pass-2

(i) Generate object code by converting symbolic op-code into respective numeric op-code.

(ii) Generate data for literal and look for values of symbol.

(iii) Define a program that reads the source code two times.

(iv) It reads the source code and translate the code into object code.

Example:-

Assembly language program:-

```
start   MOV A, 5
        ADD A, 3
        Store A, X
```

- A is a register
- X is a memory location
- start is a label.

Pass-1

Symbol Table

Symbol	Address
start	1000
X	2000

literal Table

5	
3	

Pass-2 convert to machine code

Mov A, 5 → 0001 0000 0101

ADD A, 3 → 0010 0000 0011

Store A, X → 0011 0000 2000

Final machine code

0001 0000 0101

0010 0000 0011

0011 0000 2000