ASSEMBLER DIRECTIVES

- Assembler directives are the commands to the assembler that direct the assembly process.
- They indicate how an operand is treated by the assembler and how assembler handles the program.
- They also direct the assembler how program and data should arrange in the memory.
- ALP's are composed of two type of statements.
- The instructions which are translated to machine codes by assembler.
- The directives that direct the assembler during assembly process, for which no machine code is generated.

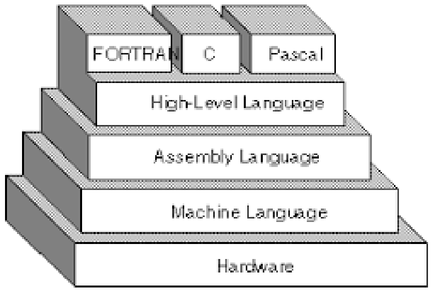
1. **ASSUME**: Assume logical segment name

Syntax:

ASSUMEsegreg:segname,…segreg:segname

Ex: ASSUME CS:CODE

- ASSUME CS:CODE,DS:DATA,SS:STACK



2.DB: Define Byte

- The DB directive is used to reserve byte or bytes of memory locations in the available memory.
- Syntax: Name of variable DB initialization value. Ex: MARKS DB 35H,30H,35H,40H
- NAME DB “VARDHAMAN

3.DW: Define Word

- The DW directive serves the same purposes as the DB directive, but it now makes the assembler reserve the number of memory words(16-bit) instead of bytes.
- Syntax: variable name DW initialization values. Ex: WORDS DW 1234H,4567H,2367H
- WDATA DW 5 Dup(522h)

(or) Dup(?)

4. **DD**: Define Double:

- The directive DD is used to define a double word (4bytes) variable.
- Syntax: variable name DD 12345678H Ex: Data1 DD 12345678H

5. DQ: Define Quad Word

- This directive is used to direct the assembler to reserve 4 words (8 bytes) of memory for the specified variable and may initialize it with the specified values.
- Syntax: Name of variable DQ initialize values.
  Ex: Data1 DQ 123456789ABCDEF2H

6.DT: Define Ten Bytes

- The DT directive directs the assembler to define the specified variable requiring 10 bytes for its storage and initialize the 10-bytes with the specified values.
- Syntax: Name of variable DT initialize values.
  Ex: Data1 DT   123456789ABCDEF34567H

7. END: End of Program

- The END directive marks the end of an ALP. The statement after the directive END will be ignored by the assembler.

8. **ENDP:** End of Procedure

- The ENDP directive is used to indicate the end of procedure. In the AL programming the subroutines are called procedures.
- Ex: Procedure Start

```
          :

Start ENDP
```

9. **ENDS:** End of segment

- The ENDS directive is used to indicate the end of segment. Ex: DATA SEGMENT

```
:
DATA ENDS
```

10. EVEN: Align on Even memory address

The EVEN directives updates the location counter to the next even address. Ex: EVEN

```
Procedure Start

        :

Start ENDP
```

- The above structure shows a procedure START that is to be aligned at an even address.

11. **EQU:** Equate

- The directive EQU is used to assign a label with a value or symbol. Ex: LABEL EQU 0500H
- ADDITION EQU ADD

12. **EXTRN**: External and public

- The directive EXTRN informs the assembler that the names, procedures and labels declared after this directive have been already defined in some other AL modules.
- While in other module, where names, procedures and labels actually appear, they must be declared public using the PUBLIC directive.
- Ex: MODULE1 SEGMENT PUBLIC FACT FAR MODULE1 ENDS MODULE2 SEGMENT EXTRN FACT FAR MODULE2 END

13. **GROUP:** Group the related segments

- This directive is used to form logical groups of segments with similar purpose or type. Ex: PROGRAM GROUP CODE, DATA, STACK*CODE, DATA and STACK segments lie within a 64KB memory segment that is named as PROGRAM.

14. **LABEL:** label

- The label is used to assign name to the current content of the location counter.
- Ex: CONTINUE LABEL FAR
- The label CONTINUE can be used for a FAR jump, if the program contains the above statement.

15. **LENGTH:** Byte length of a label

- This is used to refer to the length of a data array or a string Ex : MOV CX, LENGTH ARRAY

16. **LOCAL:** The labels, variables, constant or procedures are declared LOCAL in a module are to be used only by the particular module.

- Ex : LOCAL a, b, Data1, Array, Routine

17.NAME: logical name of a module

- The name directive is used to assign a name to an assembly language program module. The module may now be refer to by its declared name.

- Ex : Name “addition”

18. **OFFSET:** offset of a label

- When the assembler comes across the OFFSET operator along with a label, it first computing the 16-bit offset address of a particular label and replace the string 'OFFSET LABEL' by the computed offset address.
- Ex : MOV SI, offset list

19. **ORG:** origin

- The ORG directive directs the assembler to start the memory allotment for the particular segment, block or code from the declared address in the ORG statement.
- Ex: ORG 1000H

20. **PROC:** Procedure

- The PROC directive marks the start of a named procedure in the statement. Ex: RESULT PROC NEAR
- ROUTINE PROC FAR

21. **PTR:** pointer

- The PTR operator is used to declare the type of a label, variable or memory operator.

- Ex : MOV AL, BYTE PTR [SI] MOV BX, WORD PTR [2000H]

22. **SEG:** segment of a label

- The SEG operator is used to decide the segment address of the label, variable or procedure.
- Ex : MOV AX, SEG ARRAY MOV DS, AX

23. **SEGMENT**: logical segment
The segment directive marks the starting of a logical segment

- Ex: CODE SEGMENT: CODE ENDS

24.**SHORT:** The SHORT operator indicates to the assembler that only one byte is required to code the displacement for jump.

- Ex : JMP SHORT LABEL

25. **TYPE:** The TYPE operator directs the assembler to decide the data type of the specified label and replaces the TYPE label by the decided data type.

- For word variable, the data type is 2.
- For double word variable, the data type is 4. For byte variable, the data type is 1.
- Ex : STRING DW 2345H, 4567H MOV AX, TYPE STRING AX=0002H

26. **GLOBAL:** The labels, variables, constants or procedures declared GLOBAL may be used by other modules of the program.

- Ex : ROUTINE PROC GLOBAL.

27. **FAR PTR:** This directive indicates the assembler that the label following FAR PTR is not available within the same segment and the address of the label is of 32-bits i.e 2-bytes of offset followed by 2-bytes of segment address.

- Ex : JMP FAR PTR LABEL

- 28. **NEAR PTR**: This directive indicates that the label following NEAR PTR is in the same segment and needs only 16-bit
- i.e 2-byte offset to address it Ex : JMP NEAR PTR LABEL CALL NEAR PTR ROUTINE