Q. Explain Macro with Example

→ Definition of a Macro.

Macro is defined to be single lined abbreviation for group of instruction.

Definition of Macro Processors.

These are the programs which are responsible for the procesing of macro

Format of Macro.

Format :- MACRO ← start of definition
_____ ← macro name

_____
_____ } macro body
_____
_____

MEND ← end of definition

Eg:-

MACRO DEFINITION

```
MACRO
INCR
A   1   DATA
A   2   DATA
A   3   DATA
MEND
```

Pass 1 :- It recognizes all macro definitions defined in the program.

1. Each input is checked line by line

2. MDT is used to store the entire definition of macro in next available location as soon as macro pseudo-opcode is encountered.

3. The macro name is entered into the MNT with pointer which indicates the first entry of the macro definition.

4. MDTC and MNTC are incremented when they encounter next statement.

5. As each successive line is ready dummy arguments in the macro definition are replaced with the positional indicators and stored in the ALA and MDT along with the MEND statements.

6. Control transfer to pass 2 in order to process macro calls when END pseudo-opcode is encountered.

Q. Demonstrate the output of pass 1 and pass 2 of Macro Processor along with the tables MNT, MDT, ALA 1 and ALA 2 for the given assembly code.

```
START
A1, DATA1
SUM 3,5
L 2, DATA1
MACRO
SUM &ARG1, &ARG2
L 1, &ARG1
L 2, &ARG2
A 1,2
ST 1, &ARG2
MEND
DELAY 2
L 1, DATA 2
L 2, DATA2
SUM 6,4
MACRO
DELAY &ARG3
L 1, &ARG3
L 2, &ARG3
L 3, &ARG3
MEND
A 1, DATA1 DELAY 7
ST 1, DATA 2
DELAY 3
DATA1 DC F'4'
DATA 2 DC F'7'
END
```

```
L 1, 3
L 2, 5
A 1, 2
ST 1, 5
L 1, 2
L 2, 2
L 3, 2
L 1, 6
L 2, 4
A 1, 2
ST 2, 4
L 1, 7
L 2, 7
L 3, 7
L 1, 3
L 2, 3
L 3, 3
```

MNT

| Index | Macro Name | MDT index |
|---|---|---|
| 1 | SUM | 1 |
| 2 | DELAY | 7 |

MDT

| Index | Macro definition |
|---|---|
| 1 | SUM &ARG1, &ARG2 |
| 2 | L 1, #1 |
| 3 | L 2, #2 |
| 4 | A 1,2 |
| 5 | ST 1, #2 |
| 6 | MEND |
| 7 | DELAY &ARG3 |
| 8 | L 1, #1 |
| 9 | L 2, #1 |
| 10 | L 3, #1 |
| 11 | MEND |

ALA (1)

| Index | Argument |
|---|---|
| 1 | &ARG1 |
| 2 | &ARG2 |

ALA (2)

| Index | Argument |
|---|---|
| 1 | &ARG3 |

ALA (3)

| Index | Argument |
|---|---|
| 1 | 3 |
| 2 | 5 |

ALA (4)

| Index | Argument |
|---|---|
| 1 | 2 |

ALA (5)

| Index | Argument |
|---|---|
| 1 | 6 |
| 2 | 4 |

ALA (6)

| Index | Argument |
|---|---|
| 1 | 7 |

ALA (7)

| Index | Argument |
|---|---|
| 1 | 3 |