

# Sample example

## Pass-1 Data structures/ programs :

- Source program with macro definitions and macro calls
- Output file without macro definitions & with macro calls
- Macro Definition Table (MDT)
- Macro Name Table (MNT)
- Argument List Array (ALA)
- Macro Definition Table Counter (MDTC) : Integer Variable
- Macro Name Table Counter (MNTC): Integer Variable

## Pass-2 Data structures/programs :

- Input file without macro definitions & with macro calls
- Expanded output file without macro definitions & macro calls (Free from Macro)
- Refers Macro Definition Table (MDT) created by Pass-1
- Refers Macro Name Table (MNT) created by Pass-1
- Argument List Array (ALA) to map formal parameters with actual
- Macro Definition Table Pointer (MDTP): Integer Variable

### Example:

```
MAC START 100
  MACRO
  ADD1
  L AR,1
  L AR,2
  ST N, 1
  MEND
  TOTAL EQU 5
  L 1,D1
  SR 2,2
  A 1,=F'5'
  ADD1
ST 2, 1
  AR TOTAL, 2
  END
```

## Output of Pass1:

### Macro Name Table :

MNTC	Macro Name	MDTC
1	ADD1	1

### Macro Definition Table :

MDTC	MDT
1	ADD1
2	L     AR,1
3	L     AR,2
4	ST    N, 1
5	MEND

## Intermediate code of Pass-1

```
MAC  START 100
      TOTAL EQU 5
      L 1,D1
      SR 2,2
      A 1,='5'
      ADD1
ST 2,1
   AR TOTAL, 2
   END
```

## Output of Pass2:

```
MAC  START 100
      TOTAL EQU 5
      L 1,D1
      SR 2,2
```

```

A      1,=F'5'
L      AR,1
L      AR,2
ST     N, 1
ST     2, 1
AR     TOTAL, 2
END

```

# Pass1

## Input file: Source Code :

```

- MAC START 100
- MACRO
- &A0 ADD1 &A1, &A2, &A3
- &A0 L 1, &A1
- L 2, &A2
- AR 1, 2
  MUL 1, &A3
  ST N, 1
  MEND
  MACRO
  SUB &P1, &P2
  L 1, &P1
  S 1, &P2
  ST 2, 1
  MEND
TOTAL EQU 5
L 1,D1
SR 2,2
A 1,=F'5'
LOOP1 ADD1 D1, D2, D3
ST 2, 1
AR TOTAL, 2
SUB X, Y
BR 14
D1 DC F'3'
D2 DC F'45'
D3 DC F'21'
X DC F'10'
Y DC F'20'
END

```

Pass 1: MNTC=1 MDTC=1

## Intermediate Code after pass1:

```

MAC START100
TOTALEQU 5
    L    1, D1
    SR   2, 2
    A    1, =F'5'
    ADD1 LOOP1, D1, D2, D3
    ST   2, 1
    AR   TOTAL, 2
    SUB  X, Y
    BR   14
D1    DC  F'3'
D2    DC  F'45'
D3    DC  F'21'
X     DC  F'10'
Y     DC  F'20'

    END

```

**Macro Name Table :**

MNTC	Macro Name	MDTC
1	ADD1	1
2	SUB	8
3		

**Argument List Array :**

Index	Argument	Actual args
1	&A0	
2	&A1	
3	&A2	
4	&A3	
5	&P1	
6	&P2	

**Macro Definition Table :**

MDTC	Macro Card
1	&A0 ADD1 &A1,&A2,&A3
2	#1 L 1, #2
3	L 2, #3
4	AR 1,2
5	MUL 1, #4
6	ST N,1
7	MEND
8	SUB &P1, &P2
9	L 1, #5
10	S 1, #6
11	ST 2, 1
12	MEND
13	

## Argument List Array :

Index	Formal Args	Actual Args
1	&A0	Loop1
2	&A1	D1
3	&A2	D2
4	&A3	D3
5	&p1	X
6	&P2	Y
7		

## Pass 2

ALA

Index	Formal	Actual
1	&A0	LOOP1
2	&A1	D1
3	&A2	D2
4	&A3	D3
5	&P1	X
6	&P2	Y

**Intermediate Code after pass1 (input file for pass 2):**

```
MAC START    100
TOTAL      EQU 5
```

```

L    1, D1
SR   2, 2
A    1, =F'5'
ADD1 LOOP1, D1, D2, D3
ST   2, 1
AR   TOTAL, 2
SUB  X, Y
BR   14
D1   DC  F'3'
D2   DC  F'45'
D3   DC  F'21'
X    DC  F'10'
Y    DC  F'20'

      END

```

### Expanded Source Code :

```

MAC  START100
TOTAL EQU 5
      L    1, D1
      SR   2, 2
      A    1, =F'5'
LOOP1  L    1, D1
      L    2, D2
      AR   1, 2
      MUL  1, D3
      ST   N, 1
      ST   2, 1
      AR   TOTAL, 2
      L    1, X
      S    1, Y
      ST   2, 1

      BR   14
D1   DC  F'3'
D2   DC  F'45'
D3   DC  F'21'
X    DC  F'10'
Y    DC  F'20'

      END

```

# Example 2

```
//Input.asm
MACRO
INCR1 &FIRST,&SECOND
  A 1,&FIRST
  L 2,&SECOND
  ST 1,&FIRST
MEND
PRG2 START
      USING      *,14
      INCR1      TEMP,RES
      SR         1,1
FOUR   DC        F'4'
FIVE   DC        F'5'
RES    DS        1F
TEMP   DC        F'2'
      END
```

# Pass1

MNTC=1

MDTC=1

## Intermediate file of Pass1

PRG2 START

USING \*,14

INCR1 TEMP,RES

FOUR DC F'4'

FIVE DC F'5'

RES DS 1F

TEMP DC F'2'

END

### Macro Name Table :

MNTC	Macro Name	MDTC
1	INCR1	1

### Macro Definition Table :

MDTC	Macro Card
1	INCR1 &FIRST,&SECOND
2	A,1,#1
3	L,2,#2
4	ST,1,#1
5	MEND
6	




**Argument List Array :**

Index	Formal Args	Actual Args
1	FIRST	TEMP
2	SECOND	RES
2		

**PASS2:**

Input file of pass 2

Intermediate file of Pass1

**PRG2 START**

**USING \*,14**

**INCR1 TEMP,RES**

**FOUR DC F'4'**

**FIVE DC F'5'**

**RES DS 1F**

TEMP DC F'2'  
END

Argument List Array :

Index	Formal Args	Actual Args
1	FIRST	TEMP
2	SECOND	RES
2		

Expanded code as output of Pass2

PRG2 START  
USING \*,14  
**A,1 TEMP**  
**L,2,RES**  
**ST,1,FIRST**  
FOUR DC F'4'  
FIVE DC F'5'  
RES DS 1F  
TEMP DC F'2'  
END