System Programming Lab
BCSE 3rd year 1st Semester
Name: Sayantan Biswas
Roll No: 001910501057

>> ***I have done this assignment in C++***

- ## Assignment 3

Q:

Design of 8086 simulator/Assembler which supports macroprocessor using C language following the working principle of Two pass Assembler.

Group A2

C++ Implementation for Two pass Assembler-

Run pass2.cpp ONLY. It automatically invokes functions for pass 1 of assembler.

By default, input file is "input_fibonacci.txt". Can be changed in pass1.cpp

Intermediate file and a modification file is maintained, which is used during the run of the program. Need not be viewed by user.

Object file is saved in "object.txt"

Listing file is saved in "list.txt"

Errors, if any, are saved in "error.txt"

FEATURES IMPLEMENTED-

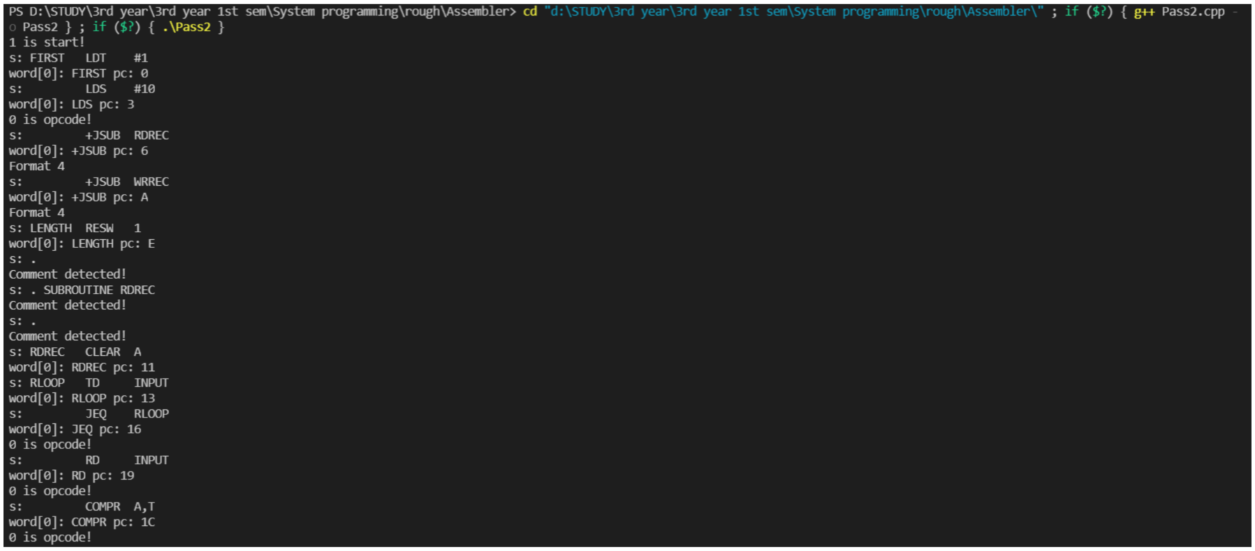
-> Different addressing modes for SIC/XE

-> Program Blocks

-> Modification Records

//-> Literals and expressions

Output:



```
PS D:\STUDY\3rd year\3rd year 1st sem\System programming\rough\Assembler> cd "d:\STUDY\3rd year\3rd year 1st sem\System programming\rough\Assembler\" ; if ($?) { g++ Pass2.cpp -
o Pass2 } ; if ($?) { .\Pass2 }
1 is start!
s: FIRST   LDT    #1
word[0]: FIRST pc: 0
s:         LDS    #10
word[0]: LDS pc: 3
0 is opcode!
s:         +JSUB  RDREC
word[0]: +JSUB pc: 6
Format 4
s:         +JSUB  WRREC
word[0]: +JSUB pc: A
Format 4
s: LENGTH  RESW   1
word[0]: LENGTH pc: E
s: .
Comment detected!
s: . SUBROUTINE RDREC
Comment detected!
s: .
Comment detected!
s: RDREC   CLEAR  A
word[0]: RDREC pc: 11
s: RLOOP   TD     INPUT
word[0]: RLOOP pc: 13
s:         JEQ    RLOOP
word[0]: JEQ pc: 16
0 is opcode!
s:         RD     INPUT
word[0]: RD pc: 19
0 is opcode!
s:         COMPR  A,T
word[0]: COMPR pc: 1C
0 is opcode!
```

Full ouput-

1 is start!

s: FIRST   LDT   #1

word[0]: FIRST pc: 0

s: LDS   #10

word[0]: LDS pc: 3

```
0 is opcode!

s:      +JSUB  RDREC

word[0]: +JSUB pc: 6

Format 4

s:      +JSUB  WRREC

word[0]: +JSUB pc: A

Format 4

s: LENGTH  RESW   1

word[0]: LENGTH pc: E

s: .

Comment detected!

s: . SUBROUTINE RDREC

Comment detected!

s: .

Comment detected!

s: RDREC   CLEAR  A

word[0]: RDREC pc: 11

s: RLOOP   TD     INPUT

word[0]: RLOOP pc: 13

s:      JEQ    RLOOP

word[0]: JEQ pc: 16

0 is opcode!
```

```
s:        RD     INPUT
word[0]: RD pc: 19
0 is opcode!
s:        COMPR  A,T
word[0]: COMPR pc: 1C
0 is opcode!
s:        JLT    RLOOP
word[0]: JLT pc: 1E
0 is opcode!
s:        COMPR  A,S
word[0]: COMPR pc: 21
0 is opcode!
s:        JGT    RLOOP
word[0]: JGT pc: 23
0 is opcode!
s:        STA    LENGTH
word[0]: STA pc: 26
0 is opcode!
s:        RSUB
word[0]: RSUB pc: 29
0 is opcode!
s: INPUT   BYTE   X'F1'
```

```
word[0]: INPUT pc: 2C
s: .
Comment detected!
s: .SUBROUTINE WDREC
Comment detected!
s: .
Comment detected!
s: WRREC   LDX    #0
word[0]: WRREC pc: 2D
s:         LDS    #1
word[0]: LDS pc: 30
0 is opcode!
s:         LDA    #0
word[0]: LDA pc: 33
0 is opcode!
s:         LDT    LENGTH
word[0]: LDT pc: 36
0 is opcode!
s: WLOOP   TD     OUTPUT
word[0]: WLOOP pc: 39
s:         JEQ    WLOOP
word[0]: JEQ pc: 3C
```

```
0 is opcode!
s:       WD     OUTPUT
word[0]: WD pc: 3F
0 is opcode!
s:       ADDR   S,A
word[0]: ADDR pc: 42
0 is opcode!
s:       STA    VALUE1
word[0]: STA pc: 44
0 is opcode!
s:       STS    VALUE2
word[0]: STS pc: 47
0 is opcode!
s:       LDA    VALUE2
word[0]: LDA pc: 4A
0 is opcode!
s:       LDS    VALUE1
word[0]: LDS pc: 4D
0 is opcode!
s:       TIXR   T
word[0]: TIXR pc: 50
0 is opcode!
```

```
s:        JLT    WLOOP
word[0]: JLT pc: 52
0 is opcode!
s: OUTPUT  BYTE   X'05'
word[0]: OUTPUT pc: 55
s: VALUE1  RESW   1
word[0]: VALUE1 pc: 56
s: VALUE2  RESW   1
word[0]: VALUE2 pc: 59
s:        END    FIRST
Input for line: 5
FIBO
START
0
0

Input for line: 10
FIRST
LDT
#1
0
3
```

```
Format 3
LDT
Immediate!
a[2]: LDT:::750001
opcode: LDT:::Input for line: 15


LDS
#10
3
6
Format 3
LDS
Immediate!
a[2]: LDS:::6D000A
opcode: LDS:::Input for line: 20


+JSUB
RDREC
6
A
a[2]: +JSUB:::4B100011
opcode: +JSUB:::Input for line: 25
```

```
+JSUB
WRREC
A
E
a[2]: +JSUB:::4B10002D
opcode: +JSUB:::Input for line: 30
LENGTH
RESW
1
E
11
opcode: RESW:::Input for line: 35
$
.



Input for line: 40
$
. SUBROUTINE RDREC
```

```
Input for line: 45

$

.



Input for line: 50

RDREC

CLEAR

A

11

13

Format 2


Not Isdigit! ob2: 0

a[2]: CLEAR ob1:B4ob2:0

a[2]: CLEAR:::B400

opcode: CLEAR:::Input for line: 55

RLOOP

TD
```

```
INPUT
13
16
Format 3
TD
prgm_ctr: 16 operand_addr: 2C
disp: 22
a[2]: TD:::E32016
opcode: TD:::Input for line: 60


JEQ
RLOOP
16
19
Format 3
JEQ
prgm_ctr: 19 operand_addr: 13
disp: -6
a[2]: JEQ:::332FFA
opcode: JEQ:::Input for line: 65


RD
```

```
INPUT
19
1C
Format 3
RD
prgm_ctr: 1C operand_addr: 2C
disp: 16
a[2]: RD:::DB2010
opcode: RD:::Input for line: 70

COMPR
A,T
1C
1E
Format 2
a[2]: COMPR ob1:A0ob2:5
a[2]: COMPR:::A005
opcode: COMPR:::Input for line: 75

JLT
RLOOP
1E
```

```
21
Format 3
JLT
prgm_ctr: 21 operand_addr: 13
disp: -14
a[2]: JLT:::3B2FF2
opcode: JLT:::Input for line: 80

COMPR
A,S
21
23
Format 2
a[2]: COMPR ob1:A0ob2:4
a[2]: COMPR:::A004
opcode: COMPR:::Input for line: 85

JGT
RLOOP
23
26
Format 3
```

```
JGT
prgm_ctr: 26 operand_addr: 13
disp: -19
a[2]: JGT:::372FED
opcode: JGT:::Input for line: 90

STA
LENGTH
26
29
Format 3
STA
prgm_ctr: 29 operand_addr: E
disp: -27
a[2]: STA:::0F2FE5
opcode: STA:::Input for line: 95

RSUB

29
2C
a[2]: RSUB:::4F0000
```

```
opcode: RSUB:::Input for line: 100
INPUT
BYTE
X'F1'
2C
2D
a[2]: BYTE:::F1
opcode: BYTE:::Input for line: 105
$
.



Input for line: 110
$
.SUBROUTINE WDREC



Input for line: 115
$
.
```

```
Input for line: 120
WRREC
LDX
#0
2D
30
Format 3
LDX
Immediate!
a[2]: LDX:::050000
opcode: LDX:::Input for line: 125

LDS
#1
30
33
Format 3
LDS
Immediate!
```

```
a[2]: LDS:::6D0001
opcode: LDS:::Input for line: 130

LDA
#0
33
36
Format 3
LDA
Immediate!
a[2]: LDA:::010000
opcode: LDA:::Input for line: 135

LDT
LENGTH
36
39
Format 3
LDT
prgm_ctr: 39 operand_addr: E
disp: -43
a[2]: LDT:::772FD5
```

```
opcode: LDT:::Input for line: 140
WLOOP
TD
OUTPUT
39
3C
Format 3
TD
prgm_ctr: 3C operand_addr: 55
disp: 25
a[2]: TD:::E32019
opcode: TD:::Input for line: 145

JEQ
WLOOP
3C
3F
Format 3
JEQ
prgm_ctr: 3F operand_addr: 39
disp: -6
a[2]: JEQ:::332FFA
```

```
opcode: JEQ:::Input for line: 150

WD
OUTPUT
3F
42
Format 3
WD
prgm_ctr: 42 operand_addr: 55
disp: 19
a[2]: WD:::DF2013
opcode: WD:::Input for line: 155

ADDR
S,A
42
44
Format 2
a[2]: ADDR ob1:90ob2:40
a[2]: ADDR:::9040
opcode: ADDR:::Input for line: 160
```

```
STA
VALUE1
44
47
Format 3
STA
prgm_ctr: 47 operand_addr: 56
disp: 15
a[2]: STA:::0F200F
opcode: STA:::Input for line: 165

STS
VALUE2
47
4A
Format 3
STS
prgm_ctr: 4A operand_addr: 59
disp: 15
a[2]: STS:::7F200F
opcode: STS:::Input for line: 170
```

```
LDA
VALUE2
4A
4D
Format 3
LDA
prgm_ctr: 4D operand_addr: 59
disp: 12
a[2]: LDA:::03200C
opcode: LDA:::Input for line: 175

LDS
VALUE1
4D
50
Format 3
LDS
prgm_ctr: 50 operand_addr: 56
disp: 6
a[2]: LDS:::6F2006
opcode: LDS:::Input for line: 180
```

```
TIXR
T
50
52
Format 2
5
Not Isdigit! ob2: 50
a[2]: TIXR ob1:B8ob2:50
a[2]: TIXR:::B850
opcode: TIXR:::Input for line: 185

JLT
WLOOP
52
55
Format 3
JLT
prgm_ctr: 55 operand_addr: 39
disp: -28
a[2]: JLT:::3B2FE4
opcode: JLT:::Input for line: 190
OUTPUT
```

```
BYTE
X'05'
55
56
a[2]: BYTE:::05
opcode: BYTE:::Input for line: 195
VALUE1
RESW
1
56
59
opcode: RESW:::Input for line: 200
VALUE2
RESW
1
59
5C
opcode: RESW:::Input for line: 205

END
FIRST
5C
```

INPUT FILE ASSEMBLED SUCCESSFULY!!
