

# CS348-Assignment 2

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## README

### Submission Contents:

- A2\_200101079.cpp
- Readme
- sample\_input.txt
- intermediate.txt
- output.txt
- opcode\_table.txt
- symbol\_table.txt

### Running the code:

- To compile the code:

`g++ A2_200101079.cpp`

```
C:\Users\DELL\OneDrive\Desktop\sem 6\IPLL\A2_200101079>g++ A2_200101079.cpp
```

- To run the code:

`a.exe <sample_input.txt`

```
C:\Users\DELL\OneDrive\Desktop\sem 6\IPLL\A2_200101079>a.exe <sample_input.txt
```

Note: sample\_input.txt is the input file here. Any other input file can also be used by changing the command.

## Description:

The entire code can be split into the following sections:

- SET OPCODE TABLE
- PRINT OPCODE TABLE IN opcode\_table.txt FILE
- PRINT SYMBOL TABLE IN symbol\_table.txt FILE
- PARSE INPUT AND STORE IT IN A VECTOR
- SET THE ADDRESS OF EACH INSTRUCTION
  - BYTE
  - RESB
  - RESW
  - OTHERS
- GENERATE THE OBJECT CODE
  - RESB/RESW/END
  - BYTE
  - WORD
  - OTHERS
- GENERATE THE MACHINE CODE

*Note:* The steps are shown in the code's comments in uppercase.

## Output:

On running the code, two output files are generated. They are

- **intermediate.txt**

The intermediate code, along with comments, is shown in this file. The file's name can be changed in the first line of the generate\_final\_object\_code() function. This code is fully formatted and contains the address of the instruction followed by the label, opcode, and operand in each line.

≡ intermediate.txt

```
1 1000 COPY START 1000
2 1000 FIRST STL RETADR
3 1003 CLOOP JSUB RDREC
4 1006 LDA LENGTH
5 1009 COMP ZERO
6 100C JEQ ENDFIL
7 100F JSUB WRREC
8 1012 J CLOOP
9 1015 ENDFIL LDA EOF
10 1018 STA BUFFER
11 101B LDA THREE
12 101E STA LENGTH
13 1021 JSUB WRREC
14 1024 LDL RETADR
15 1027 RSUB
16 102A EOF BYTE C'EOF'
17 102D THREE WORD 3
18 1030 ZERO WORD 0
19 1033 RETADR RESW 1
20 1036 LENGTH RESW 1
21 1039 BUFFER RESB 4096
22 .
23 . SUBROUTINE TO READ RECORD INTO BUFFER
24 .
25 2039 RDREC LDX ZERO
26 203C LDA ZERO
27 203F RLOOP TD INPUT
28 2042 JEQ RLOOP
29 2045 RD INPUT
30 2048 COMP ZERO
31 204B JEQ EXIT
32 204E STCH BUFFER,X
33 2051 TIX MAXLEN
34 2054 JLT RLOOP
35 2057 EXIT STX LENGTH
36 205A RSUB
37 205D INPUT BYTE X'F1'
38 205E MAXLEN WORD 4096
39 .
40 . SUBROUTINE TO WRITE RECORD FROM BUFFER
41 .
42 2061 WRREC LDX ZERO
43 2064 WLOOP TD OUTPUT
44 2067 JEQ WLOOP
45 206A LDCH BUFFER,X
46 206D WD OUTPUT
47 2070 TIX LENGTH
48 2073 JLT WLOOP
49 2076 RSUB
50 2079 OUTPUT BYTE X'05'
51 207A END FIRST
52
```

- **output.txt**

The machine code is shown in this file. The file's name can be changed in the first line of the `generate_machine_code()` function.

```
≡ output.txt
1  HCOPY  00100000107A
2  T0010001E1410334820390010362810303010154820613C100300102A0C103900102D
3  T00101E150C10364820610810334C0000454F46000003000000
4  T0020391E041030001030E0205D30203FD8205D2810303020575490392C205E38203F
5  T0020571C1010364C0000F1001000041030E02079302064509039DC20792C1036
6  T002073073820644C000005
7  E001000
8  |
```

- **opcode\_table.txt**

The opcode table is printed in this file. The file's name can be changed in the first line of the `print_opcode_table()` function.

```
≡ opcode_table.txt
1  STSW E8
2  MJL 20
3  OR 44
4  STX 10
5  LDCH 50
6  WD DC
7  RD D8
8  TD E0
9  LDL 08
10 JLT 38
11 ADD 18
12 STL 14
13 AND 40
14 LDA 00
15 JGT 34
16 TIX 2C
17 JEQ 30
18 DIV 24
19 SUB 1C
20 STCH 54
21 LDX 04
22 RSUB 4C
23 J 3C
24 STA 0C
25 COMP 28
26 JSUB 48
27
```

- **symbol\_table.txt**

The symbol table is printed in this file. The label and its corresponding address are printed in this file. The file's name can be changed in the first line of the `print_symbol_table()` function.

```
≡ symbol_table.txt
1  OUTPUT 2079
2  WLOOP 2064
3  INPUT 205D
4  EXIT 2057
5  WRREC 2061
6  RLOOP 203F
7  RETADR 1033
8  CLOOP 1003
9  FIRST 1000
10 ENDFIL 1015
11 RDREC 2039
12 EOF 102A
13 THREE 102D
14 MAXLEN 205E
15 LENGTH 1036
16 ZERO 1030
17 BUFFER 1039
18
```

THANK YOU