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Problem Statement: Design suitable data structures and implement pass-I of a two-pass assembler for pseudo-

machine in Java using object oriented feature. Implementation should consist of a few

instructions from each category and few assembler directives.

\*/

import java.io.\*;

class SymTab

{

public static void main(String args[])throws Exception

{

FileReader FP=new FileReader(args[0]);

BufferedReader bufferedReader = new BufferedReader(FP);

String line=null;

int line\_count=0,LC=0,symTabLine=0,opTabLine=0,litTabLine=0,poolTabLine=0;

//Data Structures

final int MAX=100;

String SymbolTab[][]=new String[MAX][3];

String OpTab[][]=new String[MAX][3];

String LitTab[][]=new String[MAX][2];

int PoolTab[]=new int[MAX];

int litTabAddress=0;

/\*---------------------------------------------------------------------------------------------------\*/

System.out.println("\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_");

while((line = bufferedReader.readLine()) != null)

{

String[] tokens = line.split("\t");

if(line\_count==0)

{

LC=Integer.parseInt(tokens[2]);

//set LC to operand of START

for(int i=0;i<tokens.length;i++) //for printing the input program

System.out.print(tokens[i]+"\t");

System.out.println("");

}

else

{

for(int i=0;i<tokens.length;i++) //for printing the input program

System.out.print(tokens[i]+"\t");

System.out.println("");

if(!tokens[0].equals(""))

{

//Inserting into Symbol Table

SymbolTab[symTabLine][0]=tokens[0];

SymbolTab[symTabLine][1]=Integer.toString(LC);

SymbolTab[symTabLine][2]=Integer.toString(1);

symTabLine++;

}

else if(tokens[1].equalsIgnoreCase("DS")||tokens[1].equalsIgnoreCase("DC"))

{

//Entry into symbol table for declarative statements

SymbolTab[symTabLine][0]=tokens[0];

SymbolTab[symTabLine][1]=Integer.toString(LC);

SymbolTab[symTabLine][2]=Integer.toString(1);

symTabLine++;

}

if(tokens.length==3 && tokens[2].charAt(0)=='=')

{

//Entry of literals into literal table

LitTab[litTabLine][0]=tokens[2];

LitTab[litTabLine][1]=Integer.toString(LC);

litTabLine++;

}

else if(tokens[1]!=null)

{

//Entry of Mnemonic in opcode table

OpTab[opTabLine][0]=tokens[1];

if(tokens[1].equalsIgnoreCase("START")||tokens[1].equalsIgnoreCase("END")||tokens[1].equalsIgnoreCase("ORIGIN")||tokens[1].equalsIgnoreCase("EQU")||tokens[1].equalsIgnoreCase("LTORG")) //if Assembler Directive

{

OpTab[opTabLine][1]="AD";

OpTab[opTabLine][2]="R11";

}

else if(tokens[1].equalsIgnoreCase("DS")||tokens[1].equalsIgnoreCase("DC"))

{

OpTab[opTabLine][1]="DL";

OpTab[opTabLine][2]="R7";

}

else

{

OpTab[opTabLine][1]="IS";

OpTab[opTabLine][2]="(04,1)";

}

opTabLine++;

}

}

line\_count++;

LC++;

}

System.out.println("\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_");

//print symbol table

System.out.println("\n\n SYMBOL TABLE ");

System.out.println("--------------------------");

System.out.println("SYMBOL\tADDRESS\tLENGTH");

System.out.println("--------------------------");

for(int i=0;i<symTabLine;i++)

System.out.println(SymbolTab[i][0]+"\t"+SymbolTab[i][1]+"\t"+SymbolTab[i][2]);

System.out.println("--------------------------");

//print opcode table

System.out.println("\n\n OPCODE TABLE ");

System.out.println("----------------------------");

System.out.println("MNEMONIC\tCLASS\tINFO");

System.out.println("----------------------------");

for(int i=0;i<opTabLine;i++)

System.out.println(OpTab[i][0]+"\t\t"+OpTab[i][1]+"\t"+OpTab[i][2]);

System.out.println("----------------------------");

//print literal table

System.out.println("\n\n LITERAL TABLE ");

System.out.println("-----------------");

System.out.println("LITERAL\tADDRESS");

System.out.println("-----------------");

for(int i=0;i<litTabLine;i++)

System.out.println(LitTab[i][0]+"\t"+LitTab[i][1]);

System.out.println("------------------");

//intialization of POOLTAB

for(int i=0;i<litTabLine;i++)

{

if(LitTab[i][0]!=null && LitTab[i+1][0]!=null ) //if literals are present

{

if(i==0)

{

PoolTab[poolTabLine]=i+1;

poolTabLine++;

}

else if(Integer.parseInt(LitTab[i][1])<(Integer.parseInt(LitTab[i+1][1]))-1)

{

PoolTab[poolTabLine]=i+2;

poolTabLine++;

}

}

}

//print pool table

System.out.println("\n\n POOL TABLE ");

System.out.println("-----------------");

System.out.println("LITERAL NUMBER");

System.out.println("-----------------");

for(int i=0;i<poolTabLine;i++)

System.out.println(PoolTab[i]);

System.out.println("------------------");

// Always close files.

bufferedReader.close();

}

}

/\*

OUTPUT-

neha@neha-1011PX:~/neha\_SPOS$ javac SymTab.java

neha@neha-1011PX:~/neha\_SPOS$ java SymTab input.txt

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

START 100

READ A

LABLE MOVER A,B

LTORG

='5'

='1'

='6'

='7'

MOVEM A,B

LTORG

='2'

LOOP READ B

A DS 1

B DC '1'

='1'

END

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SYMBOL TABLE

--------------------------

SYMBOL ADDRESS LENGTH

--------------------------

LABLE 102 1

LOOP 111 1

A 112 1

B 113 1

--------------------------

OPCODE TABLE

----------------------------

MNEMONIC CLASS INFO

----------------------------

READ IS (04,1)

MOVER IS (04,1)

LTORG AD R11

MOVEM IS (04,1)

LTORG AD R11

READ IS (04,1)

DS DL R7

DC DL R7

END AD R11

----------------------------

LITERAL TABLE

-----------------

LITERAL ADDRESS

-----------------

='5' 104

='1' 105

='6' 106

='7' 107

='2' 110

='1' 114

------------------

POOL TABLE

-----------------

LITERAL NUMBER

-----------------

1

5

6

------------------

\*/

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Problem Statement: Implement Pass-II of two pass assembler for pseudo-machine in Java using object oriented

features. The output of assignment-1 (intermediate file and symbol table) should be

input for this assignment.

\*/

import java.io.BufferedReader;

import java.io.FileReader;

import java.io.FileWriter;

import java.io.IOException;

import java.util.HashMap;

public class Pass2 {

public static void main(String[] Args) throws IOException{

BufferedReader b1 = new BufferedReader(new FileReader("intermediate.txt"));

BufferedReader b2 = new BufferedReader(new FileReader("symtab.txt"));

BufferedReader b3 = new BufferedReader(new FileReader("littab.txt"));

FileWriter f1 = new FileWriter("Pass2.txt");

HashMap<Integer, String> symSymbol = new HashMap<Integer, String>();

HashMap<Integer, String> litSymbol = new HashMap<Integer, String>();

HashMap<Integer, String> litAddr = new HashMap<Integer, String>();

String s;

int symtabPointer=1,littabPointer=1,offset;

while((s=b2.readLine())!=null){

String word[]=s.split("\t\t\t");

symSymbol.put(symtabPointer++,word[1]);

}

while((s=b3.readLine())!=null){

String word[]=s.split("\t\t");

litSymbol.put(littabPointer,word[0]);

litAddr.put(littabPointer++,word[1]);

}

while((s=b1.readLine())!=null){

if(s.substring(1,6).compareToIgnoreCase("IS,00")==0){

f1.write("+ 00 0 000\n");

}

else if(s.substring(1,3).compareToIgnoreCase("IS")==0){

f1.write("+ "+s.substring(4,6)+" ");

if(s.charAt(9)==')'){

f1.write(s.charAt(8)+" ");

offset=3;

}

else{

f1.write("0 ");

offset=0;

}

if(s.charAt(8+offset)=='S')

f1.write(symSymbol.get(Integer.parseInt(s.substring(10+offset,s.length()-1)))+"\n");

else

f1.write(litAddr.get(Integer.parseInt(s.substring(10+offset,s.length()-1)))+"\n");

}

else if(s.substring(1,6).compareToIgnoreCase("DL,01")==0){

String s1=s.substring(10,s.length()-1),s2="";

for(int i=0;i<3-s1.length();i++)

s2+="0";

s2+=s1;

f1.write("+ 00 0 "+s2+"\n");

}

else{

f1.write("\n");

}

}

f1.close();

b1.close();

b2.close();

b3.close();

}

}

/\*

OUTPUT:

neha@neha-1011PX:~/Desktop/neha\_SPOS/Turn1/A2$ javac Pass2.java

neha@neha-1011PX:~/Desktop/neha\_SPOS/Turn1/A2$ java Pass2

neha@neha-1011PX:~/Desktop/neha\_SPOS/Turn1/A2$ cat Pass2.txt

intermediate code -

(AD,01)(C,200)

(IS,04)(1)(L,1)

(IS,05)(1)(S,1)

(IS,04)(1)(S,1)

(IS,04)(3)(S,3)

(IS,01)(3)(L,2)

(IS,07)(6)(S,4)

(DL,01)(C,5)

(DL,01)(C,1)

(IS,02)(1)(L,3)

(IS,07)(1)(S,5)

(IS,00)

(AD,03)(S,2)+2

(IS,03)(3)(S,3)

(AD,03)(S,6)+1

(DL,02)(C,1)

(DL,02)(C,1)

(AD,02)

(DL,01)(C,1)

Symbol Table --

A 211 1

LOOP 202 1

B 212 1

NEXT 208 1

BACK 202 1

LAST 210 1

literal table --

5 206

1 207

1 213

machine code --

+ 04 1 206

+ 05 1 211

+ 04 1 211

+ 04 3 212

+ 01 3 207

+ 07 6 208

+ 00 0 005

+ 00 0 001

+ 02 1 213

+ 07 1 202

+ 00 0 000

+ 03 3 212 \*/