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2016230069 TE COMPS
BATCH E

CODE:

MACRO

```
import java.io.*;
import java.util.*;
class MNT{
    String name;
    int addr;
    String ala[] = new String[10];

    public String getName()
            { return name; }
    public int getAddr()
            {return addr; }
    public String getAla(int i)
            { return ala[i]; }

    public void setName(String name)
            { this.name = name ;}
    public void setAddr(int addr)
            { this.addr = addr ;}
    public void setAla(int i, String val)
            { this.ala[i] = val; }

    public int findInAla(String word){
            for(int i=0; i<ala.length;i++)
                    if(ala[i].compareTo(word)==0)
                            return i;
            return -1;
    }

}

public class NIKIM{
    static BufferedReader br;
    static    MNT[] mnt = new MNT[10] ;
    static    boolean foundM = false, foundMend=false;
    static int mntc = 1, mdtp=0;
    static int mdtc = 1, i=0;
    static String mdt[] = new String[50];
    private static final String FILENAME = "/home/students/Downloads/Intermediate.asm";
            static BufferedWriter bw = null;
    static FileWriter fw = null;

    private static final String FILENAME1 = "/home/students/Downloads/Final.asm";
            static BufferedWriter bw1 = null;
    static FileWriter fw1 = null;
```

```
    public static void main(String args[]){
        try{

        File file = new File(FILENAME);
        br = new BufferedReader(new FileReader("Codem.asm"));
        System.out.println();

        String line = br.readLine();
        while(line!=null){
                String arrOfStr[] = line.split(" ");                    //array of all words in string
                int len = arrOfStr.length;

                if(foundM){
                        i=0;
                        mnt[mntc] = new MNT();
                        for(String word : arrOfStr){                    //for all words
                                if(word.startsWith("&")){                       //prepare ALA (index,ARG)
                                        mnt[mntc].setAla(i, word);
                                        i++;
                                        //System.out.println("Arg - "+mnt[mntc].getAla(i) +" at loc "+i);
                                }else{
                                        mnt[mntc].setName(word); mnt[mntc].setAddr(mdtc);
                                        //System.out.println("Name - "+mnt[mntc].getName() +" at addr
"+mdtc);
                                }
                        }
                        System.out.println("Ala of mnt "+mnt[mntc].getName()+":");
                        for(int j=0;j<i;j++)
                                System.out.println(mnt[mntc].getAla(j)+" at loc "+j);
                        System.out.println();
                        mntc++;
                        mdt[mdtc]=line; mdtc++;
                        foundM = false;
                }else{
                        if(line.compareTo("MACRO")==0){
                                foundM = true; foundMend = false;
                                //read next line
                        }
                        else if(line.compareTo("MEND")==0){
                                mdt[mdtc]=line; mdtc++;
                                foundMend = true;
                                //read next line
                        }
                        else if(!foundMend){                                            //mdt entry until mend
                                String temp;
                                for(String word : arrOfStr){
                                        if(word.startsWith("&")){
                                                int index = mnt[mntc-1].findInAla(word);
                                                temp = "#"+Integer.toString(index);
                                                line = line.replace(word,temp);
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                        }
                    }
                    mdt[mdtc]=line; mdtc++;
                 //read next line
                }
                else if(!foundM && foundMend){
                        if (!file.exists()) {
                        file.createNewFile();
                        }
                    fw = new FileWriter(file, true);
                    bw = new BufferedWriter(fw);
                    bw.write(line+"\n");


                    if (bw != null)
                    bw.close();

                   if (fw != null)
                    fw.close();
                }
                else if(line.compareTo("END")==0){
                 //read next line
                }
        }
        line = br.readLine();
}

System.out.println("--------MDT--------");
for(int j=1;j<mdtc;j++)
        System.out.println(   j+" "+mdt[j]);
System.out.println("Curr MDTC at: "+mdtc);
System.out.println("Curr MNTC at: "+mntc);
br.close();


System.out.println("-----PASS 2-----");
boolean noexpand = false;
foundM = false; foundMend = false;
br = new BufferedReader(new FileReader("Intermediate.asm"));
System.out.println();
line = br.readLine();
File file1 = new File(FILENAME1);
while(line!=null){
        String arrOfStr[] = line.split(" ");                    //array of all words in string
        int len = arrOfStr.length;
                int index=0;
                for(String word : arrOfStr){
                    for(i=1;i<mntc;i++){
                        if(word.compareTo(mnt[i].getName())==0){
                                index = i; break;
                        }
```

```
                        }
                    }
                    if(index>0){
                        mdtp=mnt[index].getAddr();
                        i=0;
                        for(String word : arrOfStr){
                            if(word.compareTo(mnt[index].getName())!=0){
                                mnt[index].setAla(i, word);
                                i++;
                            }
                        }
                        //mdtp++;
                        String temp = mdt[++mdtp];
                        //System.out.println(temp);
                        while(temp.compareTo("MEND")!=0){
                            String arrOfReplace[] = temp.split(" ");
                            for(String word : arrOfReplace){
                                if(word.startsWith("#")){
                                    String somestr = word.substring(1);
                                    int repIndex = Integer.parseInt(somestr);
                                    temp = temp.replace(word,
mnt[index].getAla(repIndex));
                                }
                            }
                            System.out.println(temp);
                            temp = mdt[++mdtp];
                        }
                    }else{
                        System.out.println(line);
                    }

                line = br.readLine();
            }
            br.close();
           }
           catch(Exception e){
                e.printStackTrace();
            }


    }
}
```

Codem.asm

```
MACRO
&LAB ADD &A1
&LAB A 1 , &A1
MEND
MACRO
&A0 ADDS &A1 &A2
&A0 A 2 , &A1
```

ST 2 , &A2
MEND
PRGM START 0
USING * , 15
LOOP1 ADD D1
LOOP2 ADDS D2 D3
ST 1,3
END

OUTPUT: