TWO PASS ASSEMBLER

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S7 CSE B

24

PASS ONE
****

```c
#include<stdio.h>
#include<string.h>

void main()
{
        int locctr=0,f=0,start=0;
        char c,label[10],opcode[10],operand[10],symname[10];
        FILE *f1,*f2,*f3,*f4;
        f1=fopen("input.txt","r");
        f2=fopen("intermediate.txt","w");
        f3=fopen("symbol.txt","r+");
        f4=fopen("size.txt","w");
        while((c=fgetc(f1))!=EOF)
        {
                fscanf(f1," %s\t %s\t %s",label,opcode,operand);
                if(!strcmp(opcode,"START"))
                {
                        start=atoi(operand);
                        locctr=atoi(operand);
                        fprintf(f2," %d\t%s\t%s\t%s\n",locctr,label,opcode,operand);
                }
                else
                        locctr=0;
                while(strcmp(opcode,"END"))
                {
                        fscanf(f1,"%s\t%s\t%s",label,opcode,operand);
                        fprintf(f2," %d\t%s\t%s\t%s\n",locctr,label,opcode,operand);
                        if(label[0]!='#')
                        {
                                if(strcmp(label,"-"))
                                {
                                        rewind(f3);
                                        while(!feof(f3))
                                        {
                                                fscanf(f3,"%s",symname);
                                                if(!strcmp(symname,label))
                                                {
                                                        f=1;
                                                        printf("\nDuplicate label\n");
                                                        break;
                                                }
                                        }
                                        if(f==0)
                                                fprintf(f3,"%s\t%d\n",label,locctr);
                                }
                                if(!strcmp(opcode,"WORD"))
                                        locctr+=3;
                                else if(!strcmp(opcode,"RESW"))
```

```c
                              locctr=locctr+(3*atoi(operand));
                    else if(!strcmp(opcode,"RESB"))
                              locctr=locctr+atoi(operand);
                    else if(!strcmp(opcode,"BYTE"))
                              locctr=locctr+strlen(operand)-3;
                    else
                              locctr+=3;
               }
          }
          printf("\nThe length of the program : %d\n",locctr-start-3);
          fprintf(f4,"%d",locctr-start-3);
          break;
     }
     fclose(f1);
     fclose(f2);
     fclose(f3);
     fclose(f4);
}
```

PASS TWO
****
```c
#include<stdio.h>
#include<string.h>

void main()
{
        int locctr=0,fo=0,fs=0,start=0,size,oploc,symval;
        char c,label[10],opcode[10],operand[10],symname[10],opname[10];
        FILE *f1,*f2,*f3,*f4,*f5;
        f1=fopen("code.txt","w+");
        f2=fopen("intermediate.txt","r");
        f3=fopen("symbol.txt","r+");
        f4=fopen("size.txt","r+");
        f5=fopen("optab.txt","r+");
        while(!feof(f2))
        {
                fscanf(f2," %d\t%s\t%s\t%s\n",&locctr,label,opcode,operand);
                fscanf(f4,"%d",&size);
                if(!strcmp(opcode,"START"))
                {
                        start=atoi(operand);
                        fscanf(f2," %d\t%s\t%s\t%s\n",&locctr,label,opcode,operand);
                }
                fprintf(f1,"H^%d^%d^\n",start,size);
                fprintf(f1,"T^%d^%d^",start,size);
                while(strcmp(opcode,"END"))
                {

                        if(label[0]!='#')
                        {
                                rewind(f5);
                                while(!feof(f5))
                                {
                                        fscanf(f5,"%s\t%d",opname,&oploc);

                                        if(!strcmp(opname,opcode))
                                        {
                                                fo=1;
                                                break;
                                        }
                                }
                                if(fo==1)
                                {
                                        fprintf(f1,"%d",oploc);
                                        fo=0;
                                        rewind(f3);
                                        while(!feof(f3))
                                        {
                                                fscanf(f3,"%s\t%d",symname,&symval);
                                                if(!strcmp(symname,operand))
                                                {
                                                        fs=1;
                                                        break;
                                                }
                                        }
                                        if(fs==1)
                                        {
```

```c
                                        fs=0;
                                        fprintf(f1,"%d",symval);
                                }
                        }
                        if(!strcmp(opcode,"BYTE") || !strcmp(opcode,"WORD"))
                        {
                                if(!strcmp(opcode,"BYTE"))
                                        fprintf(f1,"0000%d",operand[2]);
                                else
                                        fprintf(f1,"00000%d",atoi(operand));
                        }
                }
                if(strcmp(opcode,"RESB") || strcmp(opcode,"RESW"))
                fprintf(f1,"^");
                fscanf(f2," %d\t%s\t%s\t%s\n",&locctr,label,opcode,operand);
        }
    }
    fprintf(f1,"\nE^%d^\n",start);
    fclose(f1);
    fclose(f2);
    fclose(f3);
    fclose(f4);
    fclose(f5);
}
```

INPUT.TXT
****
COPY START 1000
- LDA FIVE
- STA NUM1
- LDCH NUM2
- STCH C1
NUM1 RESW 1
FIVE WORD 5
NUM2 BYTE C'Z'
C1 RESB   1
- END -

SYMBOL.TXT
****
NUM1   1012
FIVE   1015
NUM2   1018
C1   1019

OPTAB.TXT
****
LDA   15
STA   32
LDCH   12
STCH   13

INTERMEDIATE.TXT
****
 1000   COPY   START 1000
 1000   -   LDA   FIVE
 1003   -   STA   NUM1
 1006   -   LDCH   NUM2
 1009   -   STCH   C1
 1012   NUM1   RESW   1
 1015   FIVE   WORD   5
 1018   NUM2   BYTE   C'Z'
 1019   C1   RESB   1
 1020   -   END   -

CODE.TXT
****
H^1000^20^
T^1000^20^151015^321012^121018^131019^^000005^000090^^
E^1000^