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Experiment No. 3

Aim: Implementation of 2 pass assembler

Code:

Pass1 Assembler

```
#include<stdio.h>
#include<conio.h>
#include<string.h>
void main() {
        FILE *f1,*f2,*f3,*f4;
        int lc,sa,l,op1,o,len;
        char m1[20],la[20],op[20],otp[20],ch;
        clrscr();
        f1=fopen("input.txt","r");
        f3=fopen("symtab.txt","w");
        fscanf(f1,"%s %s %d",la,m1,&op1);
        if((strcmp(m1,"START")==0)||(strcmp(m1,"USING")==0)) {
        sa=op1;
        lc=sa;
        printf("\t%s\t%s\t%d\n",la,m1,op1);   }
        else
        lc=0;
        fscanf(f1,"%s %s",la,m1);
        while(!feof(f1)) {
        fscanf(f1,"%s",op);
        printf("\n%d\t%s\t%s\t%s\n",lc,la,m1,op);
        if(strcmp(la,"-")!=0)
        fprintf(f3,"\n%d\t%s\n",lc,la);
        f2=fopen("optab.txt","r");
        fscanf(f2,"%s %d",otp,&o);
```

```
while(!feof(f2)) {
        if(strcmp(m1,otp)==0) {
                lc=lc+4;
                break; }
        fscanf(f2,"%s %d",otp,&o);   }
        fclose(f2);
        if(strcmp(m1,"ST")==0)
        lc=lc+4;
        if(strcmp(m1,"DC")==0)
           lc=lc+4;
        else if(strcmp(m1,"DS")==0)
                lc=lc+4;
        fscanf(f1,"%s%s",la,m1);  }
                if(strcmp(m1,"END")==0)
                printf("Program length =\n%d",lc-sa);
                fclose(f1);
                fclose(f3);
                getch();
                }
```

Input.txt

```
PRG1 START 0
- USING *,15
- L 1,FIVE
- A 1,FOUR
- ST 1,TEMP
FOUR DC F'4'
FIVE DC F'5'
TEMP DS '1'F
- END –
```

Optab.txt

L 58

A 5A

ST 50

Symtab.txt

12 FOUR

16 FIVE

20 TEMP

Output:

```
        PRG1    START   0
0       -       USING   *,15
0       -       L       1,FIVE
4       -       A       1,FOUR
8       -       ST      1,TEMP
12      FOUR    DC      F'4'
16      FIVE    DC      F'5'
20      TEMP    DS      '1'F
24      -       END     -
Program length = 24
```

Pass 2 Assembler

```
#include<stdio.h>
#include<conio.h>
#include<string.h>
#include<ctype.h>
void main() {
        FILE *fint,*ftab,*flen,*fsym;
        int op1[10],txtlen,txtlen1,i,j=0,len;
        char add[5],symadd[5],op[5],start[10],temp[30],line[20],label[20],mne[10];
        char operand[10],symtab[10],opmne[10],ch;
        clrscr();
```

```
fint=fopen("input2.txt","r");
flen=fopen("length.txt","r");
ftab=fopen("optab.txt","r");
fsym=fopen("symtab.txt","r");
fscanf(fint,"%s%s%s%s",add,label,mne,operand);
if(strcmp(mne,"START")==0) {
strcpy(start,operand);
fscanf(flen,"%d",&len); }
printf("\nThe contents of intermediate file:\n");
while((ch=fgetc(fint))!=EOF)
        printf("%c",ch);
fclose(fint);
printf("\nThe contents of symbol table:\n");
while((ch=fgetc(fsym))!=EOF)
        printf("%c",ch);
fclose(fsym);
fint=fopen("input2.txt","r");
fsym=fopen("symtab.txt","r");
printf("\nThe contents of object file:\n");
printf("H^%s^%s^%d\nT^00%s^",label,start,len,start);
fscanf(fint,"%s%s%s%s",add,label,mne,operand);
while(strcmp(mne,"END")!=0) {
fscanf(ftab,"%s%s",opmne,op);
while(!feof(ftab)) {
if(strcmp(mne,opmne)==0) {
fclose(ftab);
fscanf(fsym,"%s%s",symadd,symtab);
while(!feof(fsym)) {
if(strcmp(operand,symtab)==0) {
printf("%s%s",op,symadd);
```

```
        break; }
        else
        fscanf(fsym,"%s%s",symadd,symtab); }
        break; }
        else
        fscanf(ftab,"%s%s",opmne,op); }
        if((strcmp(mne,"DC")==0)||(strcmp(mne,"DS")==0)) {
        len=strlen(operand);
        for(i=2;i<len;i++)
                printf("%d",operand[i]);
        printf("^"); }
        fscanf(fint,"%s%s%s%s",add,label,mne,operand);
        ftab=fopen("optab.txt","r");
        fseek(ftab,SEEK_SET,0); }
        printf("\nE^00%s",start);
        fclose(fint);
        fclose(ftab);
        fclose(fsym);
        fclose(flen);
        getch(); }
```

Intermediate code

```
- PRG1 START 0
0 - USING *,15
0 - L 1,FIVE
4 - A 1,FOUR
8 - ST 1,TEMP
12 FOUR DC F'4'
16 FIVE DC F'5'
20 TEMP DS '1'F
24 - END –
```

Output

The contents of intermediate file:

0 - USING *,15

0 - L 1,FIVE

4 - A 1,FOUR

8 - ST 1,TEMP

12 FOUR DC F'4'

16 FIVE DC F'5'

20 TEMP DS '1'F

24 - END -

The contents of symbol table:

12 FOUR

16 FIVE

20 TEMP

The contents of object file:

H^PRG1^0^24

T^000^5239^5339^3970^

E^000