Implement a single pass assembler.

Source Code

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#include<stdio.h>
#include<stdlib.h>
#include<conio.h>
#include<string.h>

void main() {
  FILE * f1, * f2, * f3, * f4, * f5;
  int lc, sa, i = 0, j = 0, m[10], pgmlen, len, k, len1, l = 0;
  char name[10], opnd[10], la[10], mne[10], s1[10], mne1[10], opnd1[10],lcs[10], ms[10];
  char sym[10], symaddr[10], obj1[10], obj2[10], s2[10], q[10], s3[10];
  f1 = fopen("input.txt", "r");
  f2 = fopen("optab.txt", "r");
  f3 = fopen("symtab.txt", "w+");
  f4 = fopen("symtab1.txt", "w+");
  f5 = fopen("output.txt", "w+");
  fscanf(f1, "%s%s%s", la, mne, opnd);
  if (strcmp(mne, "START") == 0) {
    sa = atoi(opnd);
    strcpy(name, la);
    lc = sa;
  }
  strcpy(s1, "*");
  fscanf(f1, "%s%s%s", la, mne, opnd);
  while (strcmp(mne, "END") != 0) {
    if (strcmp(la, "-") == 0) {
      fscanf(f2, "%s%s", mne1, opnd1);
      while (!feof(f2)) {
        if (strcmp(mne1, mne) == 0) {
          m[i] = lc + 1;
          fprintf(f3, "%s\t%s\n", opnd, s1);
          fprintf(f5, "%s\t0000\n", opnd1);
          lc = lc + 3;
          i = i + 1;
          break;
        } else
          fscanf(f2, "%s%s", mne1, opnd1);
      }

    } else {
      fseek(f3, SEEK_SET, 0);
      fscanf(f3, "%s%s", sym, symaddr);
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    while (!feof(f3)) {
      if (strcmp(sym, la) == 0) {
        itoa(lc, lcs, 10);
        fprintf(f4, "%s\t%s\n", la, lcs);
        itoa(m[j], ms, 10);
        j = j + 1;
        fprintf(f5, "%s\t%s\n", ms, lcs);
        i = i + 1;
        break;
      } else
        fscanf(f3, "%s%s", sym, symaddr);
    }
    if (strcmp(mne, "RESW") == 0)
      lc = lc + 3 * atoi(opnd);
    else if (strcmp(mne, "BYTE") == 0) {
      strcpy(s2, "-");
      len = strlen(opnd);
      lc = lc + len - 2;
      for (k = 2; k < len; k++) {
        q[l] = opnd[k];
        l = l + 1;
      }
      fprintf(f5, "%s\t%s\n", q, s2);
      break;
    } else if (strcmp(mne, "RESB") == 0)
      lc = lc + atoi(opnd);
    else if (strcmp(mne, "WORD") == 0) {
      strcpy(s3, "#");
      lc = lc + 3;
      fprintf(f5, "%s\t%s\n", opnd, s3);
      break;
    }
  }

  fseek(f2, SEEK_SET, 0);
  fscanf(f1, "%s%s%s", la, mne, opnd);
}
fseek(f5, SEEK_SET, 0);
pgmlen = lc - sa;
printf("H^%s^%d^0%x\n", name, sa, pgmlen);
printf("T^");
printf("00%d^0%x", sa, pgmlen);
fscanf(f5, "%s%s", obj1, obj2);
while (!feof(f5)) {
  if (strcmp(obj2, "0000") == 0)
    printf("^%s%s", obj1, obj2);
  else if (strcmp(obj2, "-") == 0) {
    printf("^");
    len1 = strlen(obj1);
    for (k = 0; k < len1; k++)
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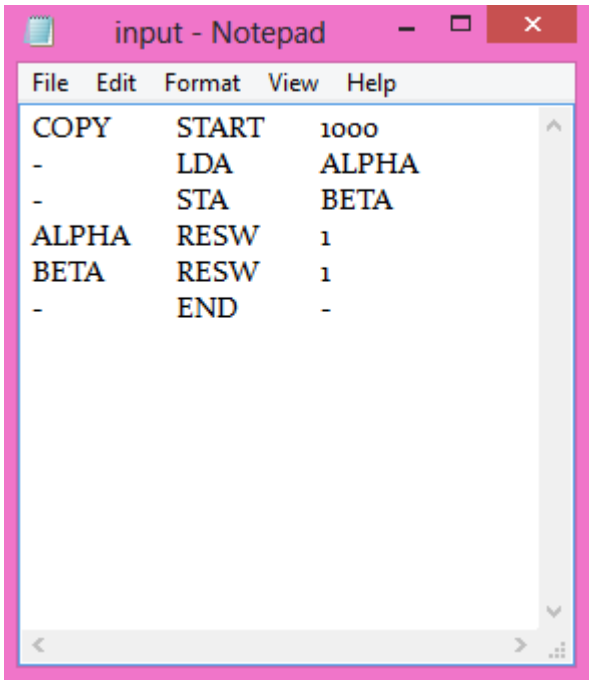
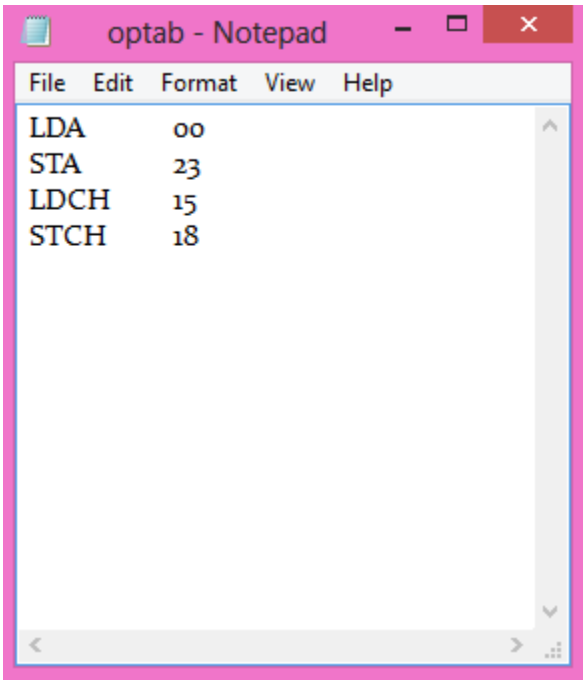
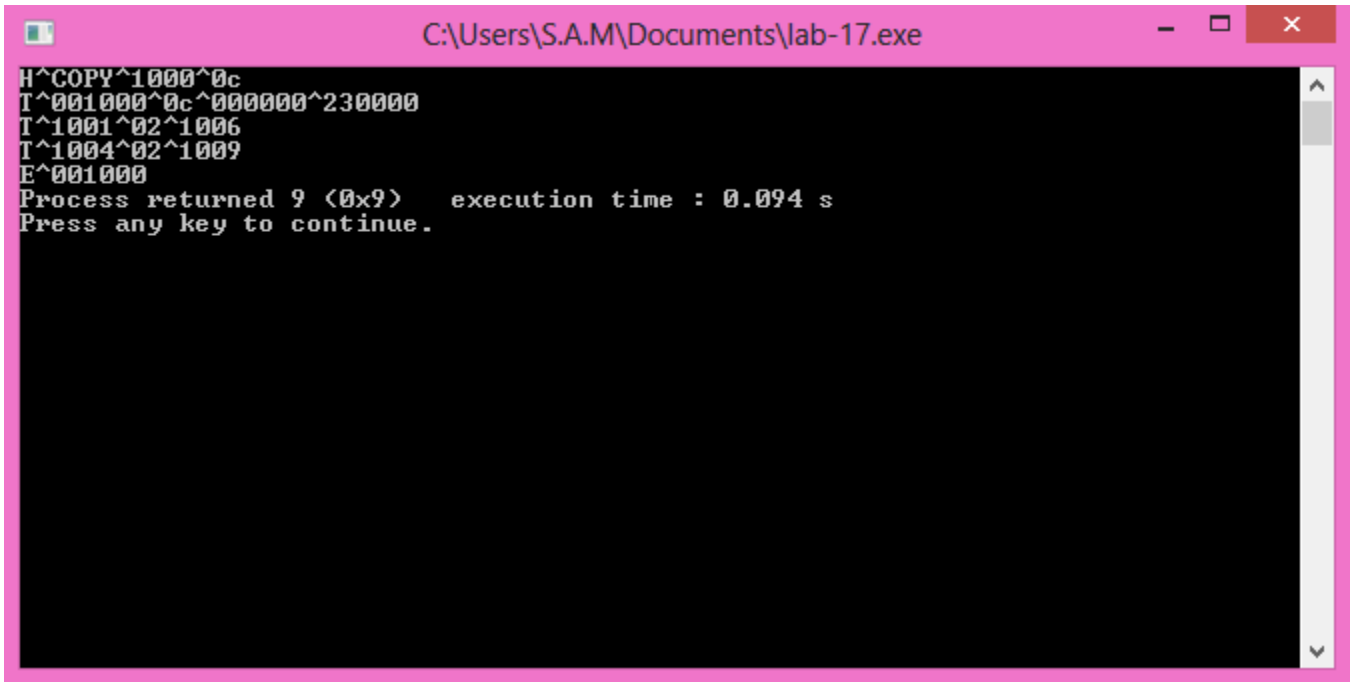
        printf("%d", obj1[k]);
    } else if (strcmp(obj2, "#") == 0) {
      printf("^");
      printf("%s", obj1);
    }
    fscanf(f5, "%s%s", obj1, obj2);
  }
  fseek(f5, SEEK_SET, 0);
  fscanf(f5, "%s%s", obj1, obj2);
  while (!feof(f5)) {
    if (strcmp(obj2, "0000") != 0) {
      if (strcmp(obj2, "-") != 0) {
        if (strcmp(obj2, "#") != 0) {
          printf("\n");
          printf("T^%s^02^%s", obj1, obj2);
        }
      }
    }
    fscanf(f5, "%s%s", obj1, obj2);
  }
  printf("\nE^00%d", sa);
}
```

Output




optab - Notepad
File Edit Format View Help
LDA 00
STA 23
LDCH 15
STCH 18


C:\Users\S.A.M\Documents\lab-17.exe
H^COPY^1000^0c
T^001000^0c^000000^230000
T^1001^02^1006
T^1004^02^1009
E^001000
Process returned 9 (0x9) execution time : 0.094 s
Press any key to continue.