LAB-6 REPORT

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LAB TARGET

Write a program which can turn LC-3 assembly code to binary machine code.

CODE:

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

void dectobin16(int n);
void dectobin4(int n);
void dectobin3(int n);
void dectobin5(int n);
void dectobin9(int n);
void dectobin6(int n);
void dectobin8(int n);
void dectobin11(int n);
void signeddectobin5(int n);
void signeddectobin6(int n);
void signeddectobin16(int n);
void signeddectobin9(int n);
void signeddectobin11(int n);




int main (void){
//  char str0[100];
//  char ch;
//  int button;
//  int site=0;
    int i;
    int words = 0; /*the number of the words */
    int end = 1; /*to decide whether it is ended*/
    int num = 1; /*the number of the number of beginning  */
    int begin = 0; /* the site of the beginning */
    int beg[4]; /* store the site of the beginning */
    int opcode=0; /* store what the opcode is*/
    int out=0; /* used to input the opcode in bin*/
    int j=0;/*used in the circles*/
    int p=0;/*用于计算offset（避免.BLKW及.STRINGZ导致的汇编码和机械码行数的区别）
*/
    int lines=1;/*记录当前行数*/
    int finallines=0;/*记录总行数 */
    int l=0;/*label数组中记录标签的编号*/
    int lin[500]={1}; /*记录每一行末尾的坐标*/
    char label[100][20]; /*记录每行开头的标签*/
    int label2[100]={};
```

```
//  int width; /*used in the instrucions that begins with .STRINGZ  to count the length of the strings*/

// read the input and count how many words there are at the same time
    char str[10000][30]={};
    while(end!=0){
        scanf ("%s",str[words]);
        end=strcmp(str[words],".END");
        words++;
    }
//  for(j=0;j<=99;j++){
//      for(i=0;i<=14;i++){
//          ch=getchar();
//  //      printf("%d\n",ch);
//  //      printf("%c\n",ch);
//          if((ch!='\n'&&ch!=32&&ch!=9)){
//              str[j][i]=ch;
//              button=1;
//          }

//          else if((ch=='\n'||ch==32||ch==9)&&button==1){
//              str[j][i]='\0';
//              i=15;
//              words++;
//              button=0;
//          }
//          else if((ch=='\n'||ch==32||ch==9)&&button==0){
//              i=-1;
//          }
//      }
//      if(strcmp(str[j],".END")==0){
//          j=100;
//      }
//  }
//  words--;
//// 输出来检查
//  for(i=0;i<words;i++){
//      printf ("str[%d]=%s \n",i,str[i]);
//  }
// 读入起始位置
    i=0;
//     printf("%d\n",str[1][num]-48);
//     printf("%c\n",str[1][num]);
    while ((str[1][num]-48>=0 &&str[1][num]-48<=9)||(str[1][num]-65>=0 &&str[1][num]-65<=5)){
//      printf("%d \n",str[1][num]-48);
        if ((str[1][num]-48>=0 &&str[1][num]-48<=9))  beg[i]=str[1][num]-48;
        if ((str[1][num]-65>=0 &&str[1][num]-65<=5))  beg[i]=str[1][num]-55;
        i++;
        num++;
    }
    num--;
//  printf ("%d",num);

//计算出起始位置的十进制表示
    for (i=4-num;i<num;i++){
```

```
        begin+=beg[3-i]*pow(16,i);
    }
//  printf ("%d",begin);
//转换为十六位二进制输出
    dectobin16(begin);
    printf ("\n");

 //labels
for (i=2;i<words;i++){
        if (strcmp(str[i],"ADD")==0){
            i+=3;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"AND")==0){
            i+=3;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"NOT")==0){
            i+=2;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"LD")==0){
            i+=2;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"LDR")==0){
            i+=3;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"LDI")==0){
            i+=2;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"LEA")==0){
            i+=2;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"ST")==0){
            i+=2;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"STR")==0){
            i+=3;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"STI")==0){
            i+=2;
            lines++;
            lin[lines]=i;
```

```
        }
        else if (strcmp(str[i],"TRAP")==0){
            i+=1;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"HALT")==0){
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"JMP")==0){
            i+=1;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"RET")==0){
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"JSR")==0){
            i+=1;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"JSRR")==0){
            i+=1;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],"RTI")==0){
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],".FILL")==0){
            i+=1;
            lines++;
            lin[lines]=i;
        }
        else if (strcmp(str[i],".BLKW")==0){
            i+=1;
            j=1;
            out=0;
            while(str[i][j]!=0){
                out=out*10+(str[i][j]-48);
                j++;
            }
            for(j=0;j<out;j++){
                lines++;
                lin[lines]=i;
            }
        }
        else if (strcmp(str[i],".STRINGZ")==0){
            opcode=20;
            p=0;
            i++;
            j=1;
            while(str[i][j]!='"'){
                if(str[i][j]!=0){
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```
                    out=str[i][j];
                    j++;
                    p++;
                }
                else {
                    i++;
                    p++;
                    j=0;
                }
            }
            for(j=0;j<=p;j++){
                lines++;
                lin [lines]=i;
            }

        }
        else if (strcmp(str[i],"GETC")==0){
            lines++;
            lin [lines]=i;
        }
        else if (strcmp(str[i],"OUT")==0){
            lines++;
            lin [lines]=i;
        }
        else if (strcmp(str[i],"PUTS")==0){
            lines++;
            lin [lines]=i;
        }
        else if (strcmp(str[i],"IN")==0){
            lines++;
            lin [lines]=i;
        }
        else if (strcmp(str[i],"PUTSP")==0){
            lines++;
            lin [lines]=i;
        }
        else if (strcmp(str[i],".END")==0){
            lines++;
            lin [lines]=i;
        }
        else if
(strcmp(str[i],"BRn")==0||strcmp(str[i],"BRnz")==0||strcmp(str[i],"BRnp")==0||strcmp(str[i],"BRnzp")==0||strcmp(str[i],"BRz")==0||strcmp(str[i],"BRzp")==0||strcmp(str[i],"BRp")==0||strcmp(str[i],"BR")==0){
            i+=1;
            lines++;
            lin[lines]=i;
        }
        else {
            for(j=0;j<=19;j++){
                label[l][j]=str[i][j];
            }
            label2[l]=lines;
            l++;
        }
    }
    finallines=lines;
    lines=1;
```

```
//     for(i=0;i<l;i++){
//         printf("lin[%d]=%s %d\n",i,label[i],label2[i]+1);
//     }

//opcodes
    for (i=2;i<words;i++){
        if (strcmp(str[i],"ADD")==0){
            opcode=1;
            out=1;
            dectobin4(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
            if(str[i][0]=='R'){
                printf("000");
                out=str[i][1]-48;
                dectobin3(out);
                printf("\n");
            }
            if(str[i][0]=='#'){
                printf("1");
                if(str[i][1]=='-'){
                    out= str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
//                  printf("%d",out);
                    signeddectobin5(out);
                    printf("\n");
                }
                else{
                    out= str[i][1]-48;
                    if(str[i][2]!=0)
                    out=out*10+str[i][2]-48;
                    dectobin5(out);
                    printf("\n");
                }
            }
            if ((str[i][0]=='x'||str[i][0]=='X')&&(str[i][1]!=0)){
                printf("1");
                if(str[i][1]=='-'){
                    if ((str[i][2]-48>=0 &&str[i][2]-48<=9))  out=str[i]
[2]-48;
                    else if ((str[i][2]-65>=0 &&str[i][2]-65<=5))
out=str[i][2]-55;
                    if(str[i][3]!=0){
                        if ((str[i][3]-48>=0 &&str[i][3]-48<=9))
out=out*16+str[i][3]-48;
                        else if ((str[i][3]-65>=0 &&str[i][3]-65<=5))
out=out*16+str[i][3]-55;
                    }
                    signeddectobin5(out);
                    printf("\n");
                }
                else{
```

```
                    if ((str[i][1]-48>=0 &&str[i][1]-48<=9))  out=str[i][1]-48;
                    else if ((str[i][1]-65>=0 &&str[i][1]-65<=5)) out=str[i][1]-55;
                    if(str[i][2]!=0){
                        if ((str[i][2]-48>=0 &&str[i][2]-48<=9)) out=out*16+str[i][2]-48;
                        else if ((str[i][2]-65>=0 &&str[i][2]-65<=5)) out=out*16+str[i][2]-55;
                    }
                    dectobin5(out);
                    printf("\n");
                }
            }
            lines++;

        }
        else if (strcmp(str[i],"AND")==0){
            opcode=2;
            out=5;
            dectobin4(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
            if(str[i][0]=='R'){
                printf("000");
                out=str[i][1]-48;
                dectobin3(out);
                printf("\n");
            }
            if(str[i][0]=='#'){
                printf("1");
                if(str[i][1]=='-'){
                    out= str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    signeddectobin5(out);
                    printf("\n");
                }
                else{
                    out= str[i][1]-48;
                    if(str[i][2]!=0)
                    out=out*10+str[i][2]-48;
                    dectobin5(out);
                    printf("\n");
                }
            }
            if ((str[i][0]=='x'||str[i][0]=='X')&&(str[i][1]!=0)){
                printf("1");
                if(str[i][1]=='-'){
                    if ((str[i][2]-48>=0 &&str[i][2]-48<=9))  out=str[i][2]-48;
                    else if ((str[i][2]-65>=0 &&str[i][2]-65<=5)) out=str[i][2]-55;
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```
                    if(str[i][3]!=0){
                        if ((str[i][3]-48>=0 &&str[i][3]-48<=9))
out=out*16+str[i][3]-48;
                        else if ((str[i][3]-65>=0 &&str[i][3]-65<=5))
out=out*16+str[i][3]-55;
                    }
                    signeddectobin5(out);
                    printf("\n");
                }
                else{
                    if ((str[i][1]-48>=0 &&str[i][1]-48<=9))  out=str[i]
[1]-48;
                    else if ((str[i][1]-65>=0 &&str[i][1]-65<=5))
out=str[i][1]-55;
                    if(str[i][2]!=0){
                        if ((str[i][2]-48>=0 &&str[i][2]-48<=9))
out=out*16+str[i][2]-48;
                        else if ((str[i][2]-65>=0 &&str[i][2]-65<=5))
out=out*16+str[i][2]-55;
                    }
                    dectobin5(out);
                    printf("\n");
                }
            }
            lines++;
        }
        else if (strcmp(str[i],"NOT")==0){
            opcode=3;
            out=9;
            dectobin4(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            printf("111111");
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],"LD")==0){
            opcode=4;
            out=2;
            dectobin4(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
            if(str[i][0]=='#'){
                if(str[i][1]=='-'){
                    out= str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    if(str[i][4]!=0)
                    out=out*10+str[i][4]-48;
                    signeddectobin9(out);
                }
                else{
```

```
                    out= str[i][1]-48;
                    if(str[i][2]!=0)
                    out=out*10+str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    dectobin9(out);
                }
            }
            else{
                for(j=0;j<l;j++){
                    if(strcmp(str[i],label[j])==0){
                        out=label2[j]-lines-1;
                        if(out>=0) {
                            dectobin9(out);
                            break;
                        }
                        else if(out<0){
                            out=-out;
                            signeddectobin9(out);
                            break;
                        }
                    }
                }
            }
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],"LDR")==0){
            opcode=5;
            out=6;
            dectobin4(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
            if(str[i][0]=='#'){
                if(str[i][1]=='-'){
                    out= str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    signeddectobin6(out);
                    printf("\n");
                }
                else{
                    out= str[i][1]-48;
                    if(str[i][2]!=0)
                    out=out*10+str[i][2]-48;
                    dectobin6(out);
                    printf("\n");
                }
            }
            if ((str[i][0]=='x'||str[i][0]=='X')&&(str[i][1]!=0)){
                if(str[i][1]=='-'){
                    if ((str[i][2]-48>=0 &&str[i][2]-48<=9))  out=str[i]
[2]-48;
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```
                    else if ((str[i][2]-65>=0 &&str[i][2]-65<=5))
out=str[i][2]-55;
                    if(str[i][3]!=0){
                        if ((str[i][3]-48>=0 &&str[i][3]-48<=9))
out=out*16+str[i][3]-48;
                        else if ((str[i][3]-65>=0 &&str[i][3]-65<=5))
out=out*16+str[i][3]-55;
                    }
                    signeddectobin6(out);
                    printf("\n");
                }
                else{
                    if ((str[i][1]-48>=0 &&str[i][1]-48<=9))  out=str[i]
[1]-48;
                    else if ((str[i][1]-65>=0 &&str[i][1]-65<=5))
out=str[i][1]-55;
                    if(str[i][2]!=0){
                        if ((str[i][2]-48>=0 &&str[i][2]-48<=9))
out=out*16+str[i][2]-48;
                        else if ((str[i][2]-65>=0 &&str[i][2]-65<=5))
out=out*16+str[i][2]-55;
                    }
                    dectobin6(out);
                    printf("\n");
                }
            }
            lines++;
        }
        else if (strcmp(str[i],"LDI")==0){
            opcode=4;
            out=10;
            dectobin4(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
            if(str[i][0]=='#'){
                if(str[i][1]=='-'){
                    out= str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    if(str[i][4]!=0)
                    out=out*10+str[i][4]-48;
                    signeddectobin9(out);
                }
                else{
                    out= str[i][1]-48;
                    if(str[i][2]!=0)
                    out=out*10+str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    dectobin9(out);
                }
            }
            else{
                for(j=0;j<l;j++){
                    if(strcmp(str[i],label[j])==0){
                        out=label2[j]-lines-1;
```

```
                        if(out>=0) {
                            dectobin9(out);
                            break;
                        }
                        else if(out<0){
                            out=-out;
                            signeddectobin9(out);
                            break;
                        }
                    }
                }
            }
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],"LEA")==0){
            opcode=4;
            out=14;
            dectobin4(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
            if(str[i][0]=='#'){
                if(str[i][1]=='-'){
                    out= str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    if(str[i][4]!=0)
                    out=out*10+str[i][4]-48;
                    signeddectobin9(out);
                }
                else{
                    out= str[i][1]-48;
                    if(str[i][2]!=0)
                    out=out*10+str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    dectobin9(out);
                }
            }
            else{
                for(j=0;j<l;j++){
                    if(strcmp(str[i],label[j])==0){
                        out=label2[j]-lines-1;
                        if(out>=0) {
                            dectobin9(out);
                            break;
                        }
                        else if(out<0){
                            out=-out;
                            signeddectobin9(out);
                            break;
                        }
                    }
                }
            }
            printf("\n");
```

```
            lines++;
        }
        else if (strcmp(str[i],"ST")==0){
            opcode=4;
            out=3;
            dectobin4(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
            if(str[i][0]=='#'){
                if(str[i][1]=='-'){
                    out= str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    if(str[i][4]!=0)
                    out=out*10+str[i][4]-48;
                    signeddectobin9(out);
                }
                else{
                    out= str[i][1]-48;
                    if(str[i][2]!=0)
                    out=out*10+str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    dectobin9(out);
                }
            }
            else{
                for(j=0;j<l;j++){
                    if(strcmp(str[i],label[j])==0){
                        out=label2[j]-lines-1;
                        if(out>=0) {
                            dectobin9(out);
                            break;
                        }
                        else if(out<0){
                            out=-out;
                            signeddectobin9(out);
                            break;
                        }
                    }
                }
            }
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],"STR")==0){
            opcode=5;
            out=7;
            dectobin4(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
```

```
            if(str[i][0]=='#'){
                if(str[i][1]=='-'){
                    out= str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    signeddectobin6(out);
                    printf("\n");
                }
                else{
                    out= str[i][1]-48;
                    if(str[i][2]!=0)
                    out=out*10+str[i][2]-48;
                    dectobin6(out);
                    printf("\n");
                }
            }
            if ((str[i][0]=='x'||str[i][0]=='X')&&(str[i][1]!=0)){
                if(str[i][1]=='-'){
                    if ((str[i][2]-48>=0 &&str[i][2]-48<=9))  out=str[i]
[2]-48;
                    if ((str[i][2]-65>=0 &&str[i][2]-65<=5))  out=str[i]
[2]-55;
                    if(str[i][2]!=0){
                        if ((str[i][3]-48>=0 &&str[i][3]-48<=9))
out=out*16+str[i][3]-48;
                        if ((str[i][3]-65>=0 &&str[i][3]-65<=5))
out=out*16+str[i][3]-55;
                    }
                    signeddectobin6(out);
                    printf("\n");
                }
                else{
                    if ((str[i][1]-48>=0 &&str[i][1]-48<=9))  out=str[i]
[1]-48;
                    if ((str[i][1]-65>=0 &&str[i][1]-65<=5))  out=str[i]
[1]-55;
                    if(str[i][2]!=0){
                        if ((str[i][2]-48>=0 &&str[i][2]-48<=9))
out=out*16+str[i][2]-48;
                        if ((str[i][2]-65>=0 &&str[i][2]-65<=5))
out=out*16+str[i][2]-55;
                    }
                    dectobin6(out);
                    printf("\n");
                }
            }
            lines++;
        }
        else if (strcmp(str[i],"STI")==0){
            opcode=4;
            out=11;
            dectobin4(out);
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            i++;
            if(str[i][0]=='#'){
                if(str[i][1]=='-'){
```

```
                    out= str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    if(str[i][4]!=0)
                    out=out*10+str[i][4]-48;
                    signeddectobin9(out);
                }
                else{
                    out= str[i][1]-48;
                    if(str[i][2]!=0)
                    out=out*10+str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    dectobin9(out);
                }
            }
            else{
                for(j=0;j<l;j++){
                    if(strcmp(str[i],label[j])==0){
                        out=label2[j]-lines-1;
                        if(out>=0) {
                            dectobin9(out);
                            break;
                        }
                        else if(out<0){
                            out=-out;
                            signeddectobin9(out);
                            break;
                        }
                    }
                }
            }
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],"TRAP")==0){
            opcode=11;
            printf("11110000");
            i++;
            if ((str[i][1]-48>=0 &&str[i][1]-48<=9))  out=str[i][1]-48;
            else if ((str[i][1]-65>=0 &&str[i][1]-65<=5))  out=str[i]
[1]-55;
                if(str[i][2]!=0){
                    if ((str[i][2]-48>=0 &&str[i][2]-48<=9))
out=out*16+str[i][2]-48;
                    if ((str[i][2]-65>=0 &&str[i][2]-65<=5))
out=out*16+str[i][2]-55;
                }
            dectobin8(out);
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],"HALT")==0){
            opcode=12;
            printf("1111000000100101");
            printf("\n");
            lines++;
        }
```

```
        else if (strcmp(str[i],"JMP")==0){
            opcode=13;
            out=12;
            dectobin4(out);
            printf("000");
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            printf("000000");
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],"RET")==0){
            opcode=14;
            printf("1100000111000000");
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],"JSR")==0){
            opcode=15;
            out=4;
            dectobin4(out);
            i++;
            if(str[i][0]=='#'){
                printf("1");
                if(str[i][1]=='-'){
                    out= str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    if(str[i][4]!=0)
                    out=out*10+str[i][4]-48;
                    if(str[i][5]!=0)
                    out=out*10+str[i][5]-48;
                    signeddectobin11(out);
                }
                else{
                    out= str[i][1]-48;
                    if(str[i][2]!=0)
                    out=out*10+str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    if(str[i][4]!=0)
                    out=out*10+str[i][4]-48;
                    dectobin9(out);
                }
            }
            else{
                printf("1");
                for(j=0;j<l;j++){
                    if(strcmp(str[i],label[j])==0){
                        out=label2[j]-lines-1;
                        if(out>=0) {
                            dectobin11(out);
                            break;
                        }
                        else if(out<0){
                            out=-out;
                            signeddectobin11(out);
```

```
                            break;
                        }
                    }
                }
            }
//          i++;
            lines++;
            printf("\n");
        }
        else if (strcmp(str[i],"JSRR")==0){
            opcode=16;
            printf("0100000") ;
            i++;
            out=str[i][1]-48;
            dectobin3(out);
            printf("000000");
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],"RTI")==0){
            opcode=17;
            printf("1000000000000000");
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],".FILL")==0){
            opcode=18;
            i++;
            if(str[i][0]=='#'){
                if(str[i][1]=='-'){
                    out= str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    if(str[i][4]!=0)
                    out=out*10+str[i][4]-48;
                    if(str[i][5]!=0)
                    out=out*10+str[i][5]-48;
                    if(str[i][6]!=0)
                    out=out*10+str[i][6]-48;
                    signeddectobin16(out);
                    printf("\n");
                }
                else{
                    out= str[i][1]-48;
                    if(str[i][2]!=0)
                    out=out*10+str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    if(str[i][4]!=0)
                    out=out*10+str[i][4]-48;
                    if(str[i][5]!=0)
                    out=out*10+str[i][5]-48;
                    dectobin16(out);
                    printf("\n");
                }
            }
            if ((str[i][0]=='x'||str[i][0]=='X')&&(str[i][1]!=0)){
                if(str[i][1]=='-'){
```

```
                    if ((str[i][2]-48>=0 &&str[i][2]-48<=9))  out=str[i][2]-48;
                    else if ((str[i][2]-65>=0 &&str[i][2]-65<=5)) out=str[i][2]-55;
                    if(str[i][3]!=0){
                        if ((str[i][3]-48>=0 &&str[i][3]-48<=9)) out=out*16+str[i][3]-48;
                        else if ((str[i][3]-65>=0 &&str[i][3]-65<=5)) out=out*16+str[i][3]-55;
                        if(str[i][4]!=0){
                            if ((str[i][4]-48>=0 &&str[i][4]-48<=9)) out=out*16+str[i][4]-48;
                            else if ((str[i][4]-65>=0 &&str[i][4]-65<=5)) out=out*16+str[i][4]-55;
                            if(str[i][5]!=0){
                                if ((str[i][5]-48>=0 &&str[i][5]-48<=9)) out=out*16+str[i][5]-48;
                                else if ((str[i][5]-65>=0 &&str[i][5]-65<=5))  out=out*16+str[i][5]-55;
                            }
                        }
                    }
                    signeddectobin16(out);
                    printf("\n");
                }
                else{
                    if ((str[i][1]-48>=0 &&str[i][1]-48<=9))  out=str[i][1]-48;
                    else if ((str[i][1]-65>=0 &&str[i][1]-65<=5)) out=str[i][1]-55;
                    if(str[i][2]!=0){
                        if ((str[i][2]-48>=0 &&str[i][2]-48<=9)) out=out*16+str[i][2]-48;
                        else if ((str[i][2]-65>=0 &&str[i][2]-65<=5)) out=out*16+str[i][2]-55;
                        if(str[i][3]!=0){
                            if ((str[i][3]-48>=0 &&str[i][3]-48<=9)) out=out*16+str[i][3]-48;
                            else if ((str[i][3]-65>=0 &&str[i][3]-65<=5)) out=out*16+str[i][3]-55;
                            if(str[i][4]!=0){
                                if ((str[i][4]-48>=0 &&str[i][4]-48<=9)) out=out*16+str[i][4]-48;
                                else if ((str[i][4]-65>=0 &&str[i][4]-65<=5))  out=out*16+str[i][4]-55;
                            }
                        }
                    }
                    dectobin16(out);
                    printf("\n");
                }
            }
            lines++;
        }
        else if (strcmp(str[i],".BLKW")==0){
            opcode=19;
            i++;
            j=1;
```

```
            out=0;
            while(str[i][j]!=0){
                out=out*10+str[i][j]-48;
                j++;
            }

            for(j=0;j<out;j++){
                printf("0111011101110111");
                printf("\n");
            }
            lines+=out;
        }
        else if (strcmp(str[i],".STRINGZ")==0){
            opcode=20;
            p=0;
            i++;
            j=1;
            while(str[i][j]!='"'){
                if(str[i][j]!=0){
                    out=str[i][j];
                    dectobin16(out);
                    j++;
                    printf("\n");
                    p++;
                }
                else {
                    printf("0000000000100000");
                    printf("\n");
                    i++;
                    p++;
                    j=0;
                }
            }
            printf("0000000000000000");
            printf("\n");
            lines+=p+1;
        }
        else if (strcmp(str[i],"GETC")==0){
            opcode=12;
            printf("1111000000100000");
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],"OUT")==0){
            opcode=12;
            printf("1111000000100001");
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],"PUTS")==0){
            opcode=12;
            printf("1111000000100010");
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],"IN")==0){
            opcode=12;
            printf("1111000000100011");
```

```
            printf("\n");
            lines++;
        }
        else if (strcmp(str[i],"PUTSP")==0){
            opcode=12;
            printf("1111000000100100");
            printf("\n");
            lines++;
        }
        else if
(strcmp(str[i],"BRn")==0||strcmp(str[i],"BRnz")==0||strcmp(str[i],"BRnp")==0||strcmp(str[i],"BRnzp")==0||strcmp(str[i],"BRz")==0||strcmp(str[i],"BRzp")==0||strcmp(str[i],"BRp")==0||strcmp(str[i],"BR")==0){
            printf("0000");
            if(str[i][2]==0) printf("111");
            else if(str[i][2]=='p') printf("001");
            else if(str[i][2]=='z'){
                printf("01");
                if(str[i][3]=='p') printf("1");
                else  printf("0");
            }
            else if(str[i][2]=='n'){
                printf("1");
                if(str[i][3]=='p') printf("01");
                else if(str[i][3]=='z'){
                    printf("1");
                    if(str[i][4]=='p') printf("1");
                    else  printf("0");
                }
                else printf("00");
            }
            i++;
            if(str[i][0]=='#'){
                if(str[i][1]=='-'){
                    out= str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    if(str[i][4]!=0)
                    out=out*10+str[i][4]-48;
                    signeddectobin9(out);
                }
                else{
                    out= str[i][1]-48;
                    if(str[i][2]!=0)
                    out=out*10+str[i][2]-48;
                    if(str[i][3]!=0)
                    out=out*10+str[i][3]-48;
                    dectobin9(out);
                }
            }
            else{
                for(j=0;j<l;j++){
                    if(strcmp(str[i],label[j])==0){
                        out=label2[j]-lines-1;
                        if(out>=0) {
                            dectobin9(out);
                            break;
                        }
```

```
                        else if(out<0){
                            out=-out;
                            signeddectobin9(out);
                            break;
                        }
                    }
                }
            }
            printf("\n");
            lines++;
        }
    }

//  for(i=0;i<l;i++){
//      printf("%d ",label2[i]);
//      printf("%s",label[i]);
//      printf("\n");
//  }

    return 0;
}

//将十进制数转换为十六位二进制数输出
void  dectobin16(int n){
    int yu=0;
    int i=0;
    int a[15]={};
    for(i=0;i<=15;i++) {
        yu = n%2;
        a[15-i]=yu;
        n/=2;
    }
    for(i=0;i<=15;i++){
        printf("%d",a[i]);
    }
}

//将十进制数转换为四位二进制数输出
void  dectobin4(int n){
    int yu=0;
    int i=0;
    int a[3]={};
    for(i=0;i<=3;i++) {
        yu = n%2;
        a[3-i]=yu;
        n/=2;
    }
    for(i=0;i<=3;i++){
        printf("%d",a[i]);
    }
}

//将十进制数转换为三位二进制数输出
void  dectobin3(int n){
    int yu=0;
    int i=0;
    int a[3]={};
    for(i=0;i<=2;i++) {
```

```
        yu = n%2;
        a[2-i]=yu;
//      printf("%d %d\n",a[2-i],2-i);
        n/=2;
    }
    for(i=0;i<=2;i++){
        printf("%d",a[i]);
    }
//  printf("\n");
}

//将十进制数转换为五位二进制数输出
void  dectobin5(int n){
    int yu=0;
    int i=0;
    int a[4]={};
    for(i=0;i<=4;i++) {
        yu = n%2;
        a[4-i]=yu;
        n/=2;
    }
    for(i=0;i<=4;i++){
        printf("%d",a[i]);
    }
}

//将十进制数转换为九位二进制数输出
void  dectobin9(int n){
    int yu=0;
    int i=0;
    int a[8]={};
    for(i=0;i<=8;i++) {
        yu = n%2;
        a[8-i]=yu;
        n/=2;
    }
    for(i=0;i<=8;i++){
        printf("%d",a[i]);
    }
}

//将十进制数转换为六位二进制数输出
void  dectobin6(int n){
    int yu=0;
    int i=0;
    int a[5]={};
    for(i=0;i<=5;i++) {
        yu = n%2;
        a[5-i]=yu;
        n/=2;
    }
    for(i=0;i<=5;i++){
        printf("%d",a[i]);
    }
}

//将十进制数转换为八位二进制数输出
void  dectobin8(int n){
```

```
    int yu=0;
    int i=0;
    int a[7]={};
    for(i=0;i<=7;i++) {
        yu = n%2;
        a[7-i]=yu;
        n/=2;
    }
    for(i=0;i<=7;i++){
        printf("%d",a[i]);
    }
}

//将十进制数转换为十一位二进制数输出
void  dectobin11(int n){
    int yu=0;
    int i=0;
    int a[10]={};
    for(i=0;i<=10;i++) {
        yu = n%2;
        a[10-i]=yu;
        n/=2;
    }
    for(i=0;i<=10;i++){
        printf("%d",a[i]);
    }
}

//将十进制负数转换为五位二进制数输出
void  signeddectobin5(int n){
    int yu=0;
    int i=0;
    int a[4]={};
    for(i=0;i<=4;i++) {
        yu = n%2;
        a[4-i]=yu;
        n/=2;
    }
    for(i=0;i<=4;i++) {
        if (a[i]==0) a[i]=1;
        else if (a[i]==1) a[i]=0;
    }
    i=4;
    if(a[i]==0) a[i]=1;
    else{
        while(a[i]==1){
        a[i]=0;
        i--;
        }
        if(i>=0) a[i]=1;
    }
    for(i=0;i<=4;i++){
        printf("%d",a[i]);
    }
}

//将十进制负数转换为六位二进制数输出
void  signeddectobin6(int n){
```

```
    int yu=0;
    int i=0;
    int a[5]={};
    for(i=0;i<=5;i++) {
        yu = n%2;
        a[5-i]=yu;
        n/=2;
    }
    for(i=0;i<=5;i++) {
        if (a[i]==0) a[i]=1;
        else if (a[i]==1) a[i]=0;
    }
    i=5;
    if(a[i]==0) a[i]=1;
    else{
        while(a[i]==1){
        a[i]=0;
        i--;
        }
        if(i>=0) a[i]=1;
    }
    for(i=0;i<=5;i++){
        printf("%d",a[i]);
    }
}

//将十进制负数转换为十六位二进制数输出
void  signeddectobin16(int n){
    int yu=0;
    int i=0;
    int a[15]={};
    for(i=0;i<=15;i++) {
        yu = n%2;
        a[15-i]=yu;
        n/=2;
    }
    for(i=0;i<=15;i++) {
        if (a[i]==0) a[i]=1;
        else if (a[i]==1) a[i]=0;
    }
    i=15;
    if(a[i]==0) a[i]=1;
    else{
        while(a[i]==1){
        a[i]=0;
        i--;
        }
        if(i>=0) a[i]=1;
    }
    for(i=0;i<=15;i++){
        printf("%d",a[i]);
    }
}

//将十进制负数转换为九位二进制数输出
void  signeddectobin9(int n){
    int yu=0;
    int i=0;
```

```
    int a[8]={};
    for(i=0;i<=8;i++) {
        yu = n%2;
        a[8-i]=yu;
        n/=2;
    }
    for(i=0;i<=8;i++) {
        if (a[i]==0) a[i]=1;
        else if (a[i]==1) a[i]=0;
    }
    i=8;
    if(a[i]==0) a[i]=1;
    else{
        while(a[i]==1){
        a[i]=0;
        i--;
        }
        if(i>=0) a[i]=1;
    }
    for(i=0;i<=8;i++){
        printf("%d",a[i]);
    }
}

//将十进制负数转换为十一位二进制数输出
void  signeddectobin11(int n){
    int yu=0;
    int i=0;
    int a[10]={};
    for(i=0;i<=10;i++) {
        yu = n%2;
        a[10-i]=yu;
        n/=2;
    }
    for(i=0;i<=10;i++) {
        if (a[i]==0) a[i]=1;
        else if (a[i]==1) a[i]=0;
    }
    i=10;
    if(a[i]==0) a[i]=1;
    else{
        while(a[i]==1){
        a[i]=0;
        i--;
        }
        if(i>=0) a[i]=1;
    }
    for(i=0;i<=10;i++){
        printf("%d",a[i]);
    }
}
```

Q&A

null