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

typedef struct tnode {
  char s[20];
  struct tnode *left, *right;
} tnode;
typedef tnode *pnode;

char resarr[110][110];
char rrrres[200];

void insertt(pnode *p, char *s, char *res, int *pathlen)
{
  int cmpres;
  /*char resres[120];*/
  int curlen;

  res[0]=0;
  if ((*p)==NULL) {
    (*p)=(pnode)malloc(sizeof(tnode));
    strcpy((*p)->s,s);
    (*p)->left=NULL;
    (*p)->right=NULL;
    strcpy(res,"");
    *pathlen=0;
    return ;
  }
  cmpres=strcmp(s,(*p)->s);
  if (0==cmpres) {
    strcpy(res,"EXISTS");
    *pathlen=0;
    return;
  }
  if (cmpres<0) /* left */ {
    res[0]='L';
    insertt(&((*p)->left),s,&res[1],&curlen);
  } else {
    res[0]='R';
    insertt(&((*p)->right),s,&res[1],&curlen);
  }
  if (strcmp(&res[1],"EXISTS")==0) {
    strcpy(res,"EXISTS");
    *pathlen=0;
    return;
  }
  *pathlen=curlen+1;
  /*strcpy(res,resres);*/
}

int main()
{
  FILE *f,*fout;
  char s[110];
  /*char res[110];*/
  int lines,I;
  pnode root;
  int pathlen,maxpathlen,sumpathlen;

  fout=fopen("OUTPUT3.TXT","wt");
  maxpathlen=0;
  sumpathlen=0;
  f=fopen("INPUT3.TXT","rt");
  fgets(s,100,f);
  sscanf(s,"%d",&lines);
  root=NULL;
  for (I=0; I<lines; I++) {
    fgets(s,100,f);
```



```c
    if (s[strlen(s)-1]=='\n')
      s[strlen(s)-1]=0;
    /*printf("DEBUG: '%s'\n",s);*/
    insertt(&root,s,rrrres,&pathlen);
    if (pathlen>maxpathlen)
      maxpathlen=pathlen;
    sumpathlen+=pathlen;
    if (strlen(rrrres)==0)
      strcpy(resarr[I],"ROOT");
    else
      strcpy(resarr[I],rrrres);
  }
  fprintf(fout,"%d %d\n",maxpathlen,sumpathlen);
  for (I=0; I<lines; I++)
    fprintf(fout,"%s\n",resarr[I]);
  fclose(f);
  fclose(fout);
  return 0;
}
```