数据结构实验一

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#include<io.h> /\* eof() \*/

#include<math.h> /\* floor(),ceil(),abs() \*/

#include<process.h> /\* exit() \*/

#define TRUE 1

#define FALSE 0

#define OK 1

#define ERROR 0

#define INFEASIBLE -1

#define LIST\_INIT\_SIZE 100

#define LISTINCREMRNT 10

typedef int ElemType;

typedef int Status;

typedef int Boolean;

typedef struct

{

ElemType\* elem; //储存空间基地址

int length; // 记录当前链表长度

int listsize; //链表规模

} SqList;

Status InitList(SqList\* L)

{

(\*L).elem = (ElemType\*)malloc(LIST\_INIT\_SIZE \* sizeof(ElemType));

if (!(\*L).elem)

exit(OVERFLOW);

(\*L).length = 0;

(\*L).listsize = LIST\_INIT\_SIZE;

return OK;

}

Status DestroyList(SqList\* L)

{ /\* 操作结果：三元组T被销毁 \*/

free((\*L).elem);

(\*L).elem = NULL;

(\*L).length = 0;

return OK;

}

void ClearList(SqList\* L) {

(\*L).length = 0;

}

Status ListEmpty(SqList L) //值拷贝

{

return L.length == 0 ? 1 : 0;

}

Status ListLength(SqList L)

{

return L.length;

}

Status GetEle(SqList L, int i, int\* e)

{

if (i<1 || i>L.length)

return ERROR;

\*e = L.elem[i - 1];

return OK;

}

Status ListInsert(SqList\* L, int i, int e)

{

int\* newbase;

int\* p, \* q;

if (i<1 || i>(\*L).length + 1)

return ERROR;

if ((\*L).length > (\*L).listsize)

{

newbase = (ElemType\*)realloc((\*L).elem, ((\*L).listsize + LISTINCREMRNT) \* sizeof(ElemType));

if (!newbase)

exit(OVERFLOW);

(\*L).elem = newbase;

(\*L).listsize += LISTINCREMRNT;

}

q = &((\*L).elem[i - 1]);

for (p = &(\*L).elem[(\*L).length - 1]; p >= q; --p)

{

\*(p + 1) = \*p;

}

\*q = e;

++(\*L).length;

return OK;

}

Status ListDelete(SqList\* L, int i, int\* e)

{

int\* p;

if (i<1 || i>(\*L).length)

return ERROR;

\*e = (\*L).elem[i - 1];

for (p = &(\*L).elem[i - 1]; p < &(\*L).elem[(\*L).length - 2]; p--)

{

\*p = \*(p + 1);

}

(\*L).length--;

return OK;

}

Status Max(SqList\* L)

{

int i = 0;

int max;

max = (\*L).elem[0];

for (i = 0; i < (\*L).length; i++)

{

if ((\*L).elem[i] > max)

max = (\*L).elem[i];

i++;

}

return max;

}

Status Min(SqList\* L)

{

int i = 0;

int min;

min = (\*L).elem[0];

for (i = 0; i < (\*L).length; i++)

{

if ((\*L).elem[i] < min)

min = (\*L).elem[i];

i++;

}

return min;

}

Status ListTraverse(SqList L)

{

for (int i = 0; i <= L.length - 1; i++)

{

printf(" %d ", L.elem[i]);

}

return OK;

}

void MergeList(SqList La, SqList Lb, SqList\* Lc)

{

InitList(Lc);

int i = 1, j = 1, k = 0;

int La\_length = ListLength(La);

int Lb\_length = ListLength(Lb);

int ai, bj;

while ((i <= La\_length) && (j <= Lb\_length))

{

GetEle(La, i, &ai);

GetEle(Lb, j, &bj);

if (ai <= bj)

{

ListInsert(Lc, ++k, ai);

++i;

}

else

{

ListInsert(Lc, ++k, bj);

++j;

}

}

while (i <= La\_length)

{

GetEle(La, i++, &ai);

ListInsert(Lc, ++k, ai);

}

while (j <= Lb\_length)

{

GetEle(Lb, j++, &bj);

ListInsert(Lc, ++k, bj);

}

}

void main()

{

SqList L1, L2, L3;

//int e;

int i;

if (InitList(&L1) == 1 && InitList(&L2) == 1)

{

printf("顺序表初始化成功\n");

}

for (i = 1; i < 10; i++)

ListInsert(&L1, i, 2 \* i);

for (i = 1; i < 10; i++)

ListInsert(&L2, i, (2 \* i + 1));

printf("%d\n", Max(&L1));

printf("%d\n", Min(&L1));

MergeList(L1, L2, &L3);

ListTraverse(L3);

DestroyList(&L1);

DestroyList(&L2);

DestroyList(&L3);

}

实验总结：最初两个表均有一个数无法显示，后来改变输入表时的循环方式解决问题。

for (i = 1; i < 10; i++)

ListInsert(&L1, i, 2 \* i);

for (i = 1; i < 10; i++)

ListInsert(&L2, i, (2 \* i + 1));