

200X 年试题

选择题

- (1) Suppose 1,2,3,4 is the order which these elements push onto a stack. The sequence obtained is (B)
- A.4.1.2.3 B.3.2.4.1 C.3.4.1.2 D.4.3.1.2
- (2) Suppose that a linear list contains $n=31$ nodes, the binary search is applied to the list, the maximum times in searching is (B)
- A 4 B 5 C 2^5-1 D 2^4-1
- (3) In the following sorting algorithms, which is unstable (A)
- A Selection sort B Merge sort C Bubble sort D Insertion sort
- (4) Bubble sort is used for n nodes, the minimum number of comparisons is (A)
- A $n-1$ B n C $n(n-1)/2$ D $n(n+1)/2$
- (5) How many binary trees in different forms can at most be built by three nodes? (B)
- A 4 B 5 C 6 D 7

填空题

- (1) The stack takes on character of _____ 后进先出 _____
- (2) The postfix expression is 'abcde/*-/*+'. Its infix expression is $a+b[c-d/(e*f)]$ _____
- (3) The advantage of circular queues is _____ 克服队满溢出 _____
- (4) If the depth of full binary tree is k , then the number of nodes in the tree at least 2^k+1-1 _____
- (5) The selection sort is used to sort n nodes, the number of its comparisons is $n(n-1)/2$ _____

三. (1) Write a function Deletion in C for linear list. (5 points)

```
int sq_delete(list,p_n,i)
int list[]; /*形参数组可不指定大小*/
int *p_n,i;
{
    int j;
    if(i<0||i>=*p_n) return(1);
    for(j=i+1,j<*p_n;j++) list[j-1]=list[j];
    (*p_n)--;
    return(0);
}
```

(2) Write a function Pop in C for linked stack. (5 points)

(3) Write a function in C for binary search. (10 point)

```
int bisect(a,n,v)
int a[],v,n;
{
    int i,j,m;
    i=0;
    j=n-1;
    while(i<=j){ m=(i+j)/2;
        if(v==a[m]) return(m);
        if(v<a[m]) j=m-1;
    }
}
```

```

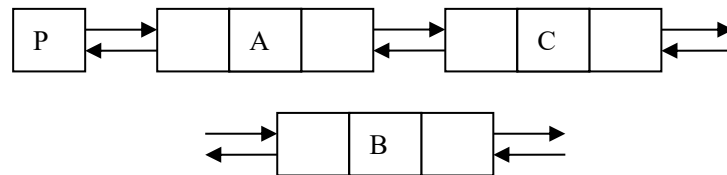
        else i=m+1;
    }
    return(-1);
}

```

(4) Write some sentences in C which delete the node b in the following figure. (5 point)(附图)



(5) Write some sentences in C which insert the node b in the following figure(5pont)(附图)



四.

(2) Write a function in C of quick sort. (10 point)

```

Position Partition(List *list, Posotion low, Position high)
{ ListEntry pivot;
  Position i, lastsmall, pivotpos;
  Swap(low,(low+high)/2,list);
  pivot=list->entry[low];
  pivotpos=low;
  for(i=low+1; i<=high;i++)
    if(LT(list->entry[i].key, pivot.key))
      Swap(++pivotpos, i, list);
  Swap(low, pivotpos, list);
  return pivotpos;
}

```

(3) Suppose that a hash table contains 5 entries indexed from 0 through 4 and that the following keys are to be mapped into the table.

12,19,17,14,10,24,15

Hash function $h(k)=k \bmod 5$.

(a) Determine the hash addresses and resolute collision by chaining.

(b) Write a function in C for search by chaining. (10point)

```

void search2(t,k,p,q)
NODE *t[ ];
int k;
NODE *p,*q;
{ *p=NULL;
  *q=t[h(k)];
  while(*q!=NULL)
    if ((*q)->key==k) return;
    else{*p=*q;

```

```

        *q=(*q)->link;
    }
}

```

五.

(1) Write a function in C which will interchange all left and right subtrees in binary tree. (10 point)

(2) Write a function in C for linked queue. (10 point)

```

void Append(QueueEntry x, Queue *q)
{
    if (QueueFull(q))
        Error("cannot append an entry to a full queue.");
    else{
        q->count++;
        q->rear=(q->rear+1)%MAXQUEUE;
        q->entry[q->rear]=x;
    }
}

```

选择题

(1) In a simple linked list with n nodes, the number of pointer fields with NULL Totals(D).

A. n B. 2 C. n/2 D. 1

(2) In the linear lists, two concepts which are the same as each other is(AB)

A. node B. record C. field D. type of structure

(3) In the binary search tree, for any root of subtree, the keys of all nodes in its left subtree is (D)
the keys of all nodes in its right subtree.

A. less than B. equal to C. great than D. less than or equal to

(4) For general trees, the correct choice is (B)

A. it may be empty B. at least one node
C. at least two nodes D. A, B and C are incorrect

(5) The bubble sort is used to n nodes, least number of comparison is(A)

A. n-1 B. n C. n(n-1)/2 D. n(n+1)/2

填空题

(1) A binary tree with n nodes stored by standard form, there are 2n pointers where n-1 pointers are used to point to sub-nodes, and n+1 pointers are empty.

(2) The postfix expression is abc*+de/f*-, then its infix expression is a+b*c-d/e*f

(3) The basic operations of linear lists are 插入删除访问

(4) The character of stack is 后进先出

(5) Hash storage faced with two problems of Hash 函数 and 冲突

三.

(1) Write a function Pop for stack (5point)

```

Void Pop(StackEntry *item, Stack *s)
{
    if(StackEmpty(s))Error;
    else
        *item=S->entry[--s->top];
}

```

}

(2) Translate the quadratic formula.

$$(a+b*c) \uparrow d \uparrow (e*f/g)-h*i$$

into postfix form. (10point)

(3) Write a function in C which changes the linked list in Figure 1 to another linked list in Figure 2. (10point)(附图)

(4)

(1).(a)By hand, trace through the steps bubble sort will use on the list. The following seven number to be sorted into increasing order.

(b)Write a function of bubble sort. (10point)

void bubble_sort(a,n)

int a[],n;

{ int i,j,t;

n--;

while(n>0){j=0;

for(i=0;i<n;i++){if(a[i]>a[i+1])

{t=a[i];

a[i]=a[i+1];

a[i+1]=t;

j=i;

}

n=j;

}

}

(2)By hand, sort the list 46.26.22.68.48.42.36.84.66 using selection sort.

Write a function of selection sort.(10point)

void insertion_sort(a, n)

int a[];

int n;

{ **int i, j;**

int t;

for(i=1;i<n;i++){

t=a[i];

for(j=i-1;j>=0&& t<a[j];j--)a[j+1]=a[j];

a[j+1]=t;

}

}

(3).Suppose that a hash table contains 11 entries from 0 through 10 and that the following keys are to be mapped into the table.

(32,75,63,48,94,25,36,18,70)

Hash function $h(k)=k \bmod 11$

(a)Determine the hash addresses and resolute collision by linear probing.

(b)Determine the hash addresses and resolute collision by chaining. (10point)

(4) For each of the following binary trees, determine the order in which the nodes will be visited

mixed order given by invoking function A(5point)
Void A(TreeNode *root, void(*Visit)(TreeEntry x))

```
{
    If(root){
        Visit(root->entry);
        B(root->left, Visit);
        B(root->right, Visit);
    }
}
void B(TreeNode *root, void(*Visit)(TreeEntry x))
{
    If(root){
        A(root->left, Visit);
        Visit(root->entry);
        A(root->right, Visit);
    }
}
```

五.

(2)Insert a new node r taken as the right child of node s and draw a threaded-tree.

(a) By hand

(b) By some sentences in C (10 point)

(a)

(b) **r->rightchild=s->rightchild;** // s 的右子女指针或后继线索传给 r

r->rightthread=s->rightthread; //标志一同传送//a

r->leftchild=s;r->leftthread=1; // r 为 leftchild 或为 s 的前驱线索//b

s->rightchild=r;s->rightthread=0; //r 成为 s 的右子女//c