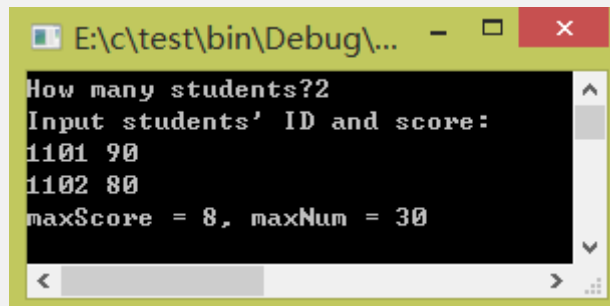# 第8章 指针
## ——指针变量做函数参数:错误案例分析

# 计算最高分及其学号

```c
#include <stdio.h>
#define N 80
void FindMax(int score[],long num[],int n, int pMaxScore, long pMaxNum);
int main()
{
    int score[N], maxScore;
    long num[N], maxNum;
    int n, i;
    printf("How many students?");
    scanf("%d", &n);
    printf("Input students' ID and score:\n");
    for (i=0; i<n; i++)
    {
        scanf("%ld%d", &num[i], &score[i]);
    }
    FindMax(score, num, n, maxScore, maxNum);
    printf("maxScore = %d, maxNum = %ld\n", maxScore, maxNum);
    return 0;
}
```

```
E:\c\test\bin\Debug\...
How many students?2
Input students' ID and score:
1101 90
1102 80
maxScore = 8, maxNum = 30
```

Not Work! Why?

```
warning: 'maxScore' is used uninitialized in this function
warning: 'maxNum' is used uninitialized in this function
```

# 计算最高分及其学号

```
void FindMax(int score[],long num[],int n, int pMaxScore, long pMaxNum)
{
    int     i;
    pMaxNum = num[0];
    pMaxScore = score[0];
    for (i=1; i<n; i++)
    {
        if (score[i] > pMaxScore)
        {
            pMaxScore = score[i];
            pMaxNum = num[i];
        }
    }
    printf("pMaxScore = %d, pMaxNum = %ld\n", pMaxScore, pMaxNum);
}
```

```
E:\c\test\bin\Debug...
How many students?3
Input students' ID and score:
1101 80
1102 90
1103 70
pMaxScore = 90, pMaxNum = 1102
maxScore = 8, maxNum = 30
```

```
E:\c\test\bin\Debu...
How many students?3
Input students' ID and score:
1101 90
1102 80
1103 70
pMaxScore = 90, pMaxNum = 30
maxScore = 8, maxNum = 30
```

*Not Work! Why?*

```
E:\c\test\bin\Deb...
How many students?3
Input students' ID and score:
1101 90
1102 80
1103 70
pMaxScore = 90, pMaxNum = 1101
maxScore = 8, maxNum = 30
```

```
FindMax(score, num, n, maxScore, maxNum);
```

**向函数传递实参值的副本不能在被调函数中修改实参的值**
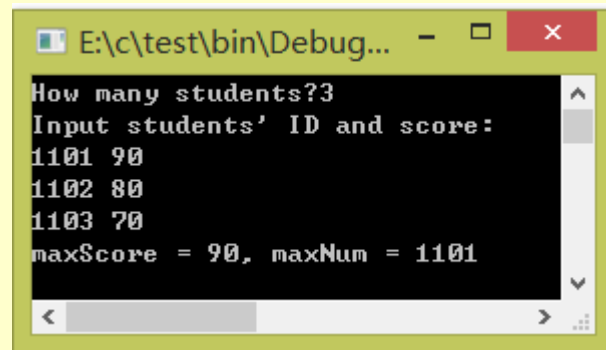
# 计算最高分及其学号

```c
#include <stdio.h>
#define N 80
void FindMax(int score[],long num[],int n, int *pMaxScore, long *pMaxNum);
int main()
{
    int score[N], maxScore;
    long num[N], maxNum;
    int n, i;
    printf("How many students?");
    scanf("%d", &n);
    printf("Input students' ID and score:\n");
    for (i=0; i<n; i++)
    {
        scanf("%ld%d", &num[i], &score[i]);
    }
    FindMax(score, num, n, &maxScore, &maxNum);
    printf("maxScore = %d, maxNum = %ld\n", maxScore, maxNum);
    return 0;
}
```

向函数传递实参的地址值，告诉形参指针，需要修改的值保存到哪里

# 计算最高分及其学号

```c
void FindMax(int score[],long num[],int n, int *pMaxScore, long *pMaxNum)
{
    int     i;
    *pMaxScore = score[0];
    *pMaxNum = num[0];
    for (i=1; i<n; i++)
    {
        if (score[i] > *pMaxScore)
        {
            *pMaxScore = score[i];
            *pMaxNum = num[i];
        }
    }
}
```

```
E:\c\test\bin\Debug...

How many students?3
Input students' ID and score:
1101 90
1102 80
1103 70
maxScore = 90, maxNum = 1101
```

```c
FindMax(score, num, n, &maxScore, &maxNum);
```

**向函数传递实参的地址值，告诉形参指针，需要修改的值保存到哪里**

# 讨论

- 下面程序的功能是从键盘任意输入n个数，然后找出其中的最大数与最小数，并将其位置对换。这个程序有无错误？如果有，那么错在哪里？请通过程序调试找到错误的原因并修正错误。

```c
#include  <stdio.h>
#define ARR_SIZE 10
int main()
{
   int a[ARR_SIZE], i, n;
   printf("Input n(n<=10):");
   scanf("%d", &n) ;
   printf("Input %d Numbers:\n", n);
   for (i=0; i<n; i++)
   {
      scanf("%d", &a[i]);
   }
   MaxMinExchang(a, n);
   printf("After MaxMinExchange:\n");
   for (i=0; i<n; i++)
   {
      printf("%d ", a[i]);
   }
   printf("\n");
  return 0;
}
```

```c
void  MaxMinExchang(int a[], int n)
{
    int  maxValue = a[0], minValue = a[0], maxPos, minPos;
    int  i, temp;
    for (i=0; i<n; i++)
    {
       if (a[i] > maxValue)
       {
           maxValue = a[i];
           maxPos = i;
       }
       if (a[i] < minValue)
       {
           minValue = a[i];
           minPos = i;
       }
    }
    temp = a[maxPos];
    a[maxPos] = a[minPos];
    a[minPos] = temp;
}
```

Thank you for your attention !

Q&A