SUSTech Southern University of Science and Technology

CS111，C Programming

Lab / Condition & Loop

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Outline

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- Review
- Condition: Showcase, switch
- Loop: Showcase, while
- Assignment

Review：Problem #1

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```
5       long long aa,bb,cc;
6       double A;
7       scanf("%lld %lld %lld",&aa,&bb,&cc);
8       printf("%lld",(bb*bb-4*aa*cc));
9       double a=aa,b=bb,c=cc;
10      if(a==0)
11      {
12          printf("%.5lf",(-c/b));
13      }
14      else
```

Bug?

Review：Problem #2

```
10      int cc0;
11      int cc1;
12      int cc2;
13      int cc3;
14      scanf("%d %d",&msg,&key);
```

```
32          char cc0= a_2 +97;//转为ASCII码
33      }
34      else{
35          char cc2= a_2+39;
36      }
37      if(a_0<=25){
38          char cc3= a_3 +97;//转为ASCII码
39      }
40      else{
41          char cc3= a_3+39;
42      }
43      printf("%c%c%c%c",cc0,cc1,cc2,cc3);
```

思考：这两个 cc2

- 是同个变量吗?
- 重复定义?
- 最后输出是哪个变量?

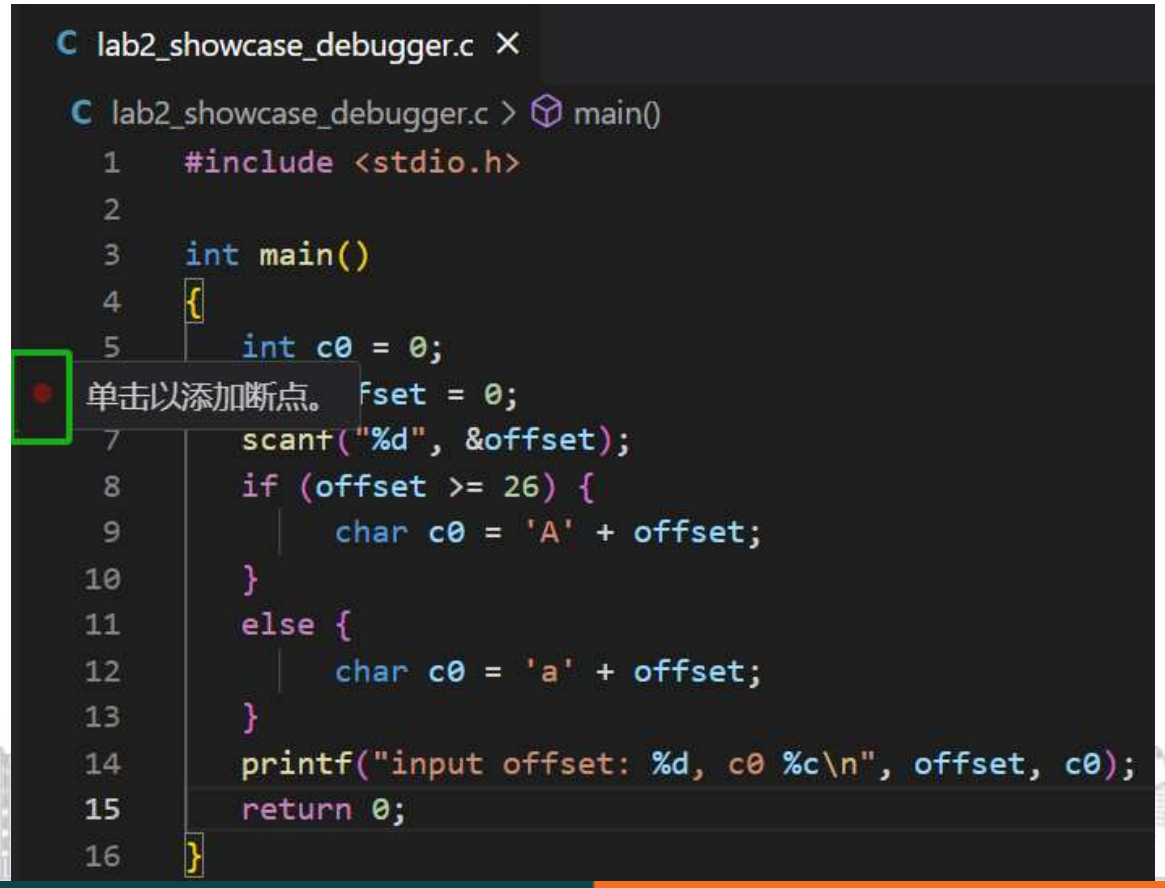
Not Sure? Let’s debug it…

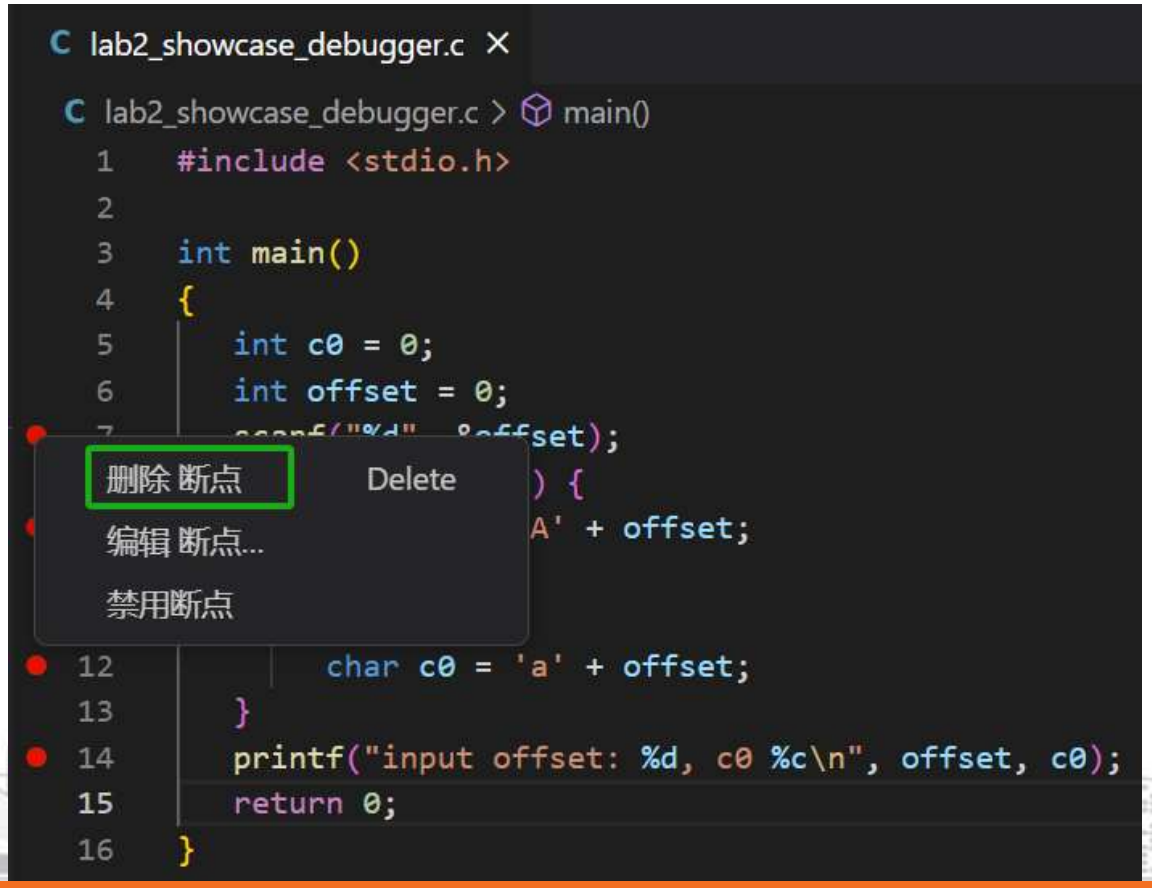
How to debug in VS Code ?

关键点

- **添加/删除断点**

注意：需要在非运行状态操作



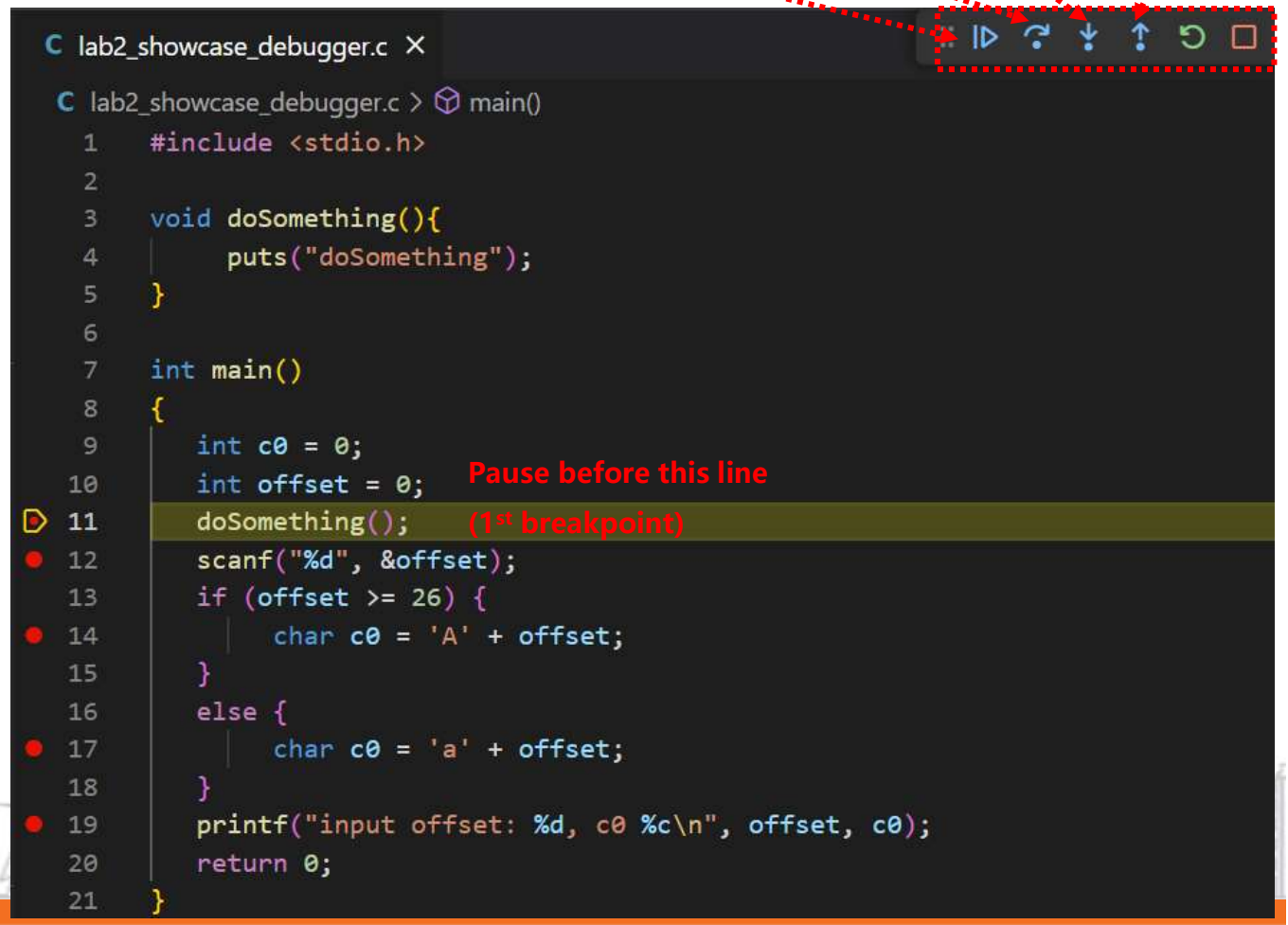


How to debug in VS Code ?

关键点

- 添加/删除断点
- **启动调试：** 继续、逐过程、单步、跳出、...

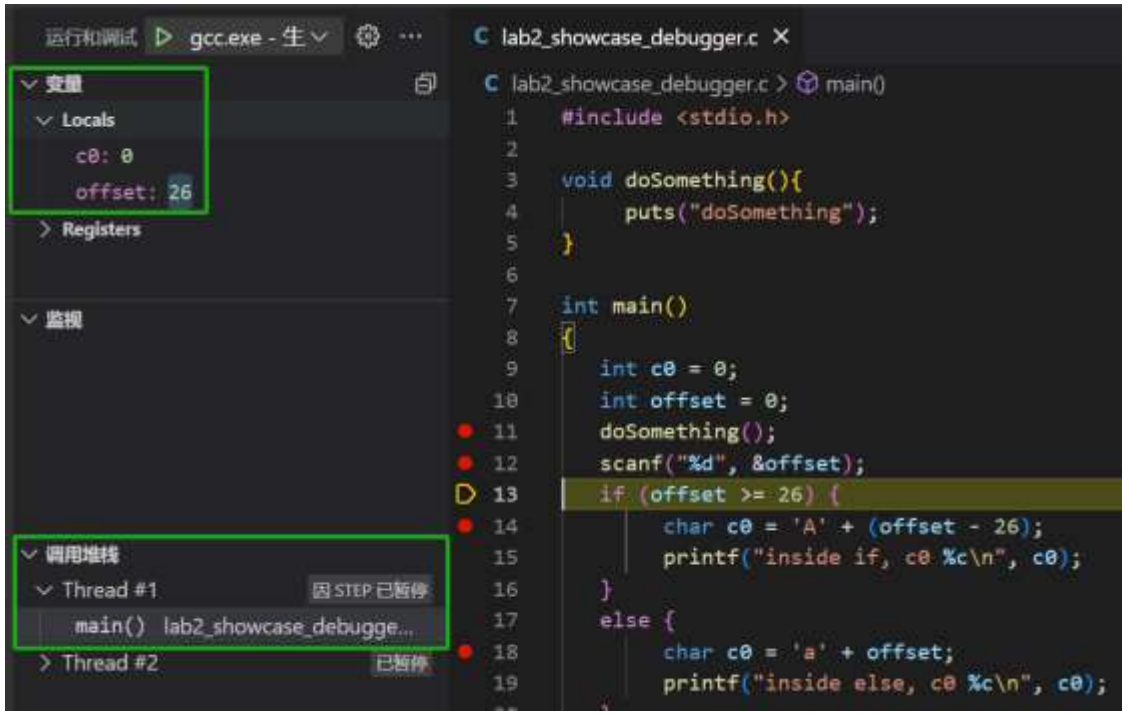
or

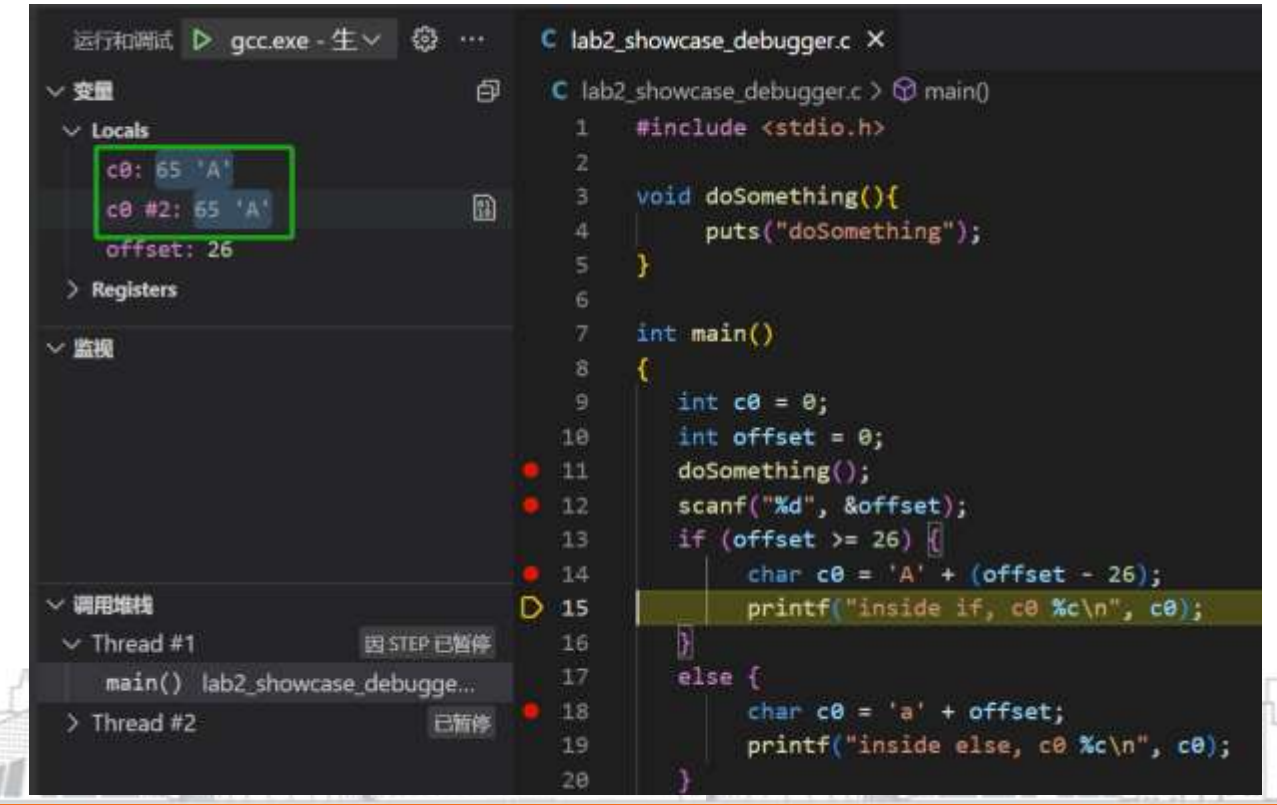


How to debug in VS Code ?

关键点

- 添加/删除断点
- 启动调试：继续、逐过程、单步、跳出、...
- **查看信息**：变量、调用堆栈





How to debug in VS Code ?

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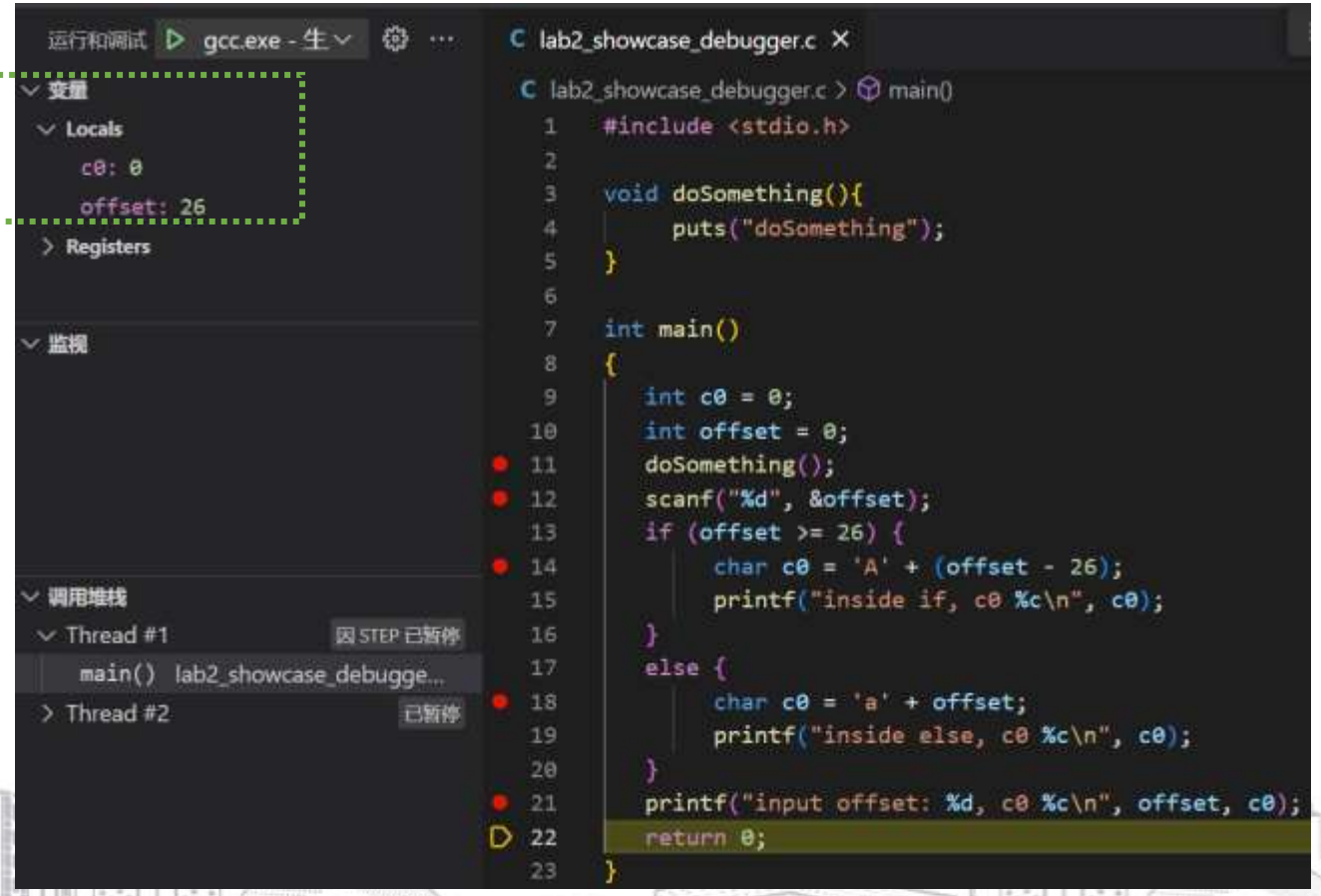
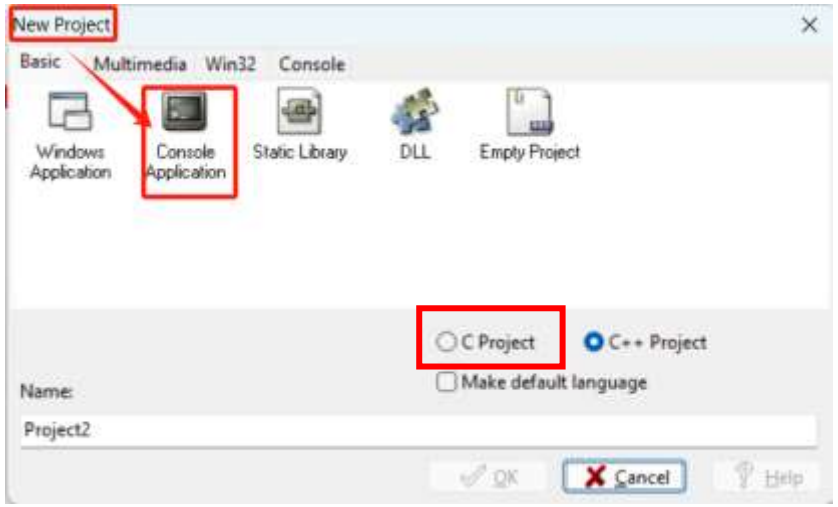


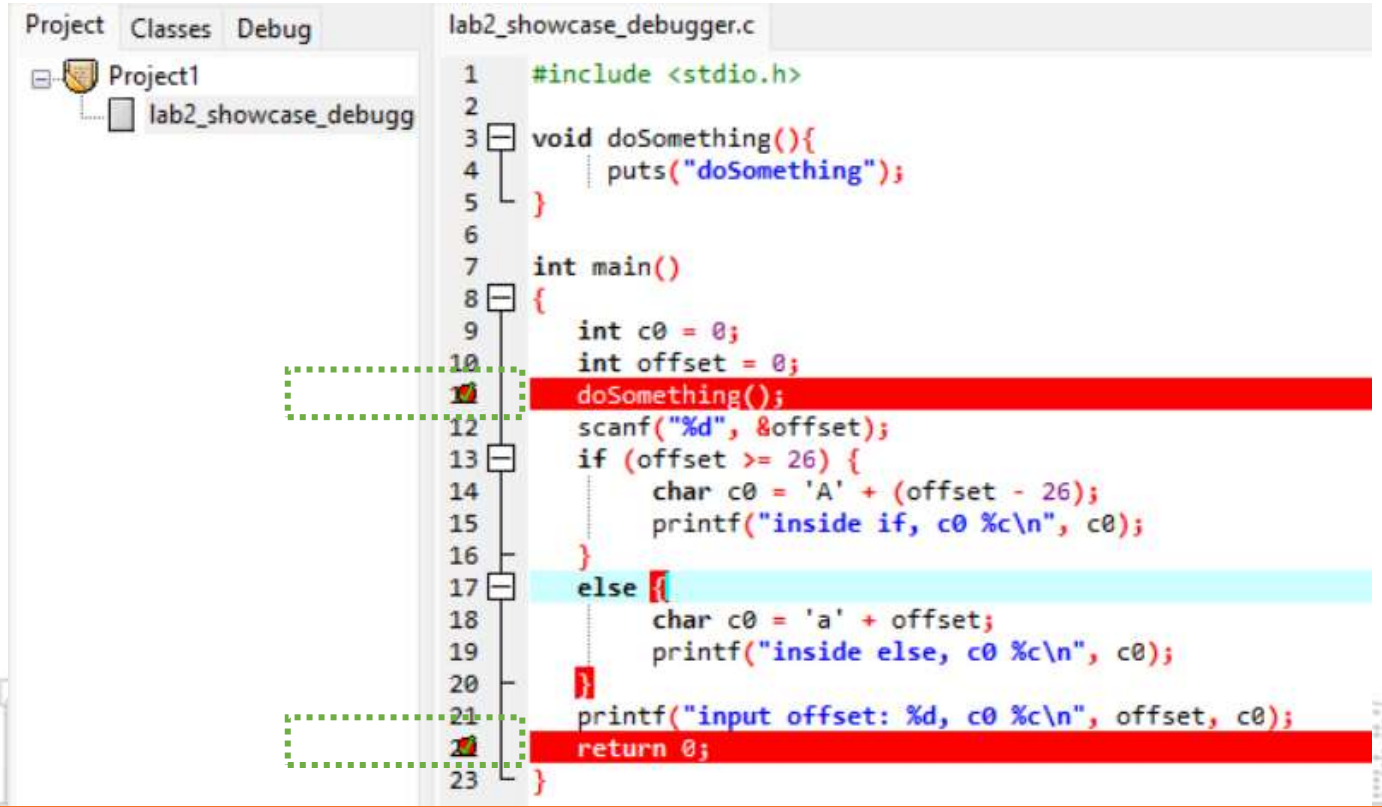

```
doSomething
26
inside if, c0 A
input offset: 26, c0
```

How to debug in Dev-C++

关键点

- 添加/删除断点
- 启动调试：继续、逐过程、单步、跳出、...
- 查看信息：变量、调用堆栈





注意：

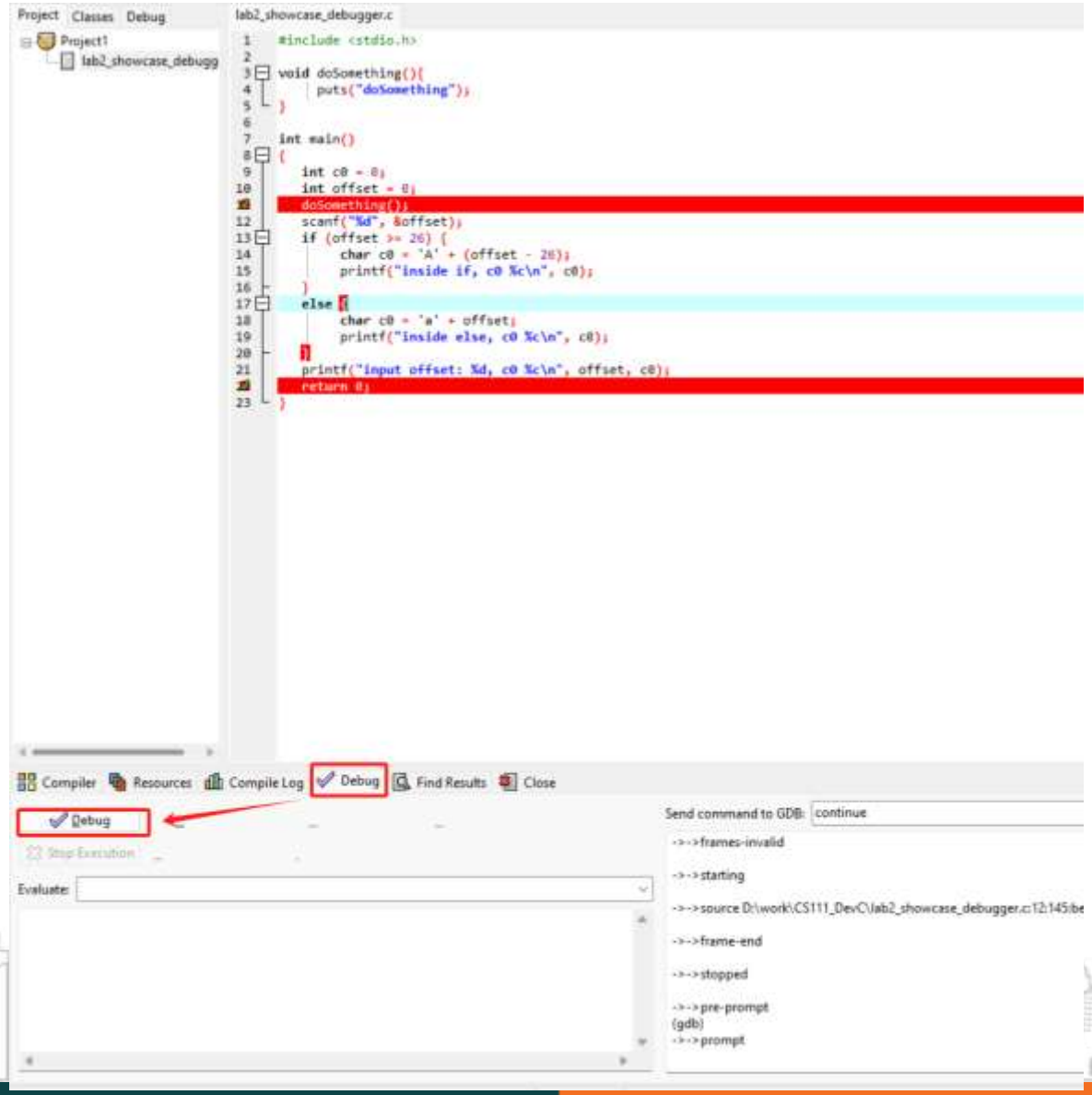
Dev-C++需针对 debug 代码创建一个 project,

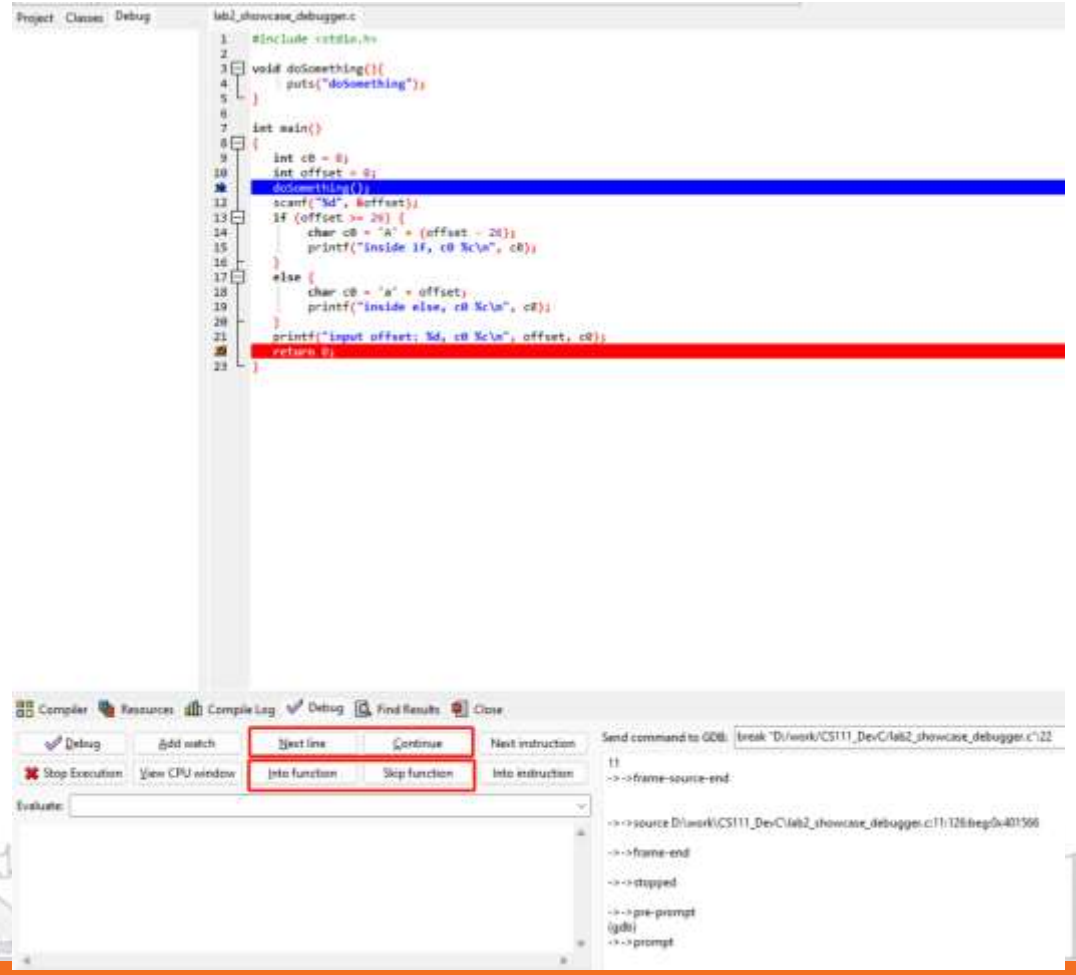
然后把待调试代码放到project中

How to debug in Dev-C++

关键点

- 添加/删除断点
- 启动调试：继续、逐过程、单步、跳出、...





How to debug in Dev-C++

关键点

- 添加/删除断点
- 启动调试：继续、逐过程、单步、跳出、...
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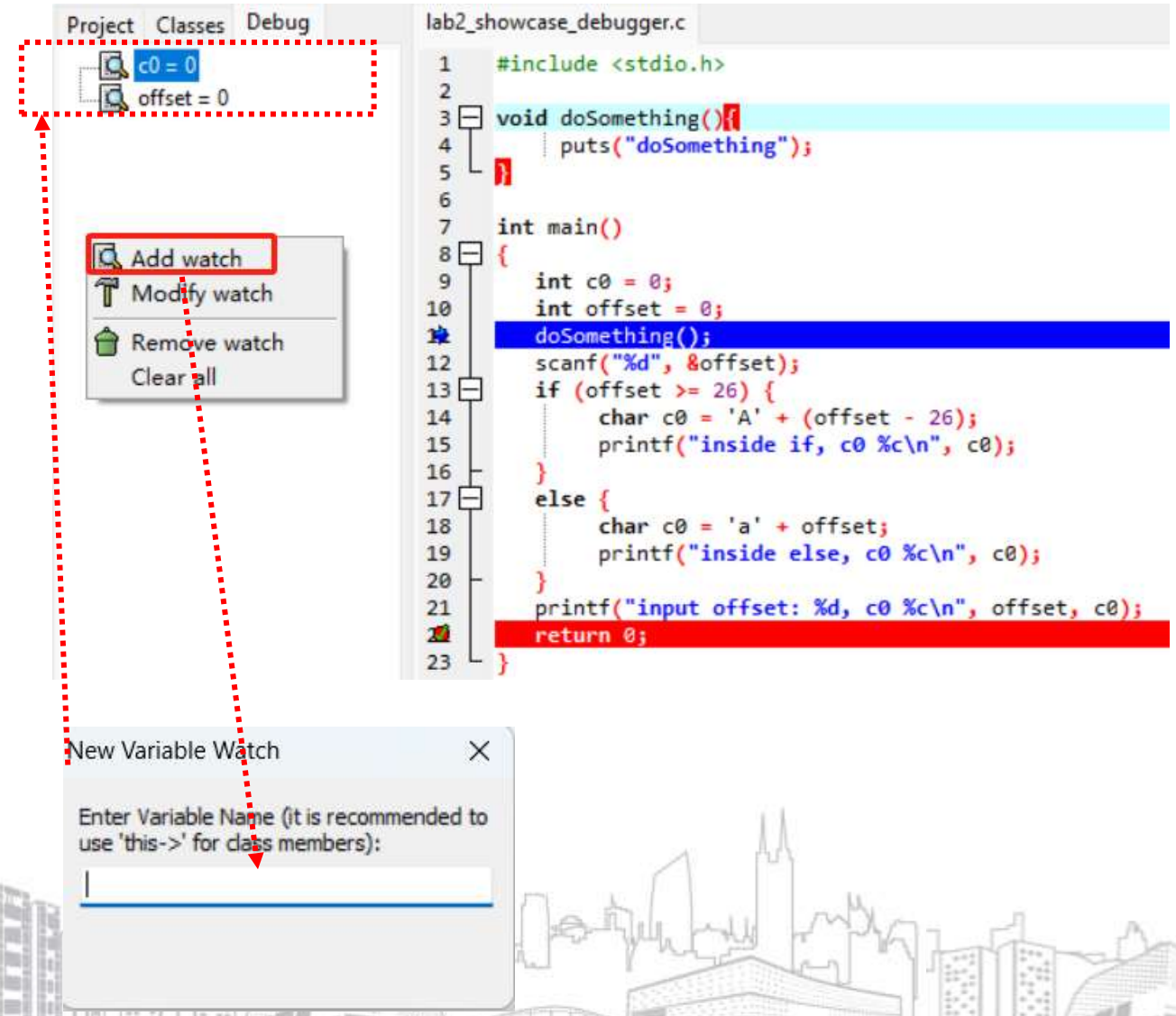

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Condition: Review, if … else …

How to re-write as

“switch … case …” ?

```
5     int a = 0;
6     scanf("%d", &a);
7     if (a == 13)
8     {
9         puts("Card Number: K");
10    }
11    else if (a == 12)
12    {
13        puts("Card Number: Q");
14    }
15    else if (a == 11)
16    {
17        puts("Card Number: J");
18    }
19    else if (a == 1)
20    {
21        puts("Card Number: A");
22    }
23    else if (a > 1 && a <= 10)
24    {
25        printf("Card Number: %d\n", a);
26    }
27    else
28    {
29        puts("Error Card Number!");
30    }
31    puts("run after if...else... block");
32    return 0;
```

Condition: Showcase, switch

```
14
Error Card Number!
```

```
3
Card Number: 3
run after switch..case... block
```

Bugs?

```c
int a = 0;
scanf("%d", &a);
if (a <= 0 || a > 13)
{
    puts("Error Card Number!");
    return 0;
}
switch (a)
{
    case 13:
        puts("Card Number: K");
    case 12:
        puts("Card Number: Q");
    case 11:
        puts("Card Number: J");
    case 1:
        puts("Card Number: A");
    default:
        printf("Card Number: %d\n", a);
}
puts("run after switch..case... block");
return 0;
```

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Loop: Showcase, while

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....

Results 2 and 3: Solve the quadratic equation $ax^2 + bx + c = 0$ and output the two solutions as double-precision floating-point numbers (保留5位小数).

- .....

- Note: For square root operations, include the <math.h> header file and utilize the sqrt() function.

扩展思考：尝试不使用 math.h 中 sqrt 函数；采用二分法近似求解出平方根，中间语法需要用到循环(e.g. while) 语句。

Let’s coding together ?

double my_sqrt(double val) ….

Loop: Show

Need a test code framework ?

```c
double my_sqrt(double val) {
    return 0.0; // TODO
}

int main()
{
    int pass = 0, fail = 0;
    double x = 0;
    while(1) {
        // step1, check input, when error input, break
        scanf("%lf", &x);
        if (x < 0) {
            printf("error input: %lf, exit\n", x);
            break;
        }
        // step2, check result, and check difference
        double my_result = my_sqrt(x);
        double diff = abs(my_result * my_result - x);
        if (diff < 0.000001) {
            pass++;
            printf("Passed: x = %.6lf, result %.6lf, Continue to test\n", x, my_result);
            continue;
        }
        fail++;
        printf("Failed: x = %.6lf, result %.6lf, Error %.6lf\n", x, my_result, diff);
    }
    printf("Test finished, pass %d, fail %d\n", pass, fail);
    return 0;
}
```

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Assignment 1)

输入2个整数，求最大公约数

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Given two integers a and b ($1 \leq a, b \leq 2 \times 10^9$), your task is to find the **greatest common divisor (GCD)** of the two integers, which is the greatest integer that divides both of them.

Hint

Here are the details of the algorithm. Suppose $a \geq b$ (note that the data does **NOT** guarantee this!)

0. Let $r = a \bmod b$
1. **Loop**
   - If $r = 0$, break the loop.
   - Otherwise, we have $r \neq 0$. Move b's value into a, then move r's value into b, finally calculate $r = a \bmod b$.
2. One of a, b, r holds the answer. Who? 😳

```
24 18
6
```

```
66 44
22
```

```
189 46
1
```

Assignment 2)

输入2个日期，计算这两个日期的相差多少天?

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Given two dates d_1 and d_2 of format `YYYY-MM-DD`, calculate the absolute differential days between them.

It is guaranteed that both d_1 and d_2 are valid dates between `1001-01-01` and `2024-12-31`.

Format

Input

There are 2 lines in the input.

The first line contains a string of format `YYYY-MM-DD` representing d_1.

The second line contains a string of format `YYYY-MM-DD` representing d_2.

Output

Print the absolute differential days between d_1 and d_2.

```
2024-02-19
2024-03-21
31
```

```
2020-03-01
2020-02-28
2
```

Hint

Remember to consider the leap year. You can check your implementation in one of the previous labs.

You can use the following code to read the date string and obtain three integers representing the date. (This is where you need to add - in the format string!)

```
int year, month, day;
scanf("%d-%d-%d", &year, &month, &day);
```

Copy

Subtasks

NOTE: 本道题在OJ拿到60+分，即可算满分

This problem is kind of challenging. If you cannot finish the whole problem, we have prepared some subtasks with simpler situations:

- **Subtask 1:** 10 pts for successfully handling the above 4 samples.
- **Subtask 2:** Another 30 pts for handling the situation where d_1, d_2 are dates in the same month of year 2020.
- **Subtask 3:** Another 30 pts for handling the situation where d_1, d_2 are dates within the same year.

The final 30 pts is for the full solution to the problem.

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THANK YOU