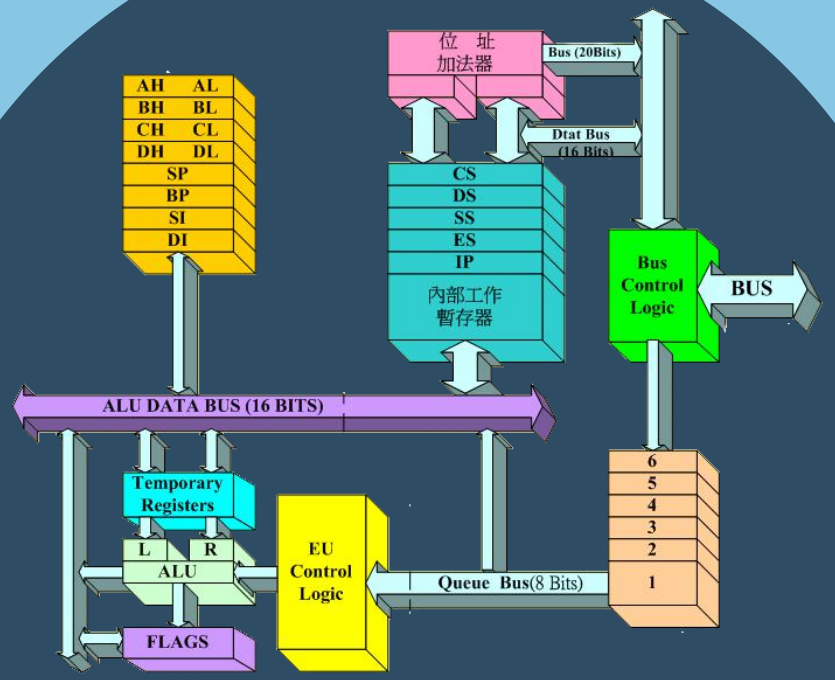
高级语言的指令级调试

贺利坚　主讲



汇编语言程序设计

Assembly Language

汇编语言与机器语言、高级语言的关系

- 汇编语言与机器语言
  - 一对一关系，每一条汇编语言指令对应一条机器语言指令
- 高级语言与汇编语言
  - 一对多关系，C语言的一条语句会扩展为多条汇编语言指令或机器指令

```
C:\>debug ptest.exe
-u
076A:0000 B86D07        MOV     AX,076D
076A:0003 8ED8          MOV     DS,AX
076A:0005 B80000        MOV     AX,0000
076A:0008 8D360000      LEA     SI,[0000]
076A:000C B90500        MOV     CX,0005
```

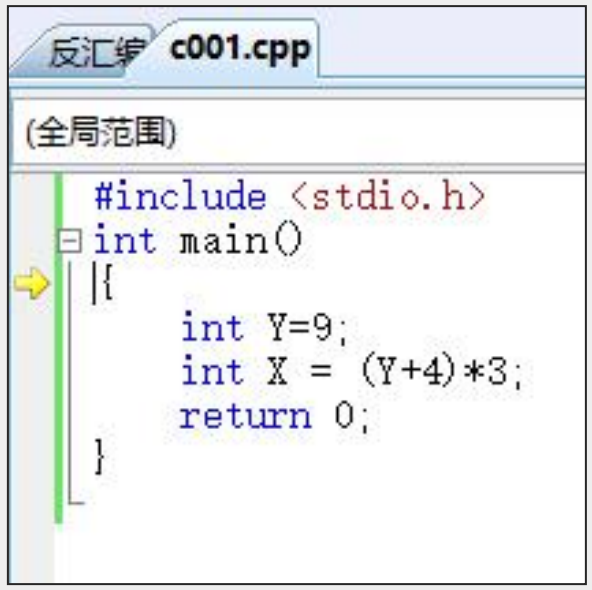
C:

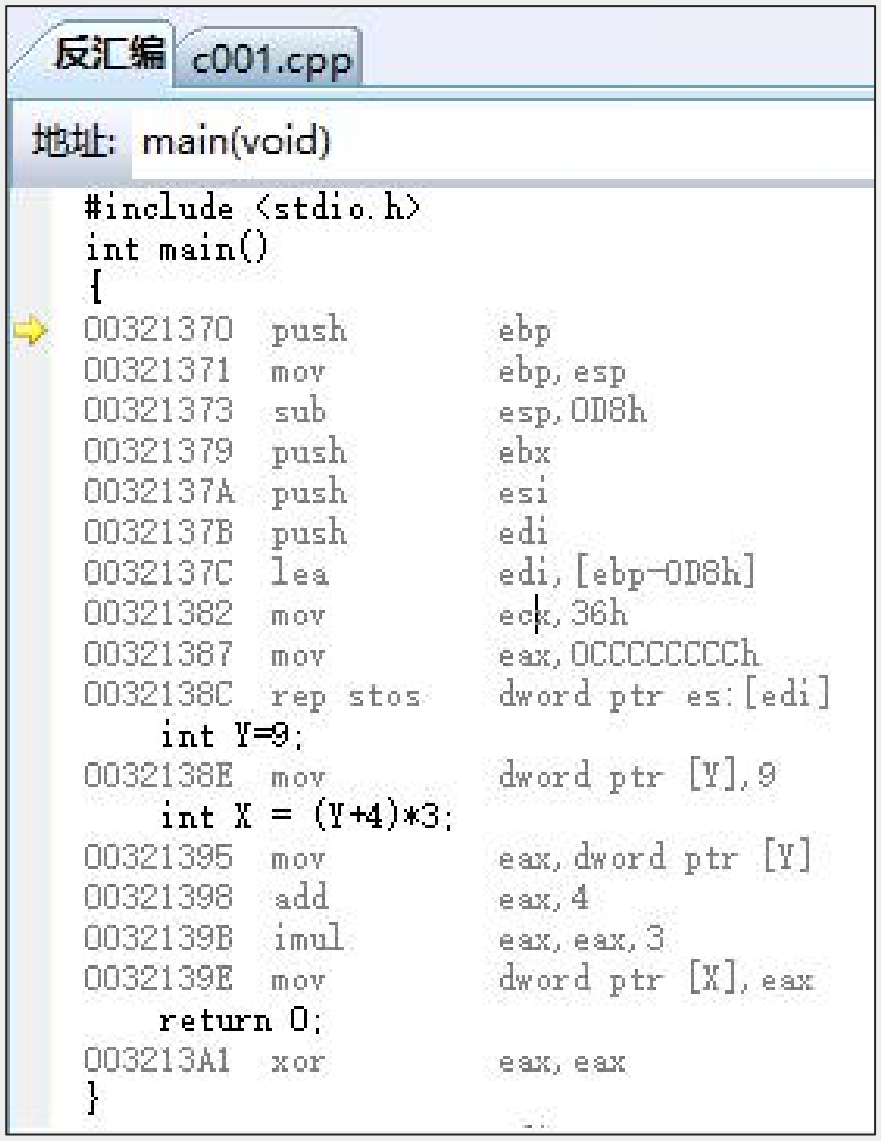
```
int Y;
int X = (Y+4)*3;
```

Assembly:

```
mov eax, Y
add eax, 4
mov ebx, 3
imul ebx
mov X, eax
```

VS中的反汇编


反汇编
c001.cpp
(全局范围)
#include <stdio.h>
int main()
{
int Y=9;
int X = (Y+4)*3;
return 0;
}


反汇编
c001.cpp
地址: main(void)
#include <stdio.h>
int main()
{
00321370 push ebp
00321371 mov ebp,esp
00321373 sub esp,0D8h
00321379 push ebx
0032137A push esi
0032137B push edi
0032137C lea edi,[ebp-0D8h]
00321382 mov ecx,36h
00321387 mov eax,0CCCCCCCCh
0032138C rep stos dword ptr es:[edi]
int Y=9;
0032138E mov dword ptr [Y],9
int X = (Y+4)*3;
00321395 mov eax,dword ptr [Y]
00321398 add eax,4
0032139B imul eax,eax,3
0032139E mov dword ptr [X],eax
return 0;
003213A1 xor eax,eax
}

反汇编再例


```
    Y=(X++)+1;
001217F5  mov         eax,dword ptr [X]
001217F8  add         eax,1
001217FB  mov         dword ptr [Y],eax
001217FE  mov         ecx,dword ptr [X]
00121801  add         ecx,1
00121804  mov         dword ptr [X],ecx
    Y=(++X)+1;
00121807  mov         eax,dword ptr [X]
0012180A  add         eax,1
0012180D  mov         dword ptr [X],eax
00121810  mov         ecx,dword ptr [X]
00121813  add         ecx,1
00121816  mov         dword ptr [Y],ecx
    return 0;
00121819  xor         eax,eax
}
```

在Codeblocks中观察、调试