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CSC 34200/34300

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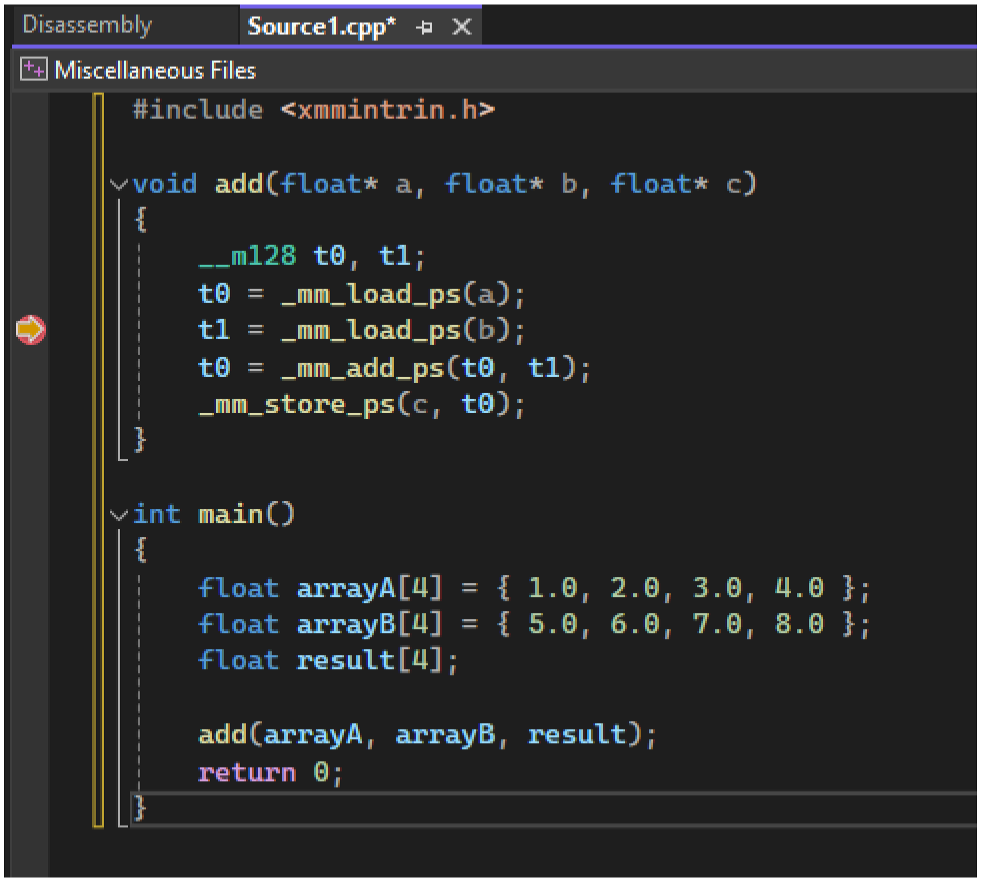
Homework Intrinsic

The screenshot below shows the source code that I debugged with the Simple Four-Iteration Loop Coded with Intrinsics as shown in the homework guidelines.



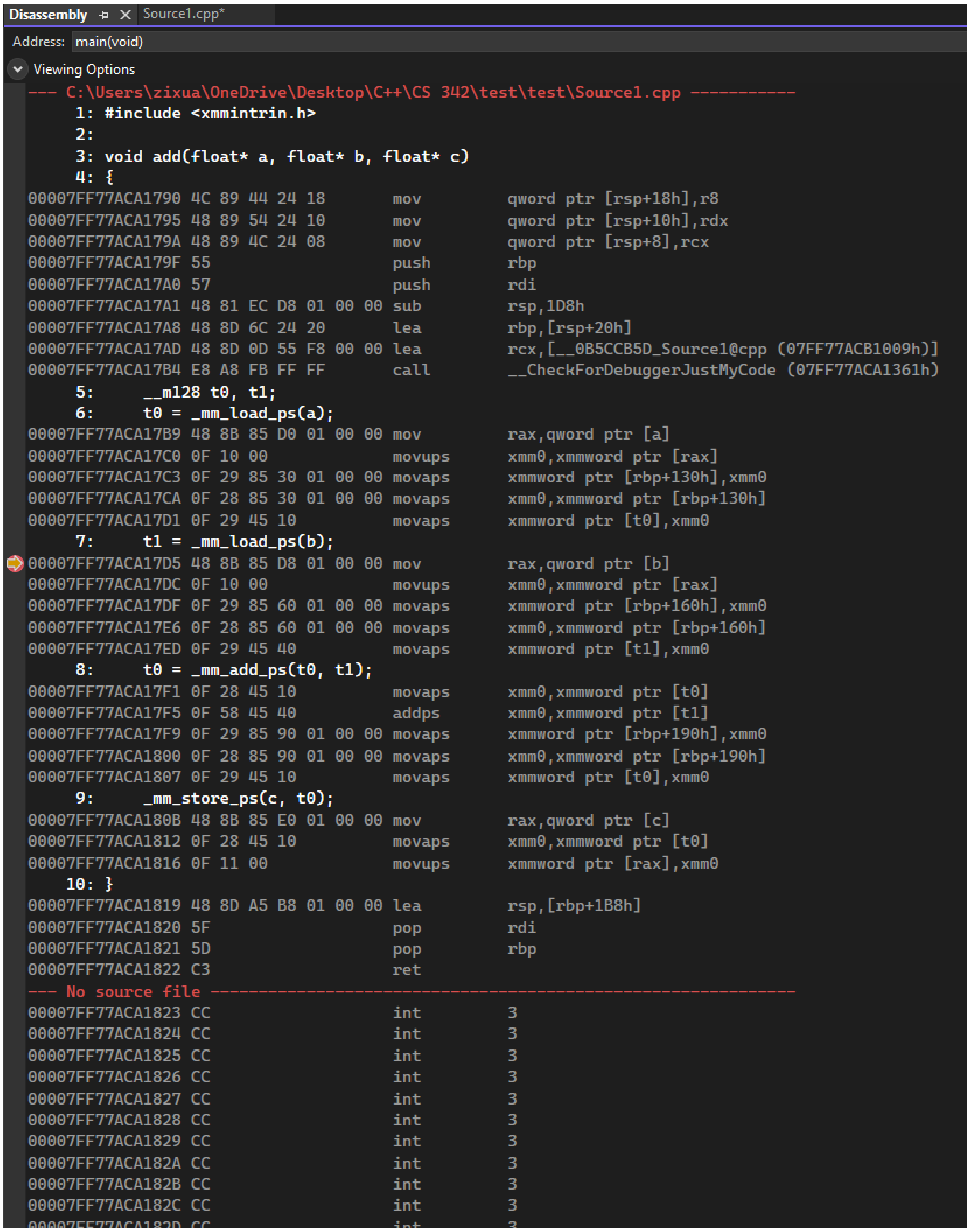
```
#include <xmmintrin.h>

void add(float* a, float* b, float* c)
{
    __m128 t0, t1;
    t0 = _mm_load_ps(a);
    t1 = _mm_load_ps(b);
    t0 = _mm_add_ps(t0, t1);
    _mm_store_ps(c, t0);
}

int main()
{
    float arrayA[4] = { 1.0, 2.0, 3.0, 4.0 };
    float arrayB[4] = { 5.0, 6.0, 7.0, 8.0 };
    float result[4];

    add(arrayA, arrayB, result);
    return 0;
}
```

The screenshot below shows the disassembly code for the vector instructions that implement the intrinsic functions.



```
--- C:\Users\zixua\OneDrive\Desktop\C++\CS 342\test\test\Source1.cpp -----------
     1: #include <xmmintrin.h>
     2:
     3: void add(float* a, float* b, float* c)
     4: {
00007FF77ACA1790 4C 89 44 24 18       mov         qword ptr [rsp+18h],r8
00007FF77ACA1795 48 89 54 24 10       mov         qword ptr [rsp+10h],rdx
00007FF77ACA179A 48 89 4C 24 08       mov         qword ptr [rsp+8],rcx
00007FF77ACA179F 55                   push        rbp
00007FF77ACA17A0 57                   push        rdi
00007FF77ACA17A1 48 81 EC D8 01 00 00 sub         rsp,1D8h
00007FF77ACA17A8 48 8D 6C 24 20       lea         rbp,[rsp+20h]
00007FF77ACA17AD 48 8D 0D 55 F8 00 00 lea         rcx,[__0B5CCB5D_Source1@cpp (07FF77ACB1009h)]
00007FF77ACA17B4 E8 A8 FB FF FF       call        __CheckForDebuggerJustMyCode (07FF77ACA1361h)
     5:     __m128 t0, t1;
     6:     t0 = _mm_load_ps(a);
00007FF77ACA17B9 48 8B 85 D0 01 00 00 mov         rax,qword ptr [a]
00007FF77ACA17C0 0F 10 00             movups      xmm0,xmmword ptr [rax]
00007FF77ACA17C3 0F 29 85 30 01 00 00 movaps      xmmword ptr [rbp+130h],xmm0
00007FF77ACA17CA 0F 28 85 30 01 00 00 movaps      xmm0,xmmword ptr [rbp+130h]
00007FF77ACA17D1 0F 29 45 10          movaps      xmmword ptr [t0],xmm0
     7:     t1 = _mm_load_ps(b);
00007FF77ACA17D5 48 8B 85 D8 01 00 00 mov         rax,qword ptr [b]
00007FF77ACA17DC 0F 10 00             movups      xmm0,xmmword ptr [rax]
00007FF77ACA17DF 0F 29 85 60 01 00 00 movaps      xmmword ptr [rbp+160h],xmm0
00007FF77ACA17E6 0F 28 85 60 01 00 00 movaps      xmm0,xmmword ptr [rbp+160h]
00007FF77ACA17ED 0F 29 45 40          movaps      xmmword ptr [t1],xmm0
     8:     t0 = _mm_add_ps(t0, t1);
00007FF77ACA17F1 0F 28 45 10          movaps      xmm0,xmmword ptr [t0]
00007FF77ACA17F5 0F 58 45 40          addps       xmm0,xmmword ptr [t1]
00007FF77ACA17F9 0F 29 85 90 01 00 00 movaps      xmmword ptr [rbp+190h],xmm0
00007FF77ACA1800 0F 28 85 90 01 00 00 movaps      xmm0,xmmword ptr [rbp+190h]
00007FF77ACA1807 0F 29 45 10          movaps      xmmword ptr [t0],xmm0
     9:     _mm_store_ps(c, t0);
00007FF77ACA180B 48 8B 85 E0 01 00 00 mov         rax,qword ptr [c]
00007FF77ACA1812 0F 28 45 10          movaps      xmm0,xmmword ptr [t0]
00007FF77ACA1816 0F 11 00             movups      xmmword ptr [rax],xmm0
    10: }
00007FF77ACA1819 48 8D A5 B8 01 00 00 lea         rsp,[rbp+1B8h]
00007FF77ACA1820 5F                   pop         rdi
00007FF77ACA1821 5D                   pop         rbp
00007FF77ACA1822 C3                   ret
--- No source file -------------------------------------------------------------
00007FF77ACA1823 CC                   int         3
00007FF77ACA1824 CC                   int         3
00007FF77ACA1825 CC                   int         3
00007FF77ACA1826 CC                   int         3
00007FF77ACA1827 CC                   int         3
00007FF77ACA1828 CC                   int         3
00007FF77ACA1829 CC                   int         3
00007FF77ACA182A CC                   int         3
00007FF77ACA182B CC                   int         3
00007FF77ACA182C CC                   int         3
00007FF77ACA182D CC                   int         3
```