Student #:

Name:

Quiz #2 2018 (5 min.)

Note 1: Return the answer sheet (even the blank one) to show your attendance.

Consider a C application program and its disassembly view below.

```
□ 🌣 Debug 🖾 🕪 Variables 🚻 Registers 🕦 Modules 🌋 XMD Console 6
memtest.c h memtest_funch 🖾 🖸
              func_time = (float)(xstop - >
printf("%f us\n",func_time);

■ Emern_test Debug [Xilinx C/C++ application (GDB)]

              return flag;
                                                                                                                                                           BE Outline ■ Disassembly ⊠
                                                                                                                                                                                mov r6, #0
b 0x1006a0 <memtest_0+116>
                                                                                                                                                             00100700:
     int memtest_1()
                                                                                                                                                                                     ; <UNDEFINED> instruction: 0x43a68000
                                                                                                                                                             00100708:
                                                                                                                                                                               memtest 1:
              int i,flag=-1;
short *Addr;
                                                                                                                                                                                push {r4, r5, r6, lr}
movw r0, #47340; 0xb8ec
movt r0, #16
bl 0x1008cc <print>
                                                                                                                                                             0010070c:
                                                                                                                                                             00100710:
00100714:
                                                                                                                                                             00100718:
                                                                                                                                                                                  movw r0, #16512; 0x4080
movt r0, #17
bl 0x1014f0 <XTime_GetTime>
                                                                                                                                                             0010071c:
00100720:
              short Pattern1;
              print ("Test 1 :");
                                                                                                                                                          00100724: b1 0x1014f0 xXTime_GetTime>
00100726: mov r3, #0
00100736: movt r3, #65535; 0xffff Y2: 0x FFFF_AMA
00100736: movt r3, #65535; 0xffff Y2: 0x FFFF_AMA
00100736: movt r1, #21845; 0x5555 Y1: 0x0000_55555
00100736: strh r1, [r3] Addr[0]: 0x5555 Addr[2]: 0x5555 --
00100746: cmr r3, #61440; 0x5050
00100744: ovino73c xmemtest_1+455 Addr[3]: 0xAAAA...
00100750: mov r3, #0
                                                                                                                                                              00100724:
              XTime GetTime(&xstart):
               //// Fill your code here! ////
              flag = 0;
Addr = 0xffff0000;
                                                                                                                                                         00100740:
300100744:
              Pattern0 = 0
                                                                                                                                                             0010074c:
00100750:
                                                                                                                                                                                                                                     Addr C3): BXAAAA...
                                                                                                                                                                                  mov r3, #0
movu r1, #43690; 0xaaaa
movt r3, #65535; 0xffff
movt r1, #65535; 0xffff
movu r0, #21845; 0x5555
                                                                                                                                                             00100754:
                                                                                                                                                              00100758:
                                                                                                                                                             0010075c:
00100760:
               for (i=0; i<1024;i++)
                                                                                                                                                                                                                                     > r3:0xffff_0004
                     Addr[2*i+0] = Pattern0;
                                                                                                                                                             00100764:
                                                                                                                                                                                   b 0x100780 <memtest_1+116>
                                                                                                                                                                                                                                             13:0xFFFF_0008
                                                                                                                                                                                  b 0x100780 (memtest_1+116)

ldnsh r2, [r3, #2]

add r3, r3, #4

cmp r2, r1

bne 0x10078c (memtest_1+128)

cmr r3, #61440 ; 0x7000

beq 0x100770 (memtest_1+228)

ldnsh r2, [r3]
                     Addr[2*i+1] = Pattern1;
                                                                                                                                                              00100768:
              // Memory Read & Check
for (i=0; i<1024;i++)
                                                                                                                                                             00100774:
                                                                                                                                                              00100778:
                                                                                                                                                                                  beq 0x100710 cmemtest_1+228:

Idrsh r2, [-3]

cmp r2, r0

beq 0x100768 cmemtest_1+92>

mvn r6, #0

movu r4, #16504; 0x4078

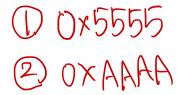
movt r4, #17

mov r0, r4

bl 0x101470 cXTime_GetTime>

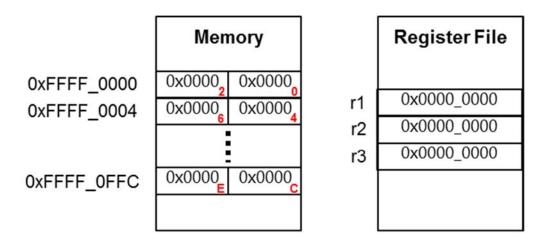
movu r3, #16512; 0x4080
                     if (Addr[2*i+0] != Pattern0 || Addr[2*i+1] != Pattern1)
                                                                                                                                                              00100780:
                                                                                                                                                              00100784:
                            flag = -1;
break;
                                                                                                                                                             00100788:
0010078c:
                                                                                                                                                              00100790:
                                                                                                                                                              00100794:
                                                                                                                                                             00100798:
0010079c:
              XTime_GetTime(&xstop);
func_time = (float)(xstop - ;
printf("%f us\n",func_time);
                                                                                                                                                                                  move r3, #16512; 8x4080
movt r3, #17
ldrd r4, [r4]
ldrd r0, [r3]
subs r0, r4, r0
sbc r1, r5, r1
                                                             xstart) / 333;
                                                                                                                                                              001007a0:
                                                                                                                                                              001007a4:
                                                                                                                                                              001007ac:
                                                                                                                                                              001007b0:
                                                                                                                                                              00100764:
```

(1) Fill out the blanks ① and ② in the above C application program [5pt].



(2) Provide **all** the <u>values</u> (e.g., $0x0000_0000$) of the register/memory locations below assuming that the program currently breaks at ③ (before executing the instruction of that line) **for the second time** [15pt].

Before Running



After Running

