

Homework Assignment 1

(Due 2:00pm, Sep. 21, email to daehyun.kim@wsu.edu)

Use the following memory map for the main memory.

| | |
|--------|-----------------|
| 0x0050 | |
| 0x004C | |
| 0x0048 | |
| 0x0044 | |
| 0x0040 | |
| 0x003C | unsigned int e; |
| 0x0038 | |
| 0x0034 | |
| 0x0030 | unsigned int d; |
| 0x002C | unsigned int c; |
| 0x0028 | |
| 0x0024 | |
| 0x0020 | |
| 0x001C | unsigned int b; |
| 0x0018 | |
| 0x0014 | |
| 0x0010 | unsigned int a; |
| 0x000C | |
| 0x0008 | |
| 0x0004 | |
| 0x0000 | |

1. (20 points) Make an assembly source code for the following C code. (Don't care about overflows, underflows, etc.). Do not optimize the code (for example, d is b, but don't do that.)

```
c = a + b;  
d = c - a;  
e = d + d;
```

2. (20 points) Make an assembly source code for swapping the values of variables a and b. For example, if a has 10 and b has 20, a will have 20 and b will have 10 after running your code.

3. (30 points) We want to make an assembly source code for $b=a$, $c=b$, $a=c$ (swapping the values of three variables, a , b , and c). For example, if a has 10, b has 20, and c has 30, a will have 30, b will have 10, and c will have 20 after running your code.

Constraint: You cannot use any other memory addresses except those for variables a , b , and c (i.e., you can access only $0x0010$, $0x001C$, and $0x002C$).

Can you find the minimum number of registers you will need?