#1. In a SPARC assembly instruction which takes 3 operands (src1, src2, and a destination), which is the only operand which can be an immediate constant (for example, 5 or -99)? _____________

What is the range of values that can be used as an immediate constant in such an operand? ________________

If a constant value outside of this range is needed, what instruction must you use to properly put this constant value into a register to be used as the operand in such an instruction? ___________

What value do you get when you read from register %g0? ____________

#2. What is the value (in hex) of %o1 after each set of instructions:

a) 
   set 0xCABAFEED, %o1
   sra %o1, 12, %o1

Value in %o1 at this point is 0x______________________________

b) 
   set 0xCABAFEED, %o1
   set 0x4D3C2B1A, %o2
   xor %o1, %o2, %o1

Value in %o1 at this point is 0x______________________________

c) 
   set 0xCABAFEED, %o1
   set 0x4D3C2B1A, %o2
   and %o1, %o2, %o1

Value in %o1 at this point is 0x______________________________

#3. Assume you run gdb on pa1.
State how to set a breakpoint at the entry point in displayDiamond():

Assume you correctly set this breakpoint and performed a run with correct command line arguments. State how to print the value of the 2\textsuperscript{nd} argument passed to displayDiamond() in gdb:

(over)
#4. Write the equivalent unoptimized SPARC assembly language instructions to perform the following C code fragment. Use the loop construct specified in class/Notes.

```c
for ( x = 7777; x != 409; --x )
{
    a = x + 345;
}
```

```
SPARC assembly
/* x is mapped to %l2 */
/* a is mapped to %l4 */
```

#5a. Write the equivalent unoptimized SPARC assembly language instructions to perform the following C code fragment.

```c
x = x * 8052;
```

```
SPARC assembly
/* x is mapped to %10 */
```

5b. Now optimize your answer from #5a to eliminate any delay slots:

Optimized version of above SPARC assembly