MC48 Intra-term Exam 1

Serial #:

This exam is an open-book, open-notes, individual-work exam. Please write your name only on this page. Do not turn the page until instructed, in order that everyone may have the same time. Then, be sure to look at all problems before deciding which one to do first. Some problems are easier than others, so plan your time accordingly. You have 50 minutes to work.

Write the answer to each problem on the page on which that problem appears. You may use the back of that same sheet if you need additional space. You may also request additional paper.

Name: ______________________________

Problem	Page	Possible	Score
1	2	12	
2	3	12	
3	4	12	
Total		36	

1. [**12 Points**]

   Two students solve this problem, one 10% faster than the other (i.e., 1.1 times as fast). They both work equally quickly on all aspects of the problem except the arithmetic, which one student does twice as fast as the other. What fraction of the quicker student's time is spent doing the arithmetic? What fraction of the slower student's time? Be sure to show your work.

2. [**12 Points**] The following procedure computes into `$v0` some function of its two arguments, which it receives in `$a0` and `$a1`. You may assume that both arguments are positive and that no overflow occurs. Express as a simple mathematical expression what function the procedure computes, and briefly describe the reasoning leading you to this conclusion.

```
foo:
        add     $t0, $a0, $a0
        add     $a0, $a0, $t0
        addi    $a1, $a1, -1
        bne     $a1, $zero, foo
        add     $v0, $a0, $zero
        jr      $ra
```

3. [**12 Points**] The floating point numeral represented by the following 32 bits is to be squared. What 32 bits should the resulting floating point numeral be? You must show your work, but you needn't do the squaring the way the computer hardware would. (Assume that the standard IEEE representation covered by our text is used.)

```
1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```