

## Quiz 5

Name: \_\_\_\_\_

**Question 1 (25 points).** The following code generates a string containing all of the numbers between 1 and the value of parameter `n`, separated by spaces; it does so **iteratively**. For instance, `number_string(3)` returns `"1 2 3"`. Write a **recursive** implementation of this function.

```
1 def number_string(n):
2     acc = ""
3     for i in range(1,n+1):
4         if i > 1:
5             acc += " "
6         acc += str(i)
7     return acc
```

**Question 2 (25 points).** The following recursive function is expected to add all of the numbers between 0 and the value of parameter `n`. For instance, `sum_up_to(6)` should return 21 (since  $0 + 1 + 2 + 3 + 4 + 5 + 6 = 21$ ). This implementation contains two bugs. Identify them and explain how to correct them.

```
1 def sum_up_to(n):
2     if n > 1:
3         return sum_up_to(n) + n
4     elif n == 0:
5         return 0
```

**Question 3 (50 points).** Consider the following class definition and then answer the questions below.

```
1 class Student(object):
2     def __init__(self, name):
3         self.name = name
4         self.courses = []
5     def __str__(self):
6         return "%s is taking: %s" % (self.name, self.courses)
7     def register(self, course):
8         self.courses.append(course)
9     def unregister(self, course):
10        self.courses.remove(course)
11    def get_courses(self):
12        return self.courses
```

**(a) (15 points).** If we have a `Student` object in variable `student`, we can call the `register` method by writing `student.register("CS21")`. The `register` method takes two parameters, but here we've only given one argument. Why is this okay? What value will each parameter of the `register` method have when `student.register("CS21")` is called?

**(b) (15 points).** Write a method `next_semester` to add to this class definition which would unregister the student from all of his or her courses.

**(c) (20 points).** Write a `test` function which creates a student, registers that student for two courses, drops one course, and then tests to make sure that the student is only registered for one course.