Name: _____ USC ID: _____

# Quiz 12: MapReduce (10 points. 15 minutes)

1. [3 points] Consider the *WordCount* program you have seen in the class. Suppose the program processes the following file (stored under an input directory) which contains 3 lines of texts. What are the **input** <key, value> pairs to the **map** function?

```
map and reduce
map or reduce
reduce after map
```

```
<0, "map and reduce">
<15, "map or reduce">
<29, "reduce after map">
```

**0.5 point for each key/value**

2. [7 points] Consider the problem of computing "R(A,B) join S(A,C)" that you have seen in class & implemented in the homework. Suppose the contents of R and S are given as follows.

| A | B |
|---|---|
| 1 | 3 |
| 1 | 4 |
| 2 | 5 |
| 3 | 6 |

Relation R

| A | C |
|---|---|
| 1 | 10 |
| 3 | 20 |
| 3 | 30 |
| 5 | 40 |

Relation S

a. [3 points] What are the **output** <key, value> pairs from the **map** function for both R and S?

| R | S |
|---|---|
| (1, ('R', 3)) | (1, ('S', 10)) |
| (1, ('R', 4)) | (3, ('S', 20)) |
| (2, ('R', 5)) | (3, ('S', 30)) |
| (3, ('R', 6)) | (5, ('S', 40)) |

**0.5 point for each key-value pair**

b. [2 points] What are the **input** <key, list-of-values> pairs to the **reduce** function?

```
<1, [('R', 3), ('R', 4), ('S', 10)]>
<2, [('R', 5)]]>
<3, [('R', 6), ('S', 20), ('S', 30)]>
<5, [('S', 40)]>
```

**0.5 point for each key-list of value pair**

c. [2 points] What are the **output** <key, value> pair from the **reduce** function?

```
<1, (3, 10)>, <1, (4, 10)>
<3, (6, 20)>, <3, (6, 30)>
```

**0.5 point for each key-value pair**