Design a MapReduce algorithm

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Map function() :

Use Department_id as the key for both the Student input value and Department input value, then in the student input we set the value as the student name, and in the Department input value, we set the value as the department name.

Reducer function():

After shuffle phase, we already have values grouped by key (Department_id). So, for every key, we first use an if statement to check whether the value have only one student value + one department value or not, if this is true, then we can just output the Department_id, Student_name and Department_name. If the value have many student name and one department name value, then we can use a for loop to find the department name for every student.

Psudocode:

```
Mapper(file):
For input in file:
  If(input[0] == Student) {
        Setoutput(input[2] + S + input[1])
  }
  else if(input[0] == Department) {
        Setoutput(input[1] + D + input[2])
  }

Reducer(key, values):
For value in values:
  If only one d + one S {
        Output(key + department name + student name)
  }
else if ( one D + many S) {
use for loop to find department name to every student name
        Output(key + department name + student name)
```

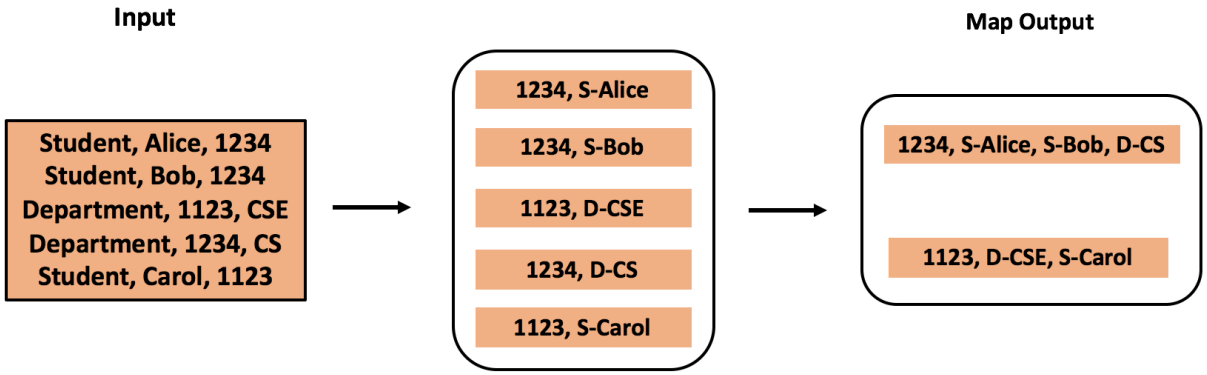
```
Student, Alice, 1234
Student, Bob, 1234
Department, 1123, CSE
Department, 1234, CS
Student, Carol, 1123
```

Input

```
1123, Carol, CSE
1234, Bob, CS
1234, Alice, CS
```

Output

Mapping function



Reducing Function