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CSE 6242
HW3: Question 2

a.)

input file:

```
100     10      3
110     10      3
200     10      1
150     130     30
110     130     67
10      101     15
```

Mapper:

- First, the map takes in our file as input. Then the it assesses each line of the input file (100, 10, 3) and splits up the line string into an array with a tab separator.
- For each array [100, 10, 3]:
    - Inbound_node = array[1]
    - Node_value = array[2]

- Then we pass to context.write(inbound_node, node_value). What gets passed to the reducer is a list of all the inbound_node and value.

Reducer: will get the minimum value for each inbound_node

- The reducer sorts and shuttles the list of key and value pairs taken in from the mapper. The sorting and shuffling will group the list by key. Each group will be a list of the key and the different values.
- So what we will be passed to the reducer function in the case of the above input file will be {10: [3, 3, 1]} {130: [30, 67]} {101: 15}
- Finally, for each key-value_array, we loop through the values to find the minimum. That value is that is sent to our output
  Context.write(key, min_value)

Our output will thus look like:

```
10      1
130     30
101     15
```

b.)

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

My algorithm would take the above file as input. Then, you would iterate through each line.

```
Fields = input from each line of the above file
If (fields[0] == “Student”) {
    Then the key-value pair passed would be (1234, (‘Alice’, ‘Student’))
}
if (fields[0] == “Department”){
    Then the key-value pair passed would be (1123, (‘CS’, ‘Department’))
}
```

Once the mapping has taken place, we would have a list of tuples with the student and department information that will be passed over to the reducer.

Once passed over to the reducer:

```
For val_1 in values:
    If val_1[1][1] == ‘Student’:
        Int key = val_1[0]
        For val_2 in values:
            If key = val_2[0] && val_2[1][1] == ‘Department’:
                Context.write(key, val_1[1][0], val_2[1][0])
```

The final output of the reducer would be as below:

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