Common Friend Generator on Facebook Data

- Ganeshram Iyer and Nishant Salvi

The idea behind this project was to use map reduce to find out common friends between people on Facebook. Given below are the logic and implementation part of our project.

1. Facebook user along with their friends:

   CommonFriendGenerator.jar contains the map and reduce functions mention below.

   Assume the friends are stored as Person->[List of Friends], our friends list is then:

   Input:

   A -> B C D
   B -> A C D E
   C -> A B D E
   D -> A B C E
   E -> B C D

   This acts as the input to Map function <LongWritable key,Text value>. In the Map function we take this input and convert it to pair of users. We use TextInputFormat to process each line of the input file and generate such pairs.

   Map:

   Each pair is then given to the reduce function. The order of the users is always in ascending order since it will be easy for us to track the keys in reduce function. This is because for each pair there will be two lists generated. Friends of A and Friends of B.

   For map (A -> B C D):

   (A B) -> B C D
   (A C) -> B C D
   (A D) -> B C D

   For map (B -> A C D E): (Note that A comes before B in the key)

   (A B) -> A C D E
   (B C) -> A C D E
   (B D) -> A C D E
   (B E) -> A C D E

Reduce:

The reduce function takes these pairs as the key and the list of friends as the value <Text key, Iterable <Text> value>. In reduce we pass the two lists obtained for each pair to the *getCommonFriends* function which returns the list of common friends excluding the pair.

Input to reduce - (A B) -> {(A C D E) ,(B C D)}
Output from reduce – (A B) -> (C D).

This output is written out as the final output.

2. Input Processing:

InputProcessing.jar contains the functions mentioned below.

Input:

The input obtained from the Facebook API after extracting the information is in the following format.

```
0 1
0 2
0 3
1 2
2 3
```

We need to convert this input to the following format, which acts as an input to the Map function of *CommonFriendsGenerator* class.

```
0       1 2 3
1       0 1
2       0 1 3
3       0 2
```

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Map:

We use *NLinesInputFormat* , which is a custom class written to process N lines together from the text file, as the input format for the map function. The map function takes each value and generates two key value pairs for each input. Since 0 1 means 0 is a friend of 1 and vice versa.

0 1 -> key 0 value 0
key 1 value 0

Reduce:

At reduce we combine all the value for a particular key, in this case we make a list of all the friends of a particular user and give that as the output.

0 -> {1,2,3} output form reduce 0 1 2 3

Thus *InputProcessing* class is used to make the input from the Facebook API compatible with the map reduce logic we have developed.