Big data: architectures and data analytics

MapReduce - Exercises

Exercise #22

- Friends of a specific user
  - Input:
    - A textual file containing pairs of users (one pair per line)
      - Each line has the format
        - Username1,Username2
      - Each pair represents the fact that Username1 is friend of Username2 (and vice versa)
    - One username specified as parameter by means of the command line
  - Output:
    - The friends of the specified username stored in a textual file
      - One single line with the list of friends

Exercise #22 - Example

- Input file

```
User1,User2
User1,User3
User1,User4
User2,User5
```

- Username parameter: User2
- Output file

```
User1 User5
```

Exercise #23

- Potential friends of a specific user
  - Input:
    - A textual file containing pairs of users (one pair per line)
      - Each line has the format
        - Username1,Username2
      - Each pair represents the fact that Username1 is friend of Username2 (and vice versa)
    - One username specified as parameter by means of the command line
  - Output:
    - The potential friends of the specified username stored in a textual file
      - One single line with the list of potential friends
    - User1 is a potential friend of User2 if they have at least one friend in common

Exercise #23 - Example

- Input file

```
User1,User2
User1,User3
User1,User4
User2,User3
User2,User4
User2,User5
User5,User6
```

- Username parameter: User2
- Output file

```
User1 User3 User4 User6
```

Exercise #23 Bis

- Potential friends of a specific user
  - Solve problem #23 by removing the friends of the specified user from the list of its potential friends

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Exercise #23 Bis - Example

- Input file

```
User1,User2
User1,User3
User1,User4
User2,User3
User2,User4
User2,User5
User5,User6
```

- Username parameter: User2
- Output file

```
User6
```

Exercise #24

- Compute the list of friends for each user
  - Input:
    - A textual file containing pairs of users (one pair per line)
      - Each line has the format
        - Username1,Username2
      - Each pair represents the fact that Username1 is friend of Username2 (and vice versa)
  - Output:
    - A textual file containing one line for each user. Each line contains a user and the list of its friends

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Exercise #24 - Example

- Input file

```
User1,User2
User1,User3
User1,User4
User2,User5
```

- Output file

```
User1: User2 User3 User4
User2: User1 User5
User3: User1
User4: User1
User5: User2
```

Exercise #25

- Compute the list of potential friends for each user
  - Input:
    - A textual file containing pairs of users (one pair per line)
      - Each line has the format
        - Username1,Username2
      - Each pair represents the fact that Username1 is friend of Username2 (and vice versa)
  - Output:
    - A textual file containing one line for each user with at least one potential friend. Each line contains a user and the list of its potential friends
    - User1 is a potential friend of User2 if they have at least one friend in common

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Exercise #25 - Example

- Input file

```
User1,User2
User1,User3
User1,User4
User2,User3
User2,User4
User2,User5
User5,User6
```

- Output file

```
User1: User2 User3 User4 User5
User2: User1 User3 User4 User6
User3: User1 User2 User4 User5
User4: User1 User2 User3 User5
User5: User1 User3 User4
User6: User2
```

Exercise #26

- Word (string) to integer conversion
  - Input:
    - A large textual file containing a list of words per line
    - The small file dictionary.txt containing the mapping of each possible word appearing in the first file with an integer. Each line contain the mapping of a word with an integer and it has the following format
      - Word\tInteger\n
  - Output:
    - A textual file containing the content of the large file where the appearing words are substituted by the corresponding integers

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Exercise #26 - Example

- Input files
  - Large textual file

```
TEST CONVERTION WORD TO INTEGER
SECOND LINE TEST WORD TO INTEGER
```

  - Small dictionary file

```
1	CONVERTION
2	INTEGER
3	LINE
4	SECOND
5	TEST
6	TO
7	WORD
```

Exercise #26 - Example

- Output file

```
5 1 7 6 2
4 3 5 7 6 2
```