Big data: architectures and data analytics

MapReduce - Exercises

Exercise #27

- Categorization rules
  - Input:
    - A large textual file containing a set of records
      - Each line contains the information about one single user
      - Each line has the format
        - UserId,Name,Surname,Gender,YearOfBirth,City,Education
    - A small file with a set of business rules that are used to assign each user to a category
      - Each line contains a business rule with the format
        - Gender=<value> and YearOfBirth=<value> -> Category
      - Rules are mutually exclusive

Exercise #27

- Output:
  - One record for each user with the following format
    - The original information about the user plus the category assigned to the user by means of the business rules
    - Since the rules are mutually exclusive, there is only one rule applicable for each user
    - If no rules is applicable/satisfied by a user, assign the user to the "Unknown" category

Exercise #27 - Example

- Users

```
User#1,John,Smith,M,1934,NewYork,Bachelor
User#2,Paul,Jones,M,1956,Dallas,College
User#3,Jenny,Smith,F,1934,Philadelphia,Bachelor
User#4,Laura,White,F,1926,NewYork,Doctorate
```

- Business rules

```
Gender=M and YearOfBirth=1934 -> Category#1
Gender=M and YearOfBirth=1956 -> Category#3
Gender=F and YearOfBirth=1934 -> Category#2
Gender=F and YearOfBirth=1956 -> Category#3
```

Exercise #27 - Example

- Output

```
User#1,John,Smith,M,1934,NewYork,Bachelor,Category#1
User#2,Paul,Jones,M,1956,Dallas,College,Category#3
User#3,Jenny,Smith,F,1934,Los Angleses,Bachelor,Category#2
User#4,Laura,White,F,1926,NewYork,Doctorate,Unknown
```

Exercise #28

- Mapping Question-Answer(s)
  - Input:
    - A large textual file containing a set of questions
      - Each line contains one question
      - Each line has the format
        - QuestionId,Timestamp,TextOfTheQuestion
    - A large textual file containing a set of answers
      - Each line contains one answer
      - Each line has the format
        - AnswerId,QuestionId,Timestamp,TextOfTheAnswer

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Exercise #28

- Output:
  - One line for each pair (question,answer) with the following format
    - QuestionId,TextOfTheQuestion, AnswerId,TextOfTheAnswer

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Exercise #28 - Example

- Questions

```
Q1,2015-01-01,What is ..?
Q2,2015-01-03,Who invented ..
```

- Answers

```
A1,Q1,2015-01-02,It is ..
A2,Q2,2015-01-03,John Smith
A3,Q1,2015-01-05,I think it is ..
```

Exercise #28 - Example

- Output

```
Q1,What is ..?,A1,It is ..
Q1,What is ..?,A3,I think it is ..
Q2,Who invented ..,A2,John Smith
```

Exercise #29

- User selection
  - Input:
    - A large textual file containing a set of records
      - Each line contains the information about one single user
      - Each line has the format
        - UserId,Name,Surname,Gender,YearOfBirth,City,Education
    - A large textual file with pairs (Userid, MovieGenre)
      - Each line contains pair Userid, MovieGenre with the format
        - Userid,MovieGenre
        - It means that UserId likes movies of genre MovieGenre

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Exercise #29

- Output:
  - One record for each user that likes both Commedia and Adventure movies
  - Each output record contains only Gender and YearOfBirth of a selected user
    - Gender,YearOfBirth
  - Duplicate pairs must not be removed

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Exercise #29 - Example

- Users

```
User#1,John,Smith,M,1934,NewYork,Bachelor
User#2,Paul,Jones,M,1956,Dallas,College
User#3,Jenny,Smith,F,1934,Philadelphia,Bachelor
```

- Likes

```
User#1,Commedia
User#1,Adventure
User#1,Drama
User#2,Commedia
User#2,Crime
User#3,Commedia
User#3,Horror
User#3,Adventure
```

Exercise #29 - Example

- Output

```
M,1934
F,1934
```