Assignment #3 - Advanced Ruby

Objective

For this assignment, you will be creating a query API for a CSV file of students. The API will query a 'YAML-base' which you generate from the CSV file. Your API will be tested with an API client that is provided to you.

Models

1. You are given a CSV file named `students.csv`. This file contains 15000 fake student records (along with headers) containing the following fields: `GivenName`, `Surname`, `StreetAddress`, `City`, `State`, `ZipCode`, `EmailAddress`, `Gender`, `Pounds`
2. Create a `class` called `Course` in `course.rb` which contains `course_name` and `course_id` fields which are set via the class constructor. Provide appropriate read/write accessors to those fields.
3. Create a `class` called `Student` in `student.rb` which contains the following fields (with appropriate read/write accessors): `student_id`, `first_name`, `last_name`, `city`, `state`, `email`, `gender`, `pounds`, `gpa` and `taking_courses`.
4. The `Student` class should have an empty constructor, but should provide an ability to be initialized via a block initializer as discussed in the lecture materials.
5. Both `Course` and `Student` classes should override the `to_s` method.

Database Generator

1. Create `db_generator.rb` file which will:

   - Read in the CSV file using Ruby's CSV library (see PickAxe for an example of reading in a `*.csv` file with headers).
   - Create an array of students, where each student will have its fields populated based on the values of the `*.csv` file with the exception of `student_id`, `gpa`, and `taking_courses` fields. **Keep in mind that pounds is a floating point number and should be stored appropriately.**
   - `student_id` should just be a value which starts with `1` and gets incremented every time a new instance of student is created (presumably finishing ~15000)
   - `gpa` should be a randomly generated floating point number with the lowest value being `2.0` and the highest `4.0` (*Hint:* take a look at Ruby's built-in `rand` function)
   - `taking_courses` should be an array of 0 to 4 `Course` objects. The idea here is that each student is taking a different number of courses. Some students might not taking any courses while others can be taking all four.
   - Create 4 courses with some id and name and randomly 'assign' 0 to 4 courses to

each created student. (***Hint:*** Ruby has a wonderful `sample` method, which can choose `n` random elements from an array.)

2. Serialize the students array to `university_db.yml` using Ruby's YAML library (see Pickaxe book for an example).

API

1. Create `DbApi` class in `db_api.rb` which will serve as an API/DSL for selecting records from the 'YAML-base' based on certain conditions. **DO NOT** re-load the YAML file every time, rather store students loaded from the YAML file in a class variable called `students` that is retrievable from a class method called `students`.

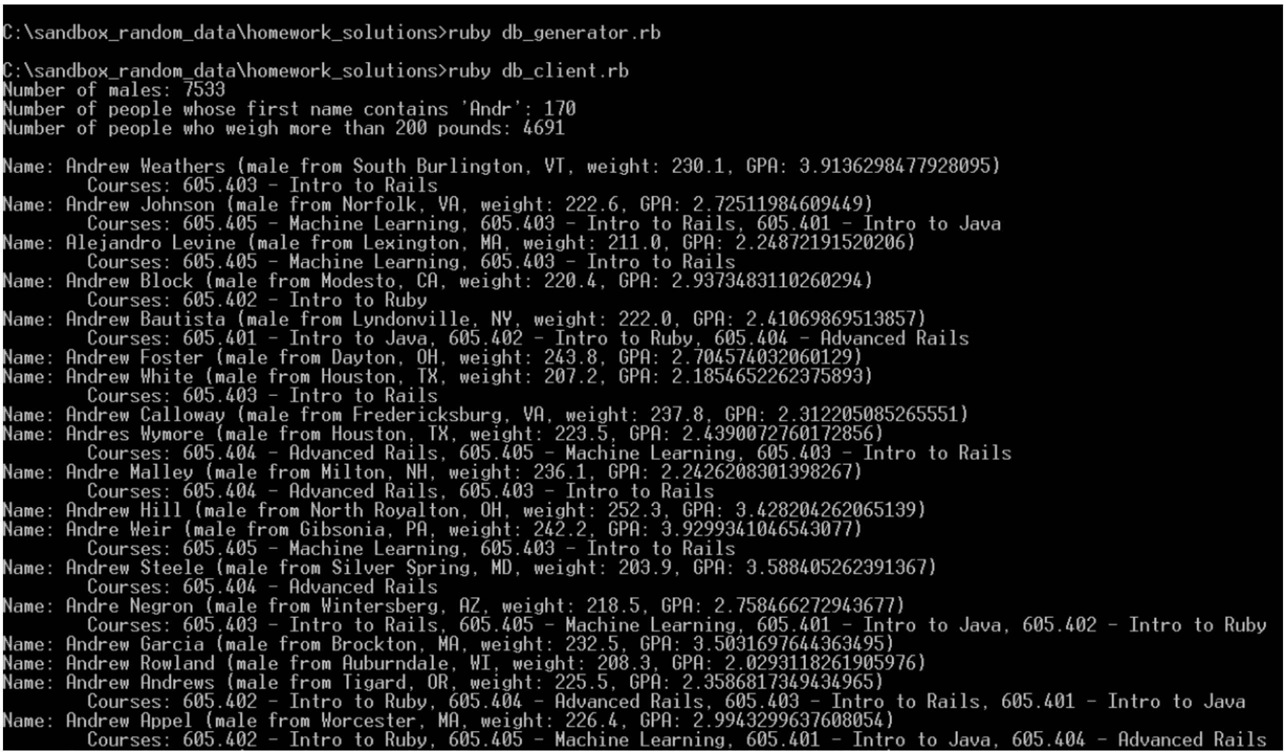
2. `DbApi` needs to have the following methods implemented:

```ruby
require_relative 'student'
require_relative 'course'
require 'yaml'

class DbApi
 def self.students ... end
 def self.select_by_gender (gender) ... end
 def self.select_by_first_name (first_name) ... end
 def self.select_by_last_name (last_name) ... end
 def self.select_by_weight_more_than(pounds) ... end
end
```

3. The `first_name` and `last_name` methods should accept a Regexp matcher as an argument.

4. `db_client.rb` (provided) will use your API. A sample output from running `db_client.rb` is as follows:



```
C:\sandbox_random_data\homework_solutions>ruby db_generator.rb

C:\sandbox_random_data\homework_solutions>ruby db_client.rb
Number of males: 7533
Number of people whose first name contains 'Andr': 170
Number of people who weigh more than 200 pounds: 4691

Name: Andrew Weathers (male from South Burlington, VT, weight: 230.1, GPA: 3.9136298477928095)
        Courses: 605.403 - Intro to Rails
Name: Andrew Johnson (male from Norfolk, VA, weight: 222.6, GPA: 2.72511984609449)
        Courses: 605.405 - Machine Learning, 605.403 - Intro to Rails, 605.401 - Intro to Java
Name: Alejandro Levine (male from Lexington, MA, weight: 211.0, GPA: 2.24872191520206)
        Courses: 605.405 - Machine Learning, 605.403 - Intro to Rails
Name: Andrew Block (male from Modesto, CA, weight: 220.4, GPA: 2.9373483110260294)
        Courses: 605.402 - Intro to Ruby
Name: Andrew Bautista (male from Lyndonville, NY, weight: 222.0, GPA: 2.41069869513857)
        Courses: 605.401 - Intro to Java, 605.402 - Intro to Ruby, 605.404 - Advanced Rails
Name: Andrew Foster (male from Dayton, OH, weight: 243.8, GPA: 2.704574032060129)
Name: Andrew White (male from Houston, TX, weight: 207.2, GPA: 2.1854652262375893)
        Courses: 605.403 - Intro to Rails
Name: Andrew Calloway (male from Fredericksburg, VA, weight: 237.8, GPA: 2.312205085265551)
Name: Andres Wymore (male from Houston, TX, weight: 223.5, GPA: 2.4390072760172856)
        Courses: 605.404 - Advanced Rails, 605.405 - Machine Learning, 605.403 - Intro to Rails
Name: Andre Malley (male from Milton, NH, weight: 236.1, GPA: 2.2426208301398267)
        Courses: 605.404 - Advanced Rails, 605.403 - Intro to Rails
Name: Andrew Hill (male from North Royalton, OH, weight: 252.3, GPA: 3.428204262065139)
Name: Andre Weir (male from Gibsonia, PA, weight: 242.2, GPA: 3.9299341046543077)
        Courses: 605.405 - Machine Learning, 605.403 - Intro to Rails
Name: Andrew Steele (male from Silver Spring, MD, weight: 203.9, GPA: 3.588405262391367)
        Courses: 605.404 - Advanced Rails
Name: Andre Negron (male from Wintersberg, AZ, weight: 218.5, GPA: 2.758466272943677)
        Courses: 605.403 - Intro to Rails, 605.405 - Machine Learning, 605.401 - Intro to Java, 605.402 - Intro to Ruby
Name: Andrew Garcia (male from Brockton, MA, weight: 232.5, GPA: 3.5031697644363495)
Name: Andrew Rowland (male from Auburndale, WI, weight: 208.3, GPA: 2.0293118261905976)
Name: Andrew Andrews (male from Tigard, OR, weight: 225.5, GPA: 2.3586817349434965)
        Courses: 605.402 - Intro to Ruby, 605.404 - Advanced Rails, 605.403 - Intro to Rails, 605.401 - Intro to Java
Name: Andrew Appel (male from Worcester, MA, weight: 226.4, GPA: 2.9943299637608054)
        Courses: 605.402 - Intro to Ruby, 605.405 - Machine Learning, 605.401 - Intro to Java, 605.404 - Advanced Rails
```

The `db_client.rb` prints an intersection of the number of males, the number of people whose first name contains 'Andr', and the number of people who weigh more than 200 pounds.

Submission Guidelines

1. Commit all the files to you local repo and push your repo out to your private team repo on gihub creating a remote branch called `assignment3`
2. You can do one of the following to accomplish the above:
    - Create a local branch called `assignment3` (`$git checkout -b assignment3`) and then push it out by doing `$git push remote_alias assignment3`
    - Work on a `master` branch in your repo and then to `$git push remote_alias master:assignment3`
3. Feel free to include a README with any comments