## Exercise – Arrival by flight to an airport in USA



All passengers arriving by flight to an airport in USA must pass the passport control. Before the passport control, the passengers are lining up in two different queues: one queue for US citizens and another queue for the rest (non-citizen visitors). A guide helps the passengers to find the right queue.

In the queue, the passengers stay until it is their turn to get their passport controlled. Passport controllers call and control one passenger at a time.

A passenger is a (passive) object and is implemented as the following:

```java
public class Passenger
{
  private String nationality;
  private int passportNumber;

  public Passenger(String nationality, int passportNumber)
  {
    this.nationality = nationality;
    this.passportNumber = passportNumber;
  }
  public String getNationality()
  {
    return nationality;
  }
  public int getPassportNumber ()
  {
    return passportNumber;
  }
  public String toString()
  {
      return "{" + nationality + ", " + passportNumber + "}";
  }
}
```

A passenger queue has two public methods and is specified by the following interface:

```
public interface PassengerQueue
{
    void putPassengerInQueue(Passenger p);
    Passenger getNextPassenger();
}
```

The guide and the controllers are active objects and are simulated by threads.

## Part 1

Implement class `AirportQueue` that implements `PassengerQueue` as a thread-safe class with the necessary synchronization mechanisms. The queue has no upper bound (it must be able to receive all arriving passengers).

## Part 2

Implement the `Guide` thread/Runnable. In the run method, implement that

- a passenger appears
- the passenger is put in the right queue.

You may implement a private method appear to generate and return a new passenger.

The guide is working the whole day, i.e. `while(true)`

## Part 3

Similarly, implement the `PassportController` thread/Runnable. The passport controller

- gets next passenger
- controls the passenger, e.g. the passenger must have a passport number. You may print out the passport number to show that it has been controlled.

The controller is working the whole day, i.e. `while(true)`

## Question 3.4

Implement a class with a main method to simulate passport controlling with

- a US-citizen queue, and
- a non-US-citizen queue.

The system has one `Guide` thread and at least two `PassportController` threads (one for US citizens and one for visitors with other nationalities).