NOMADS

NOMAD TRAVEL

(NT)

SOFTWARE DESIGN DOCUMENT

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Executive Summary

NOMAD Travel (NT) is a mobile application that simplifies users' logistical travel planning. NOMAD Travel is intended to operate in the market similarly to Expedia, Canoe, and Hopper but includes unique features. NOMAD Travel will utilize travel regulation information from respective governments to provide the user with visa-dependent travel options. NOMAD Travel will utilize personalized e-commerce models and will be distributed as a stand-alone application on mobile devices.

This document provides nontechnical information regarding the purpose and behavior of NT.

Project Description

NOMAD Travel is attempting to break into the personal travel planning industry. The app is intended to target a gap that currently exists in the travel industry: travel regulation information, such as visa travel status, is not easily accessible to consumers of personal travel planning. NOMAD Travel will provide customized travel destinations and opportunities to users depending on their visa and location of origin. Nomad travel will also be able to recommend destinations to users based on preferences they set. NOMAD Travel will use information from travel laws and local governments to connect users to destinations, depending on whether or not they can easily travel to the destination with their Visa.

NOMAD travel must be standalone and not require any network connectivity. The NOMAD Application engines must be installable directly on end user hardware. To appeal to the largest Market, NOMAD travel should be hardware and operating system agnostic.

NOMAD travel will feature an intuitive and user-friendly Graphical User Interface (GUI) that allows travelers to navigate and interact with the app's features and content seamlessly. The GUI will be designed to be visually appealing and easy to understand. It will provide users with a comfortable and engaging experience and enhance the user experience to promote user engagement with the app.

NOMAD travel features a recommendation system that will intake user preferences including climate and activities and output ideal destinations for the user. The recommendation system is designed to offer the user desirable and logical choices for their next vacation, business trip, or getaway. It will save users time and effort with planning logistics of travel, activities, and accommodations. This efficiency will encourage users to travel more frequently using NOMAD.

Document Versioning

Date	Owner	Comment
Mar 6, 2023	Camille Lewis	Feature Matrix & Description, Data Formats
Mar 6, 2023	Mustafa Sameen	Architecture Overview, Detail Design
Mar 6, 2023	Nathan Curl	Diagram, Architecture
Mar 12, 2023	Camille Lewis	Edited Apploop and component descriptions for v2
Mar 15, 2023	Mustafa Sameen & Camille Lewis	Edited and updated the whole document to meet up to date/GUI standards.
Mar 15, 2023	Nathan Curl	Uploaded Diagram for GUI

Features

The feature matrix enumerates the features requested for the project and the discussion section provides details regarding the intent of the feature. The ids will be used for traceability. Features that all stakeholders have agreed can be removed should strike-through the feature id and have a comment added to discuss the feature being dropped.

Priority Codes:

H - High, a must have feature for the product to be viable and must be present for launch
M - Medium, a strongly desirable feature but product could launch without
L - Low, a feature that could be dropped if needed

Feature Matrix

ID	Pri	Feature Name	Comment	BRD ID
P.1	H	Language	Implementation in JAVA	
I.1	H	CLI		ux1
C.1	H	AppLoop		e1,e2,e3,d1,d2,d3,d4
C.2	M	UserProfile		e1,e2
C.3	H	DataGenerator		e1,e2,e3,d1,d2,d3,d4
C.4	M	DataProcessor		d1,d2,d3,d4
C.5	M	Country		e3,d1,d2,d3,d4
T.1	M	Error Handling		e5
I.2	H	GUI		ux1, ux2,

				ux3, ux4, ux5

Feature Discussion

P.1 - Language

NOMAD must be multi-platform and run as a standalone application. JAVA is the language selected for this application to run all necessary functions and possible expansions that may include a future GUI or more complex user/data interactions. This language will also support our actions necessary for CLI support.

I.1 - CLI

NOMAD Travel has a fairly simple user interaction pattern that is well suited for CLI operation. NOMAD Travel provides a command line interface for executing travel searches in a command line terminal.

C.1 - AppLoop

Apploop is the main class of the software. It contains a DataReader/Writer and a Scanner to retrieve user input. All NOMAD user interactions will use the same basic event loop.

1. Display welcome message
2. Display user prompts to sign in or create a new profile
3. If new user, Get user input
4. Create User Profile, (jump to step 8)
5. If returning user, prompt user to view destinations or view favorites
6. If user selects view favorites display list of favorites from user profile favorites file, prompt user to return to view destinations or view favorites
7. If user selects view destinations (jump to step 8)
8. Use User Profile to run Destination Generator
9. Display Destination List to User
10. Prompt User to select a Country Card, favorite Countries, or Exit App
11. If user selects a country card, display country information
12. Prompt user to favorite country card or return to Destination List
13. If user favorites a country card, Save user favorited Countries to favorites file within user profile using a dataReaderWriter
14. Return to country card
15. If user selects return to Destination List, display list of destinations
16. Exit application if user selects exit

C.2 - UserProfile

A class that contains information collected from user input and a scanner that always runs within AppLoop. Contains user's Name, Nationality, and an ArrayList<Countries> of favorited destinations.

C.3 - DataGenerator

To create a list of recommended destinations for the user, the application will create an ArrayList<Countries> of Country objects. The DataGenerator utilizes a User Profile object and a DataProcessor Object to create the ArrayList of countries. The ArrayList of countries will be displayed to the user after the DataGenerator has stopped running and successfully created an ArrayList of countries.

C.4 - DataProcessor

The data processor will use user input from a scanner initialized in the AppLoop to parse known .csv databases using a hashmap with key info from the user profile to create a list of destination recommendations that is made of country objects.

C.5 - Country

A class that contains information, based on user nationality, on the countries' Visa, Name, and Capital City.

T.1 - Error Handling

If the user enters invalid information into the scanner, the user will be displayed an error message and prompted to re-enter correct information.

I. 2 - GUI

The GUI element of our application can be divided into three main components. There is a login component where the user can enter their login information or create a new user. Second, there is a menu component, this feature will be displayed on the side of the application. Thirdly, there is the menu option view panel where users can switch between Destination View, Favorites View, and Update User View.

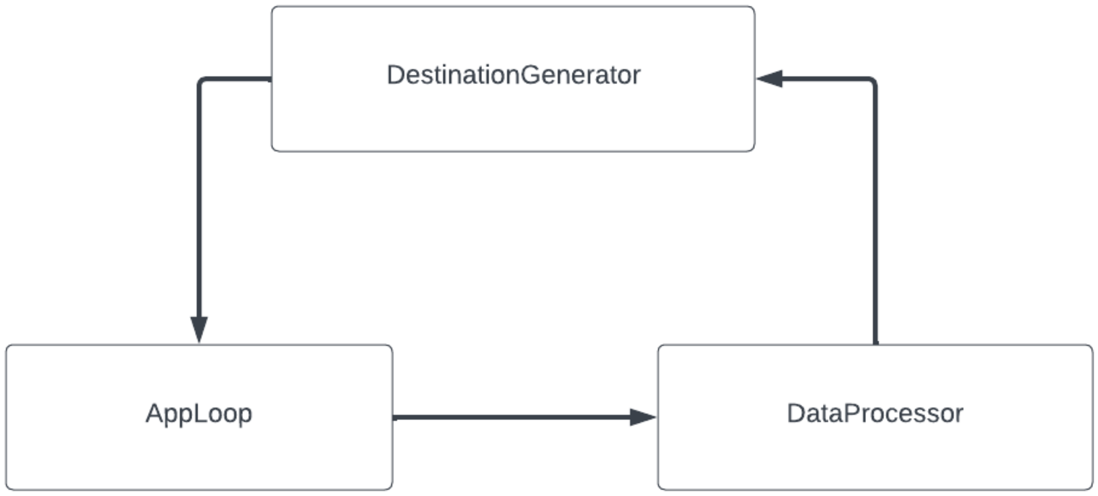
System Design

This section describes the system design in detail. An overview of the major system components and their roles will be provided, followed by more detailed discussion of components. Component discussion will reference the technical features the component helps satisfied.

Note: Design co-evolves with implementation. It is important to start with some sense of components and their interactions, but design docs should be updated during implementation to capture the actual system as-built.

Architecture Overview

High-level System Architecture



Major Components

InputAdapter

I.1, I.2

User interaction is handled via the InputAdapter. When NOMAD Travels is started, depending on how it is started, only the CLI or GUI will run. The Input Adapter will delegate if the application should be run on the GUI or CLI. This component uses the Strategy pattern to provide the functionality to select CLI or GUI operation.

AppLoop

I.1, C.1, T.1
User interaction is handled via the AppLoop. Apploop runs the basic event loop for our travel application. It utilizes a user object, a scanner object, and ArrayList of Country Objects with multiple methods. The methods used within the AppLoop class to run the application are run(), login(), mainMenu(), quit(), and a few other smaller methods. This component uses the Command pattern to provide the functionality to encapsulate user actions as commands and execute them using the event loop.

DestinationGenerator

C.2, C.3, C.4
The Destination Generator is a component in the NOMAD Travel app responsible for generating a list of destination options based on the user's preferences and criteria. It implements the Strategy Pattern such that it uses the user profile data like their nationality and generates a recommended list of destinations based on visa availability and travel regulation information. The DataGenerator class uses a User object, a DataProcessor object and uses the methods generate(), order(), and getDestinations(). The generated list is then presented to the user, who can select a destination from the list to learn more about it or favorite it for future references.

DataProcessor

C.2, C.4
The DataProcessor component receives user input and uses a hashmap to extract relevant data from known .csv databases, generating a list of country objects that match the user's preferences. The DataProcessor class uses a scanner object, a a few methods that include generateCountries(), generateVisaInfo(User), getFile(). The component then ranks the country objects based on various factors and returns a final list of destination recommendations to the AppLoop as an ArrayList of Country objects.

Detail Design

InputAdapter

The InputAdapter component contains the logic for generating output to the display and receiving input from the user. Based on the arguments provided when TAP is started, the GameMaker will instantiate the correct concrete InputAdapter and provide that adapter to the GameEngine.

InputAdapter

ux.1, ux.2

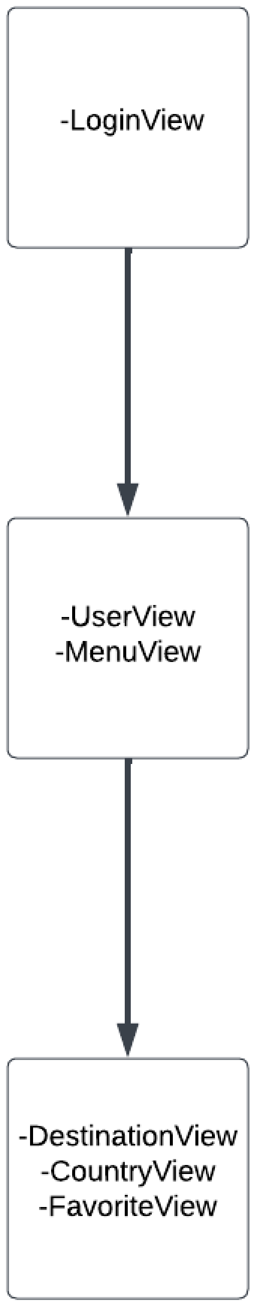
The InputAdapter is an interface that is implemented by the TextInterface and GraphicInterface classes. The concrete TextInterface and GraphicInterface classes will be responsible for the details of interaction with the user.

TextInterface

ux.1
The TextInterface implements a strategy for CLI operation. CLI operation is fairly straightforward and can likely (but does not have to) be implemented in a single class.
NOTE: if multiple classes are used the SDD must be updated to include these additional classes.

GraphicInterface

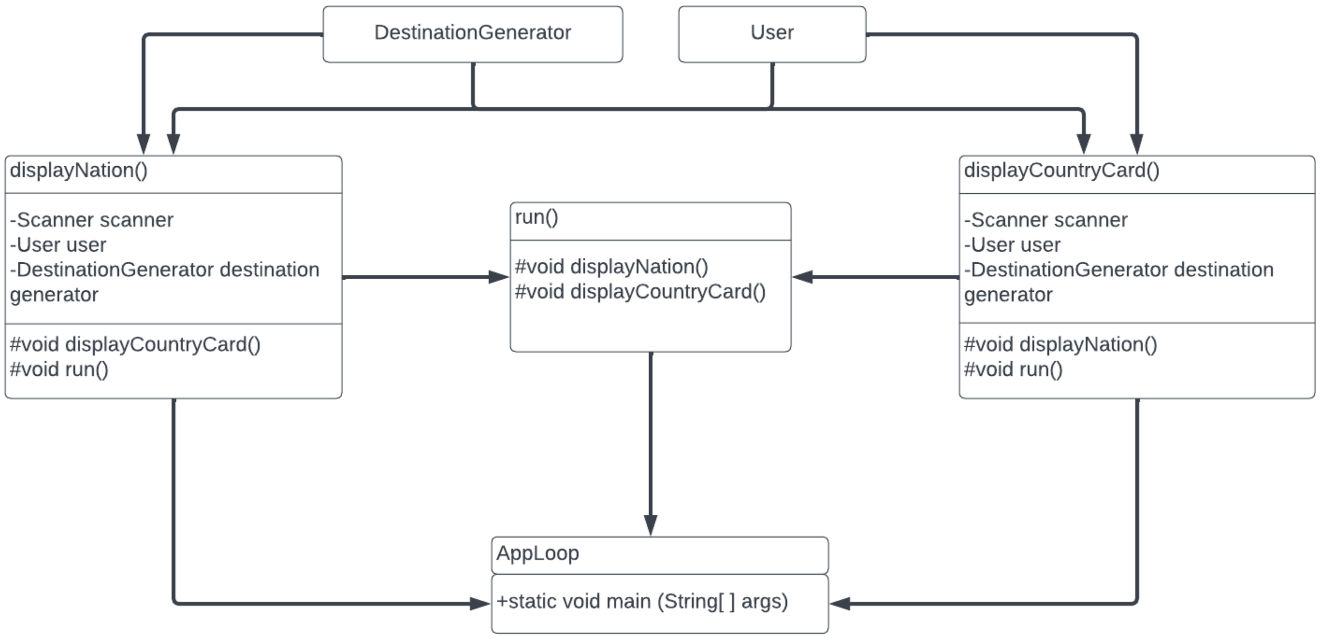
ux1, ux2, ux3, ux4, ux5
The GraphicInterface implements a strategy for GUI operation. It uses JavaFX for the GUI implementation. We will use xml files for the following Views: LoginView, MenuView, DestinationView, CountryView, FavoriteView, UserView. We will have separate controllers for each view.


-LoginView
-UserView
-MenuView
-DestinationView
-CountryView
-FavoriteView

AppLoop

The AppLoop is the central component of NOMAD Travel that manages the basic event loop and handles user interactions. When the AppLoop class starts, the run() method is first called which encapsulates the login() method within a while loop. The Login() method is then queued and the user is prompted to login as a returning or new user. After a successful returning login or the successful creation of a new user, the mainMenu() method is called. The mainMenu() method displays the user a list of menu options that include 1. Searching new Destinations, 2. See Favorites, 3, User Profile Update, and 4. Exit. If the User selects 1, then the user is given a list of destinations and asked to add favorites to the list or return to the main menu. If the user selects 2 then the favorites of the user are displayed and the user is taken back to the main menu. If the user selects 3 then they can update user information. If the user selects 4 then the application updates user information and closes the application.

AppLoop



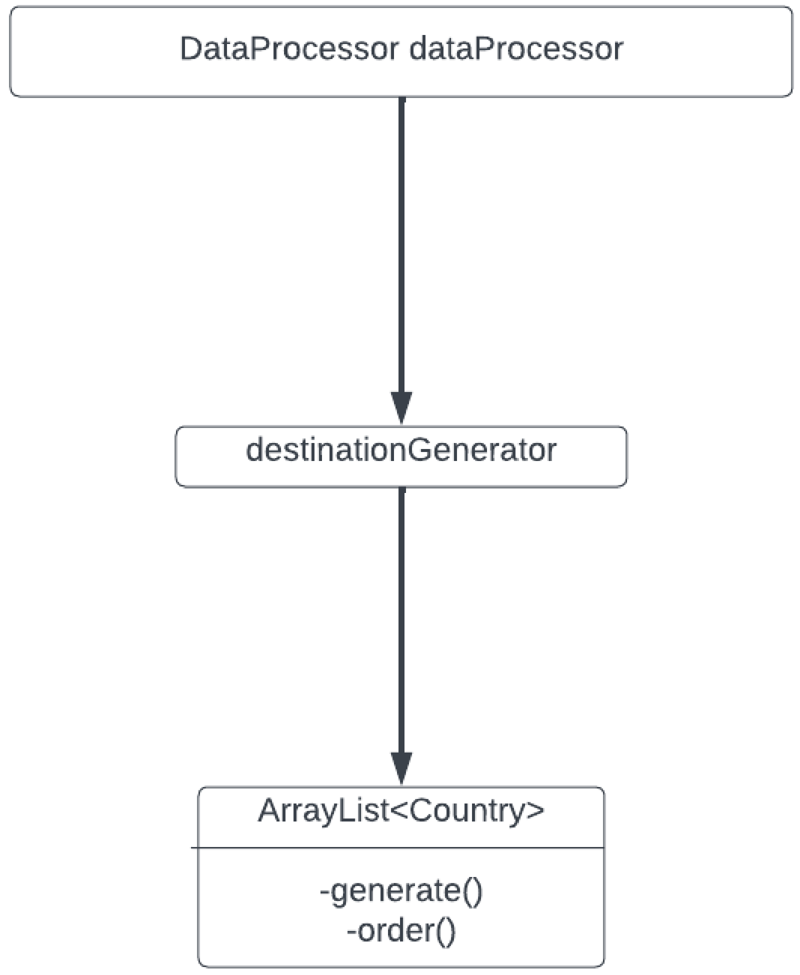
User Interface

The user interface for NOMAD Travel is a Command Line Interface (CLI) that displays messages, prompts, and menus to the user and accepts input from the user. From the InputAdapter, they can also choose GUI and interact with the JavaFX application.

DestinationGenerator

The Destination Generator component in the NOMAD Travel app is responsible for generating a list of destination options that match the user's preferences and criteria. It implements the Strategy Pattern, which allows different algorithms to be used for generating the list of destinations based on user input or other factors. DestinationGenerator uses a DataProcessor and User Object to run the methods generate(User user) to generate a country object, and create a list of destinations or country object items to display to the user.

DestinationGenerator



User

User is a class that holds essential user information collected from input and a scanner within the AppLoop. It includes data such as the user's Name and Nationality, which are used to provide personalized recommendations. The class also contains an ArrayList<Countries> of favored destinations, allowing users to save their preferred travel locations for future reference. It will have a favoriteDestination() method that will take in a Country object and add to the ArrayList of favorited countries.

Country

Country is a class that holds essential information about a country based on the user's nationality. It includes data such as the country's Visa requirements, Name, and Capital City, allowing users to make informed decisions about their travel destination. The class is used by AppLoop to display country information and by Destination Generator to store country information after extracting data with the DataProcessor.

Generate

Generate is a method that generates a list of recommended travel destinations based on various factors, including the user's nationality, visa availability, and travel regulation information.

Order

Order is a method that sorts the list of recommended destinations based on visa availability for the user.

DataProcessor

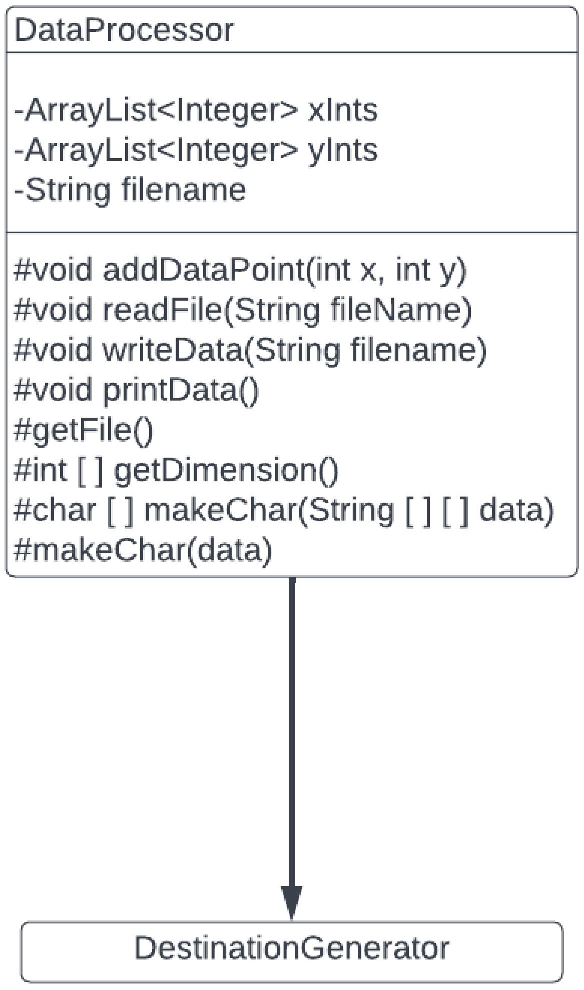
The DataProcessor component is responsible for reading and writing data. It generates a list of recommended destinations and writes user information to a .csv file. It contains several methods such as getFile(), generateVisaInfo(User), generateCountries(Hashmap) and getString(String).

DataReader

A subclass that reads data from MySQL databases. The getVisaInfo() method takes the user's nationality as input and reads the visa information of other countries. It then creates a hashmap with country names as keys and visa information as values.
The getCountries() method takes this hashmap and reads data from another dataset of countries to create an ArrayList of Country objects with all the relevant information.

DataWriter

DataWriter will write the user profile data and the list of favorite destinations into the database.


DataProcessor
-ArrayList<Integer> xInts
-ArrayList<Integer> yInts
-String filename
#void addDataPoint(int x, int y)
#void readFile(String fileName)
#void writeData(String filename)
#void printData()
#getFile()
#int [ ] getDimension()
#char [ ] makeChar(String [ ] [ ] data)
#makeChar(data)
DestinationGenerator

Data Formats

User Profile

The user profile is a table in the database file that includes user information such as the user name, nationality, first name, last name, password, and preferences..

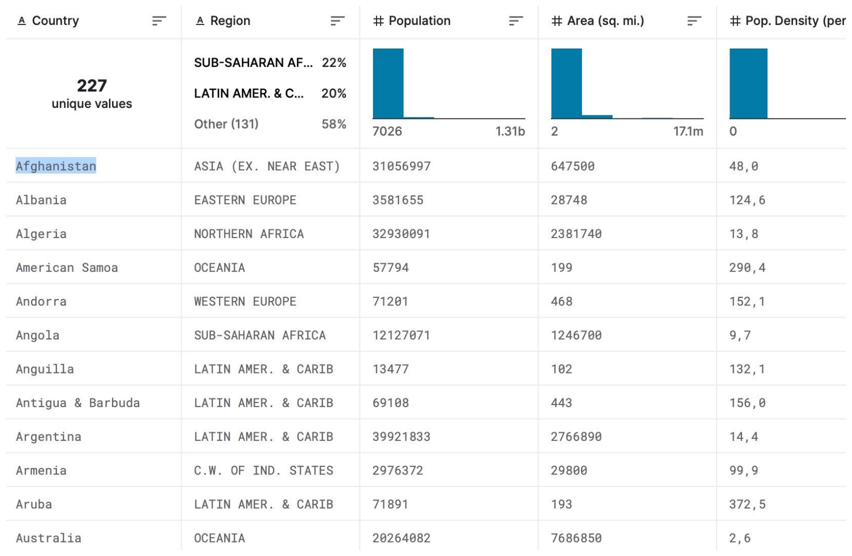
Example File

```
Username, Password, Nationality, F_Name, L_Name, Preferences
```

Country File Format

The Country File is another table in the database that includes information stored in the ArrayList<Countries> Destination recommendations created by the Dataprocessor and DestinationGeneration classes. The format of the data Countries is found in the Database example below, and a table example is also provided below.

Example Country Data



Country	Region	# Population	# Area (sq. mi.)	# Pop. Density (per
227 unique values	SUB-SAHARAN AF... 22% LATIN AMER. & C... 20% Other (131) 58%	7026 – 1.31b	2 – 17.1m	0
Afghanistan	ASIA (EX. NEAR EAST)	31056997	647500	48,0
Albania	EASTERN EUROPE	3581655	28748	124,6
Algeria	NORTHERN AFRICA	32930091	2381740	13,8
American Samoa	OCEANIA	57794	199	290,4
Andorra	WESTERN EUROPE	71201	468	152,1
Angola	SUB-SAHARAN AFRICA	12127071	1246700	9,7
Anguilla	LATIN AMER. & CARIB	13477	102	132,1
Antigua & Barbuda	LATIN AMER. & CARIB	69108	443	156,0
Argentina	LATIN AMER. & CARIB	39921833	2766890	14,4
Armenia	C.W. OF IND. STATES	2976372	29800	99,9
Aruba	LATIN AMER. & CARIB	71891	193	372,5
Australia	OCEANIA	20264082	7686850	2,6