Final Project 2022FSSW567-A

Due Dec 14, 2022 by 7pm **Points** None
Available Nov 21, 2022 at 12am - Dec 14, 2022 at 11:59pm

This assignment was locked Dec 14, 2022 at 11:59pm.

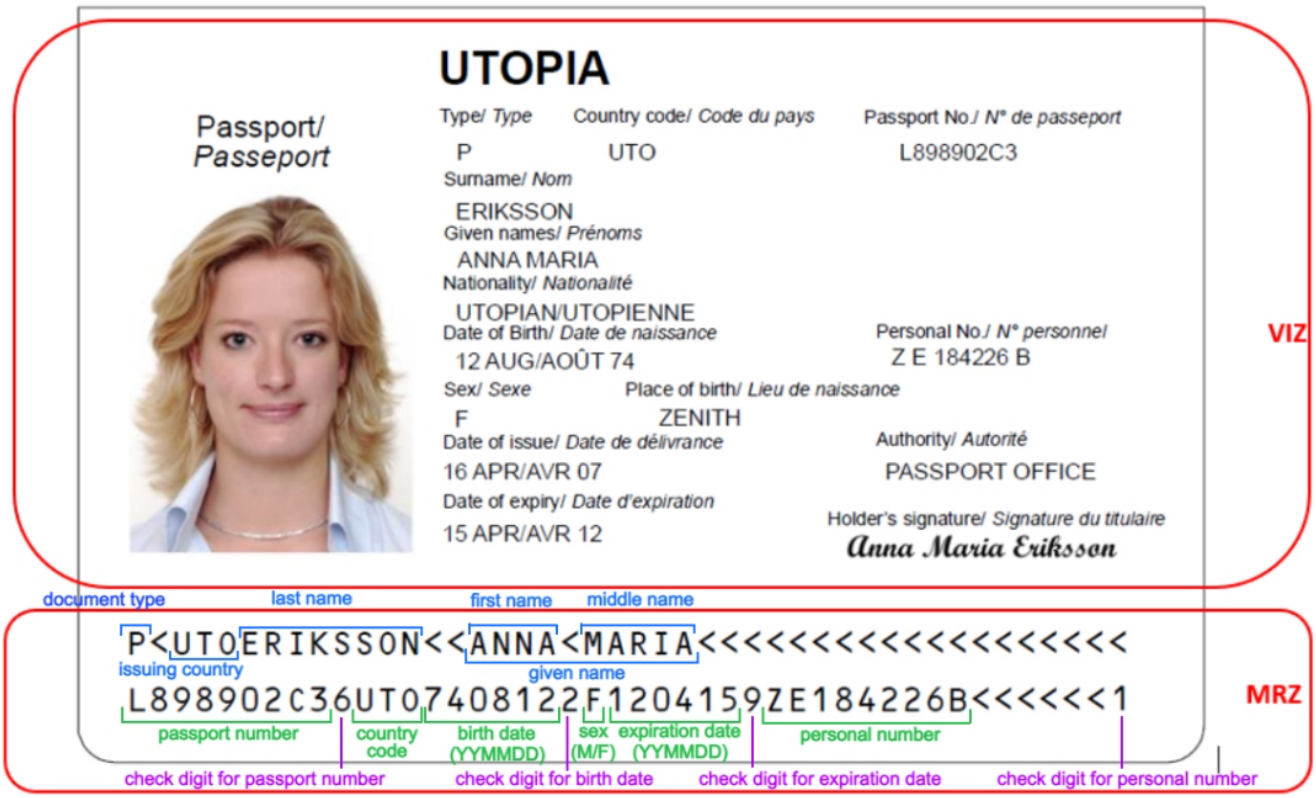
Stevens Institute of Technology

SSW567: Software Testing, Quality Assurance, and Maintenance

Final Group Project. Fall 2022

Project Background Information

A machine-readable travel document (MRTD) should present information necessary for global interoperability using visual inspection and machine-readable (optical character recognition) means. The following figure is an example. It is composed of two parts: a visual inspection zone (VIZ) and a machine-readable zone (MRZ).



The MRZ contains two lines. The first line specifies the Type of passport, the issuing country, and the name of the holder. The second line specifies the passport number, country code, birth date, gender, expiration date, and personal number. In addition to these information fields, there are four check digits inserted in between and at the end of the information fields. In the above example, they are “6”, “2”, “9”, and “1”. The check digit serves for checking the correctness of the information fields.

Following is an example illustrating the algorithm for calculating the check code. Assume that the calculation method for composite check digits is the same for all MRTDs.

Example 2 — Application of check digit to document number field

Using the number AB2134 as an example for coding a 9-character, fixed-length field (e.g. passport number), the calculation will be:

Sample data element:	A	B	2	1	3	4	<	<	<
Assigned numeric values:	10	11	2	1	3	4	0	0	0
Weighting:	7	3	1	7	3	1	7	3	1
Step 1 (multiplication) Products:	70	33	2	7	9	4	0	0	0

Step 2 (sum of products) 70 + 33 + 2 + 7 + 9 + 4 + 0 + 0 + 0 = 125

Step 3 (division by modulus) $\frac{125}{10} = 12$, remainder 5

Step 4. Check digit is the remainder, 5. The number and its check digit shall consequently be written as AB2134<<<5.

Step 1: multiply the numeric values of each digit with a weighting sequence. Note that “A” maps to 10, “B” maps to 11, and thereafter. Special symbols, such as “<”, always map to 0. You should always use the same weighting sequence of 7, 3, and 1 as shown in the above example in the scope of this project.

Step 2: Add up all the products from the previous step.

Step 3: Divide by a modulus of 10.

Step 4: The remainder will be the check digit, which is the final output of this algorithm.

Requirements:

Suppose you are a developer for the project to implement a system that can read the MRZ of a travel document, process and obtain its fields, and check the fields against the check digits. Following are some requirements and specifications of your system:

1. The system shall be able to scan the MRZ of a travel document using a hardware device scanner and get the information in MRZ as two strings (line 1 and line 2 from the above Figure). Note that you

do not need to worry about the implementation of the hardware device. But you need to define this method for the software part. This means that you define an empty method for this function.

2. The system shall be able to decode the two strings from specification #1 into their respective fields and identify the respective check digits for the fields, following the same format in the above example.
3. The system shall be able to encode travel document information fields queried from a database into the two strings for the MRZ in a travel document. This is the opposite process compared to specification #2. Assume that the database function is not ready. But for testing purposes, you need to define a method for database interaction and leave it empty.
4. The system shall be able to report a mismatch between certain information fields and the check digit. The system shall report where the miss match happened, i.e. which information field does not match its respective check digit.

You have five parts to finish. Each each has its own entry as an assignment on Canvas:

- **Part 0-Kickoff&Planning (https://sit.instructure.com/courses/60673/assignments/367606)**
- **Part 1-RequirementTesting (https://sit.instructure.com/courses/60673/assignments/367607)**
- **Part 2-UnitT esting (https://sit.instructure.com/courses/60673/assignments/367608)**
- **Part 3-PerfTesting (https://sit.instructure.com/courses/60673/assignments/367609)**
- **Part 4-Test Planning (https://sit.instructure.com/courses/60673/assignments/367610)**

This project connects different topics we learned throughout the semester together through one project theme. We gioe that this helps you to see how the things we learn in this class are connected in practice.