**SWE 434**

**Software Testing and Validation**

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***Assignment 1***

(*5% of the Total Course Mark*)

Deadline 13 Feb @ 11:00 AM

***Instructions:***

* *It is a pair assignment.*
* *A* ***hardcopy*** *of the assignment should be submitted on Thursday. 13th of Feb before 11:00 am in room S13.*
* *Use this page as cover page.*
* *Handwritten assignments will not be accepted.*
* *No late delivery of the assignment.*
* *Beware of Plagiarism: copying and handing in for credit someone else's work*
* *Any plagiarism case will result in an automatic ‘****0****’ for the Assignment.*

***Questions/Student Outcomes:*** *This assignment covers/targets the following student outcomes (SOs):*

* *SO(1). an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*
* *SO(6). an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
* *SO(7).  an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **PLO** | **Part 1** | | **Part 2** | | **Part 3** | | **Total** |
| **SO(1)** |  | 2 |  | |  | | / 2 |
| **SO(6)** |  | |  | 1 |  | | / 1 |
| **SO(7)** |  | |  | |  | 2 | / 2 |
| **Total** | / 2 | | / 1 | | / 2 | | / 5 |

|  |  |
| --- | --- |
| **Student Name:** | **Student ID:** |
| **Serial No. :** | **Section:** |

|  |
| --- |
| **A screenshot of a cell phone  Description automatically generated**  **Figure 1:** Part of National Address “address.gov.sa” Registration Form |

Figure 1 shows a screenshot of the national address “address.gov.sa” registration form. The user must complete this step in order to obtain a national address.

The form has the following fields with some constraints:

1. **National ID:** must be one of the following: Must be 10 digits long. It must start with a “1” if the person is Saudi. If the person is non-Saudi, the Id must starts with “2”.
2. **Date of birth:** The birth year should be between 1341 and 1423 to ensure the person is between 18-100 years old.
3. **Mobile Number:** Must be a 10 digit number and starts with “05”

**Please note the following:**

1. All fields are mandatory.
2. National ID and Mobile Number fields are text box.
3. For National ID to be **valid**, it must adhere to the following rules:
   1. **Saudi National ID**

1. Starts with digit 1.

2. It’s 10 digits length.

* 1. **Non-Saudi National ID “Iqama”**

1. Starts with digit 2.

2. It’s 10 digits length.

Otherwise, it is invalid.

1. For mobile numbers to be **valid**, it must adhere to the following rules:

1. Starts with the digits 05.

2. The third digit can be any digit except for 2.

3. It’s 10 digits length.

1. Birthdate

1. The day dropdown list range from 1 till 31

2. The month dropdown list range from 1 till 12

3. The day dropdown list range from 1300 till 1441

**Note:** checking for the number of days in a month is not applicable in Hijri calendar.

You are requested to write a complete set of **Black Box** test cases (using equivalence partitioning and boundary value analysis techniques) for testing the national address registration form. *Please consider writing all the steps.*

To check the validity of National ID number, here’s how to apply the Luhn check to test whether or not a national ID **is valid**. *Please note that these steps will only help you in generating valid national ID numbers for test cases.*

* **Step 1.** Double alternating digits starting with the first digit in the sequence.
* **Step 2.** If the doubling resulted in a number with two digits, add them together to get a single digit number (or subtract by 9).
* **Step 3.** Now go back to the original ID number and replace the digits that you doubled with the new value — either the doubled value, or the doubled value with the digits added together — and add it all up.
* **Step 4.** Check to see if the sum is evenly divisible by 10 (you can simply look to see whether or not it ends with a zero).

**Example:**

To check the validity of ID number: 1234567897

* **Step 1:**  
  Double the alternate digits starting from the first digit.  
  From ID number:  
  **1** 2 **3** 4 **5** 6 **7** 8 **9** 7 🡪 **2** 2 **6** 4 **10** 6 **14** 8 **18** 7
* **Step 2:**  
  For each result of **step 1**, if the value is bigger than 9 we need to subtract by 9 so each value is less than 10.  
  After that we append all of them  
  2 2 6 4 **10** 6 **14** 8 **18** 7 🡪 2 2 6 4 1 6 5 8 9 7
* **Step 3:**  
  Now add all the digits except for the last digit   
  From card number:  
  2+2+6+4+1+6+5+8+9=43
* **Step 4:**  
  Multiply the number by 9   
  43\*9= 387
* **Step 5:**  
  Take the value calculated in **step 4** and calculate the remainder when it is divided by 10. If the remainder is equal to the last digit, then it's a valid number, otherwise it's invalid.

In our example, 387 % 10 = 7 which is equal to the last digit in the ID 🡪 the number is valid.

1. Input Conditions:
   1. National ID
   2. National ID Type
   3. Date Of Birth
   4. Mobile No
2. Valid and Invalid Equivalence Classes:
3. Intervals of values

|  |  |  |
| --- | --- | --- |
|  | Valid | Invalid |
| National ID |  |  |
| National ID Type |  |  |
| Date Of Birth |  |  |
| Mobile No |  |  |

1. Number of values
2. Constraints
3. Format errors

All Valid and Invalid Equivalence Classes

1. Use-Case:
2. Boundary Value Analysis: