Process Management for ICT Engineering

Course Assignment 2: System Test Documentation

Jordi Rafael Lazo Florensa

Florin Leonard Bordei

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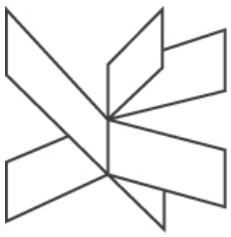

VIA University College

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1 Introduction to the Rema 1000 Test Plan

1.1 Purpose

This document presents the design of System Test Plan for the project called "Rema 1000 calculator". The purpose is to document the test strategy, objectives, schedule, estimation and deliverables, and resources required for testing for Rema's 1000 calculator. Therefore, this project consist in creating a calculator that allows the people who use it to calculate the price of the objects that they are putting in their shopping basket among other additional. Since the project consists of developing a very complex calculator, it is necessary to design a testing system that allows reducing the possible errors that occur during the use of the calculator. That's where the System Test Plan comes into place, by defining such a plan we will be able to carry out this project with as few errors as possible and ensure that the calculator developed for Rema 1000 meets their standards and accomplishes their main goal which is to have a calculator that users can use during their purchases at Rema 1000 establishments. Finally the main goal for this System Test Plan, is to define within this document, all the methods to apply during the development of the calculator, to ensure the quality of this is good enough to be released.

1.2 Scope

The scope of this document consists of specifying all the tests that must be applied and followed so that the calculator meets the minimum requirements proposed. For this, the integrity level scheme will be used, which is divided into: description of integrity levels, definitions of consequences of failure and the risk assessment scheme.

As far as test tasks are concerned, a minimum test activities and supporting tasks will be developed. Which will be conditioned by an input and output.

1.3 Definitions, acronyms and abbreviations

Hardware: computer hardware is the physical components that a computer system requires to function. It encompasses everything with a circuit board that operates within a PC or laptop; including the motherboard, graphics card, CPU (Central Processing Unit), ventilation fans, webcam, power supply, and so on.

Software: is a set of instructions, data or programs used to operate computers and execute specific tasks

Touchscreen: a computer screen that you touch to get information, buy something, etc.

Integer: a whole number and not a fraction.

Float: a floating point number, is a positive or negative whole number with a decimal point

Operation: an operation is a function which takes zero or more input values (called operands) to a well-defined output value. The number of operands (also known as arguments) is the arity of the operation.

Arity: is the number of arguments or operands taken by a function or operation in logic, mathematics, and computer science.

Reciprocal value: in math is one divided by the number in question (also known as the multiplicative inverse).

Addition: the process of adding numbers or amounts together.

Subtraction: represents the operation of removing objects from a collection.

Multiplication: the process of adding a number to itself a particular number of times, or a calculation in which this is done.

Division: the calculation of how many times one number goes into another.

Shopping basket: a basket to put groceries and other merchandise in while shopping.

Reciprocal value: the reciprocal value or inverse of a number x is the number that, when multiplied by x, equals 1.

1.4 References

Crucial. *What is computer hardware?.*
https://www.crucial.com/articles/pc-builders/what-is-computer-hardware

Techtarget. *Definition software.*
https://www.techtarget.com/searchapparchitecture/definition/software

Cambridge dictionary. *Touchscreen.*
https://dictionary.cambridge.org/dictionary/english/touchscreen

Cambridge dictionary. *Integer.*
https://dictionary.cambridge.org/dictionary/english/integer

freeCodeCamp. *Floating Point Definition.*
https://www.freecodecamp.org/news/floating-point-definition

Wikipedia. *Operation (mathematics).*
https://en.wikipedia.org/wiki/Operation$_(mathematics)$

Wikipedia. *Arity.*
https://en.wikipedia.org/wiki/Arity

Omnicalculator. *Reciprocal Calculator.*
https://www.omnicalculator.com/math/reciprocal

Cambridge dictionary. *Addition.*
https://dictionary.cambridge.org/dictionary/english/addition

Wikipedia. *Subtraction.*
https://en.wikipedia.org/wiki/Subtraction

Cambridge dictionary. *Multiplication.*
https://dictionary.cambridge.org/dictionary/english/multiplication

Cambridge dictionary. *Division.*
https://dictionary.cambridge.org/dictionary/english/division

Wiktionary. *Shopping basket*
https://en.wiktionary.org/wiki/shopping$_basket$

Varsity Tutors. *Reciprocals*
https://www.varsitytutors.com/hotmath/hotmath$_h$*elp*/*spanish*/*topics*/*reciprocals*

1.5 Overview

Once the introduction of the test plan has been presented, the following two sections will proceed to describe the integration of levels, define the consequences of failures and evaluate the risks. To finally describe and specify the testing tasks that should be performed.

2 Software and system Integrity

2.1 Integrity levels B1 for calculator

Integrity level	**Examples**
4	During the sending of data from the user's shopping basket from the calculator to the database, the user decides to turn off the calculator, therefore all the current information of the user's shopping basket is lost and it is no longer possible to know what it is. the total amount of your basket.
3	The user does not know how to add the products he is buying in the calculator because it is the first time he uses it and for him the interface is not intuitive enough
2	The user tries to add a product that has been discounted in the shopping basket and the price still appears without the discount..
1	The calculator is only in the English language and the user only knows how to read Danish

Table 1: Table of *Examples of integrity levels.*

2.2 Integrity levels B2 for calculator

Consequence	**Examples**
Catastrophic	The calculator falls on the head of a living being and it kills it
Critical	Users prefer to use the mobile phone calculator instead of the Rema 1000 calculator.
Marginal	Users do not want to use the calculator because they believe that having manufactured it has harmed the environment.
Negligible	The colors of the touch screen buttons are not fully visible to users.

Table 2: Table of *Examples of consequences of failures.*

2.3 Integrity levels B3 for calculator

Consequence	Likelihood of occurrence of an operating state that contributes to error			
	Likely	Probable	Occasional	Unlikely
Catastrophic	4	4	4 or 3	3
Critical	4	4 or 3	3	2 or 1
Marginal	3	3 or 2	2 or 1	1
Negligible	2	2 or 1	1	1

Table 3: Table of *Risk assessment scheme.*

3 Test processes

Test tasking	Inputs	Outputs
(1) Get the correct result of an arithmetic operation performed on the calculator. a) Return the correct result of the addition. b) Return the correct result of the subtraction. c) Return the correct result of the multiply. d) Return the correct result of the division. .	The user enters 2 values (integers or decimals) in the calculator and it will execute one of the available arithmetic operations.	The calculator will return the correct result of said operation on the touch screen.
(2) Return an error if the number of digits entered by the user is greater than 12 digits a) Return an error message if the number of digits in the addition operation is greater than 12. b) Return an error message if the number of digits in the subtraction operation is greater than 12. c) Return an error message if the number of digits in the multiply operation is greater than 12. d) Return an error message if the number of digits in the division operation is greater than 12. .	The user enters 2 values (integers or decimals) in the calculator and he will try to execute one of the available arithmetic operations.	The calculator will display a message error: it is not possible to execute an arithmetic operation with more than 12 digits, try it with a smaller quantity.

Table 4: Test task: arithmetic operation.

Test tasking	Inputs	Outputs
(1) Remove a product from the shopping basket. a) The user selects an item from the shopping basket and pressing the "delete" button removes it from the basket. .	The user selects an item from the shopping basket, presses the "delete" button and it disappears from the shopping basket.	The calculator will show the updated shopping basket without the product in the basket and with the final price correctly recalculated.
(2) Add a product to the shopping basket. a) The user enters the values of an item and selects the "add to basket" button to add the item to the shopping basket. .	The user enters the corresponding values to calculate the price of an item and then presses the "add to basket" button.	The calculator will add the item and its total price to the shopping basket and will recalculate the final price of this.
(3) Edit a product from the shopping basket. a) The user selects an item from the shopping cart and presses the "edit" button. .	The user will look in the shopping cart and select an item to later press the "edit" button.	The calculator will show the selected article with the fields of which it is composed ready for modification.
(4) Apply discount to shopping cart. a) The user has realized that one of his articles has a discount and decides to apply it. .	The user will look in the shopping cart and select an item, enter the discount percentage to later press the "discount" button.	The calculator will recalculate the price of the item with the discount applied and add it to the shopping cart to calculate the final price.

Table 5: Test task: modify a product from the shopping basket.

Test tasking	Inputs	Outputs
(1) Get the correct reciprocal value. a) Return the correct reciprocal value of a number that has been entered by the user. .	The user enters 1 value (integers or decimals) in the calculator and press the button "reciprocal value".	The calculator returns the reciprocal number of the number entered by the user.
(2) Return an error if the reciprocal value entered by the user is greater than 12 digits. a) Return an error message if the number of digits in the reciprocal value operation is greater than 12. .	The user enters 1 value (integers or decimals), composed of more than 12 digits, in the calculator and press the button "reciprocal value".	The calculator will display a message error: it is not possible to execute a "reciprocal value" operation with more than 12 digits, try it with a smaller quantity.
(3) Check if the reciprocal value is a prime number or not. a) The user enters a number and once its reciprocal value has been calculated the calculator will determine if this value is prime or not. .	The user has entered a value to calculate its reciprocal value and the calculator has calculated it.	The calculator determines if it is a prime number by displaying a green tick or a red tick if it is not prime.
(4) Return an error if the user tries to calculate the reciprocal value of a number that has not been entered. a) The user has not entered any number into the calculator and still tries to get the reciprocal value.	The user presses the "reciprocal value" button without having previously entered a value.	The calculator will display a message error: please enter a value to calculate its reciprocal value.

Table 6: Test task: calculate the reciprocal value.

Test tasking	Inputs	Outputs
(1) Get the total price of a product given two values: kilogram and price. a) The calculator will save the value entered by the user (kilograms). b) The calculator will save the value entered by the user (price). c) The calculator will calculate the final price of the item and add it to the shopping basket. .	The user enters 2 values (integers or decimals): kilograms and price in the calculator and he will execute the option to add to the shopping basket.	The calculator will return the total price of the shopping basket.
(2) Return an error if the user tries to add the price of an item to the shopping basket without the 2 added values. a) Return an error message if the kilogram field has not been added. b) Return an error message if the price field has not been added. .	The user tries to add an item composed by kilograms and price to the shopping basket and has not entered the two necessary fields.	The calculator will display a message error: please enter kilograms and/or price of the item.

Table 7: Test task: kilogram/price operation.

Test tasking	Inputs	Outputs
(1) Get if the total number of liters of beer in a shopping basket fit or not in a football given a diameter by the user. a) The calculator will save the value entered by the user (diameter). b) The calculator will calculate the number of liters of beer in total that the user has in the shopping basket. c) The calculator will calculate if the total number of liters of beer fit or not in the football. .	The user enters 1 value (integers or decimals): the diameter of the football then the user presses the button "calculate football capacity".	The calculator shows the amount of beer that the user has in the basket (liters) and will show a message if the ball has the necessary capacity to accept that amount of beer or not.
(2) Return an error if the user does not enter the diameter of the football. a) Return an error message if the diameter field has not been added. .	The user tries to press the "calculate football capacity" button but has not previously entered the diameter of the football.	The calculator will display a message error: please enter the diameter of the football.
(3) Return an error if the user doesn't have liters of beer in his shopping basket. a) Return an error message if the user does not contain any amount of beer in his shopping basket. b) Return an error message if the user does not contain any amount of beer in his shopping basket or does not enter the diameter of the football. .	The user tries to press the "calculate football capacity" button but has not previously added the diameter of the football and/or added any amount of beer in his shopping basket.	The calculator will display a message error: please enter the diameter of the football and/or add beer to your shopping basket.

Table 8: Test task: calculate the capacity of liters of beer that fit in a football.

Test tasking	Inputs	Outputs
(1) Get the total result of the multiplication of RAM (in megabytes). a) The calculator will save the value entered by the user (RAM). b) The calculator will calculate the multiplication of the RAM memory entered by the user. .	The user will enter any number of RAM memory values in megabytes.	The calculator will calculate the multiplication (RAM) of the values entered by the user and will display the result on the screen.
(2) Return an error if the user enter a RAM memory value and the unit is different from megabyte. a) Return an error message if the RAM memory value is different from megabyte. .	The user tries to enter a RAM memory value other than megabyte (for example gigabyte).	The calculator will display a message error: please enter a value in megabytes.
(3) Return an error if the user only enter 1 value. a) Return an error message if the user only enters 1 value to multiply. .	The user tries to press the "calculate RAM memory" button but has previously added only 1 value.	The calculator will display a message error: please enter at least 2 values to calculate RAM memory.

Table 9: Test task: calculate the total megabytes of a RAM memory.