ProjectTOBARA

URL to the project: https://github.com/MiguelRAvila/projectTOBARA

URL to the presentation:
https://github.com/MiguelRAvila/projectTOBARA/blob/master/ProjectTOBARA.pptx

Description

Our system is a Boolean function analyzer tool whose main task is to reduce the function in its simplest expression.

With this information we will create a library that allows any user to consulate the elements of any Boolean function they want to introduce.

Process

Our main goal is the analysis of the Boolean functions and the breakdown of their main components:

- Get the function
- Determinate their variables
- Determinate their terms
- Simplify the function

Objective

- Algorithms for reducing Boolean functions.

Requirements

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1. **System actors**

User. A person who uses the system.

- May consult if the Boolean function is in its simplest expression (it cannot be simplified).
- May ingress a Boolean function to be reduced in its simplest expression.
- May get their Boolean function in its sum of product expression.

2. **User requirements**.

- If the user ingress an invalid input the system will return error and the user will have to change it.
- The users might ingress a Boolean function and get its simplest expression.
- The users might convert their Boolean function into its sum of product expressions.
- The users might install a library from the Pip service of Python.
- The users might create a truth table and minterms table for the Boolean functions.
- The users might create Kmaps for the Boolean functions.

System requirements

1. **Functionals**

FR001	**Identification if the function is in its simplest expression**
Priority	High
Description	The system must be able to receive and determine the number of variables the function has.

FR002	**Minimization of the expression**
Priority	High
Description	The system must be able to receive and verify the number of terms the function has.

FR003	**Create the truth table**
Priority	High
Description	The system must be able to receive the Boolean function and read the minterms involved.

FR004	Sum of products
Priority	High
Description	The system must be able to receive a Boolean function and translate it in its sum of products expression.

FR005	Reduce function
Priority	High
Description	The system must be able to reduce the function in its simplest expression intoduccing the number of variables and the minterms that integrate the function. The system must return a string with the literal terms of the simplified function.

FR006	Installation
Priority	High
Description	The system must be re-raised to the Pip system so it might be used from the Python pip installation.

FR007	Truth tables and minterms tables
Priority	Medium
Description	The system must have a function that allows the user to create a truth table or a minterms table introducing the number or variables and minterms that integrate the function.

FR008	Creation of the Kmaps
Priority	Low
Description	The system must have a function that allows the user to introduce a Boolean function putting the number of variables and minterms that integrate the function and then

	generate a table that represents their Karnaugh Map.

2. **No functional**

NFR001	Inputs
Description	The expression must be a Boolean function and contain non-repetitive variables.

NFR002	Reduction algorithm
Description	The system will be focused in the reduction of the function by the implementation of a reduction algorithm based in the K-maps.

NFR003	Standardization of the matrix
Description	The matrix will have an order for the creation of the truth tables.

NFR004	Sum of Products
Description	The expression will be given with the minterms of the Boolean function (2^n terms).

NFR005	Installation (inclusion in the pip service)
Description	The system must be registered y count with: A presentation repository to the library. Its presentation of functions and installer.

NFR006	Maximum number of terms for a table
Description	The system will have a limit of 32 terms for the creation of tables(this includes the truth tables and the minterms tables).

NFR007	Maximum number of terms to be reduce
Description	The system limit for the reduction of the Boolean functions will be 16 terms.

NFR008	Kmaps limits
Description	The limit for the creation of Kmaps will be of 4 variables and must consider the general notation of the Kmaps.

Use cases

UC001. Simplest expression.

Description. Consult if the function is in its simplest expression.

Sequence.

1. Consult the tool Mini(funciónBool).
2. Receives a Boolean value (True or False).

Alternative departures: 1.1 If the user ingress an invalid input the system will return error and the user will have to change it.

UC002. Simplify.

Description. Given a Boolean function, the system returns its simple expression.

1. Consult the tool reducc(funciónBool).
2. Receives an array with the simplified function.

Alternative departures: 1.1 If the user ingress an invalid character the system will return error and the user will have to change it.

Use cases diagram

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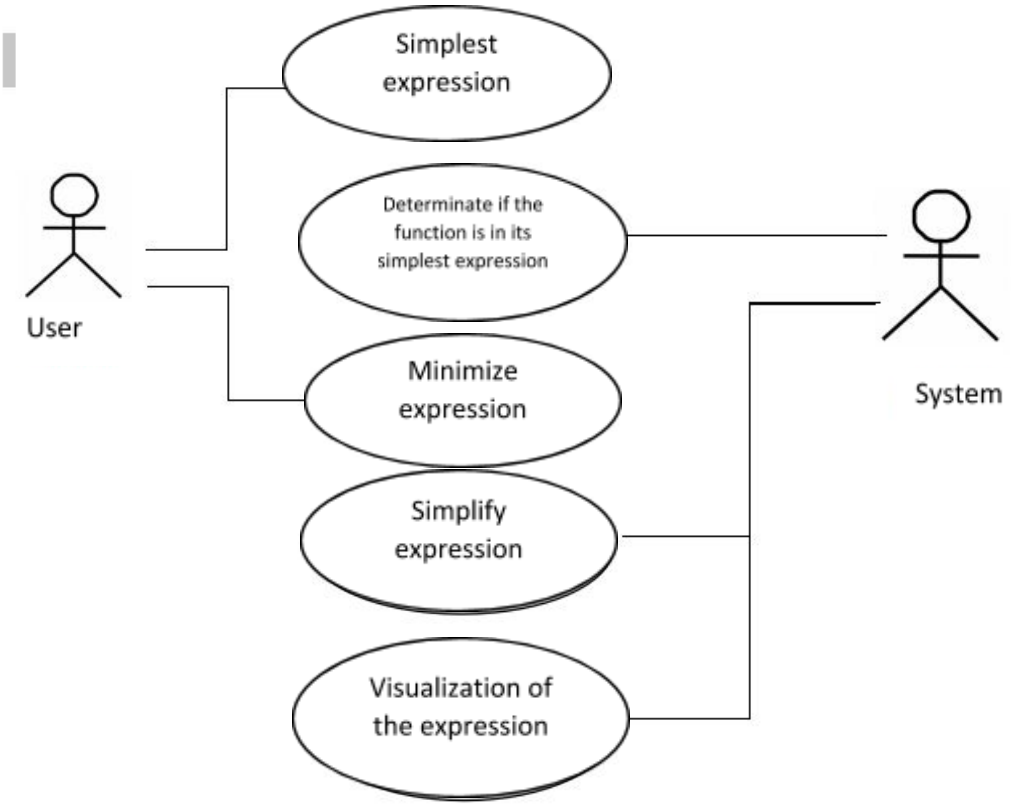

Development process:

Our activity calendars start from January 20th until June 15th. With this period, we establish some range and important dates that follow this way: From January 21st until June 8th we will realize the documentation and the Python tests. There will be 3 sprints established in this period:

- Sprint 1: We establish the objectives on April 19th and the sprint ends on May 2nd. The results of the sprint will be evaluated on May 4rd.

- Sprint 2: We establish the objectives on May 5th and the sprint ends on May 21st. The results of the sprint will be evaluated on May 22nd.

- Sprint 3: We establish the objectives on April 19th and the sprint ends on June 9th. The results of the sprint will be evaluated on June 10th.

Additionally, we establish an extra time in case the team faces some problems that might delay the date of delivery. This period is established for June 10th until June 15th.

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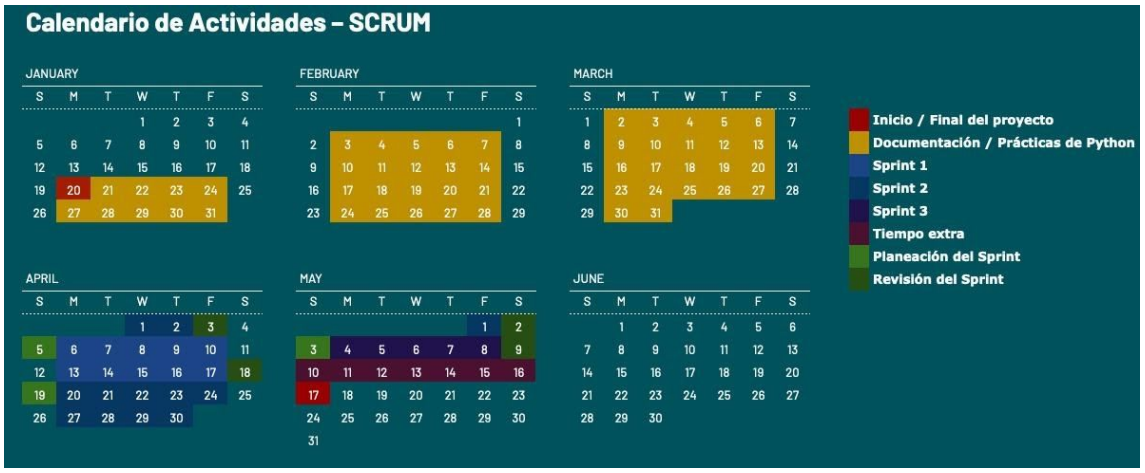

Individual contribution metric:

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Task	Evidence	Percent of the task	Responsible	Date of delivery	Complete
Investigation					
Algorithm	Presentation in the reunion	15%	Audny	April 19th	Check
Algorithm operation in Python	Repository	4%	Pamela	May 2nd	Check
Project organization	Repository and PyPi	10%	Miguel	May 2nd	Check
Codification (Functions)					
getBin	Code in the repository	5%	Miguel	June 13rd	Check
getTable	Code in the repository	14%	Jorge	June 13rd	Check
getTer	Code in the repository	4%	Jorge	June 13rd	Check
getVar	Code in the repository	4%	Pamela	June 13rd	Check
reduceFun	Code in the repository	22%	Roberto	June 14th	Check
Library organization	In the repository	5%	Miguel	June 13rd	Check
Organization					
First presentation	Presentation in the meeting	2%	Miguel	March 6th	Check
Second presentation	Presentation in the meeting	4%	Audny	May 1st	Check
Logs	Repository	11%	Pamela	Per each activity	Check

Member	# Tasks mandated	# Tasks delivered complete.	Percentage
Audny	2	2	100%
Jorge	2	2	100%
Miguel	3	3	100%
Pamela	3	3	100%

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Roberto	1	1	100%

Standards

- Respects the delivery date
- Presents the pertinent evidence