

# Software Architecture

## Project: Use Cases

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### List of Use Cases

- UC001: User requests to open a .s2v file.
- UC002: User requests to create a new spreadsheet in blank.
- UC003: User requests to change the content of a cell.
- UC004: User requests to save the current spreadsheet.
- UC005: System processes a function.
- UC006: Evaluate postfix.

### Complete Use Cases

<b>Use case Number</b>	UC001
<b>Use case Name</b>	User requests to open a .s2v file.
<b>Goal in context</b>	The system processes the content of the file.
<b>Actors and their interest</b>	<ul style="list-style-type: none"><li>● User.</li><li>● System being developed.</li></ul>
<b>Preconditions</b>	<ul style="list-style-type: none"><li>● The program shall be opened before.</li><li>● The user shall introduce this option in the menu.</li><li>● A file .s2v shall exist with a proper format.</li></ul>
<b>Postconditions</b>	A spreadsheet is available in the system if the user wants to modify something.
<b>Basic Flow</b>	<ol style="list-style-type: none"><li>1. The user introduces the full path of the file.</li><li>2. The system displays a message saying that the file has been opened.</li><li>3. The system displays a message saying that the compute of the cells is successful. (See UC003).</li><li>4. The system shows the result of the spreadsheet.</li></ol>
<b>Extensions</b>	<ol style="list-style-type: none"><li>1.a The user introduces an incorrect path:<ol style="list-style-type: none"><li>1. The system displays a message of error and shows the menu again.</li></ol></li><li>1.b The user introduces a path which leads to a not .s2v:<ol style="list-style-type: none"><li>1. The system displays a message of error and shows the menu again.</li></ol></li><li>3.a The system detects syntax errors inside the file:<ol style="list-style-type: none"><li>1. The system will notify the user about it and which is the cell with it.</li></ol></li></ol>
<b>Special Requirements</b>	All the data requirements shall be developed.

<b>Use case Number</b>	UC002
<b>Use case Name</b>	User requests to create a new spreadsheet in blank.
<b>Goal in context</b>	-
<b>Actors and their interest</b>	<ul style="list-style-type: none"> <li>• User.</li> <li>• System being developed.</li> </ul>
<b>Preconditions</b>	<ul style="list-style-type: none"> <li>• The program shall be opened before.</li> <li>• The user sees the options menu displayed by the system.</li> <li>• The user introduces the option of the menu which corresponds to creating a new blank spreadsheet.</li> </ul>
<b>Postconditions</b>	The system is able to save cells values from this moment.
<b>Basic Flow</b>	1. The system displays a message about the correctness of the action.
<b>Extension</b>	
<b>Special Requirements</b>	All the data requirements shall be developed.

<b>Use case Number</b>	UC003
<b>Use case Name</b>	User requests to change the content of a cell
<b>Goal in context</b>	-
<b>Actors and their interest</b>	<ul style="list-style-type: none"> <li>• User.</li> <li>• System being developed.</li> </ul>
<b>Preconditions</b>	<ul style="list-style-type: none"> <li>• The program shall be opened before.</li> <li>• The user sees the options menu displayed by the system.</li> <li>• The user introduces the option of the menu which corresponds to change the content of a cell.</li> </ul>
<b>Postconditions</b>	<ul style="list-style-type: none"> <li>• The system is able to change the content of the cells.</li> <li>• The system shows the menu.</li> </ul>
<b>Basic Flow</b>	<ol style="list-style-type: none"> <li>1. The user introduces the cell and the content of it, in this case a formula.</li> <li>2. The system tokenizes differentiating the string between number, cell identifier, opening round bracket, closing round bracket, colon character, semi-colon character, comma, function name and range with the operators (+, -, *, /, ^, √).</li> </ol>

	<ol style="list-style-type: none"> <li>3. The system parses the tokens and checks that the sequence meets the syntactical rules of regular arithmetic expressions.</li> <li>4. The system generates the postfix deleting the parentheses that are not part of a function and consequently order the list of tokens.</li> <li>5. The system converts the list of tokens to of components of formula.</li> <li>6. The system checks if there are any circular dependences.</li> <li>7. The system evaluates the postfix expression (see UC006).</li> <li>8. The system recomputes the content of the cells that are referencing this cell.</li> </ol>
<b>Extension</b>	<p>1.b The user introduces a number:</p> <ol style="list-style-type: none"> <li>1. The system recomputes the content of the cells if necessary.</li> </ol> <p>1.c The user introduces a string:</p> <ol style="list-style-type: none"> <li>1. The system checks if the content of this cell was referenced in a formula.</li> <li>2. If the cell were referenced the system shall show an error and to not update the content of the cell.</li> </ol> <p>3.a The user introduces an incorrect formula, and the parser notices it:</p> <ol style="list-style-type: none"> <li>1. The system will display an error message.</li> </ol> <p>6.a The user introduces a formula with circular dependencies.</p> <ol style="list-style-type: none"> <li>1. The system will display an error message.</li> <li>2. The system deletes the objects that has been created.</li> </ol> <p>7.a The user has introduced a division by 0.</p> <ol style="list-style-type: none"> <li>1. The system will display an error message.</li> <li>2. The system deletes the objects that has been created.</li> </ol>
<b>Special Requirements</b>	All the data requirements shall be developed.

<b>Use case Number</b>	UC004
<b>Use case Name</b>	User requests to save the current spreadsheet.
<b>Goal in context</b>	The user must be able to save the file properly.
<b>Actors and their interest</b>	<ul style="list-style-type: none"> <li>● User.</li> <li>● System being developed.</li> </ul>
<b>Preconditions</b>	<ul style="list-style-type: none"> <li>● The program shall be opened before.</li> <li>● A file .s2v shall exist with a proper format.</li> <li>● The user introduces the option of the menu which corresponds to the save spreadsheet.</li> </ul>
<b>Postconditions</b>	The system saved the file but maintain in memory the spreadsheet.

<b>Basic Flow</b>	<ol style="list-style-type: none"> <li>1. The user introduces the path.</li> <li>2. The system displays a message saying that it has been successfully saved.</li> </ol>
<b>Extensions</b>	<ol style="list-style-type: none"> <li>1.a The user introduces a path which does not exist: <ol style="list-style-type: none"> <li>1. The system displays an error message.</li> </ol> </li> <li>1.b The user enters a path, and the file name already exists: <ol style="list-style-type: none"> <li>1. The system asks whether to overwrite the file or not.</li> </ol> </li> </ol>
<b>Special Requirements</b>	All the data requirements shall be developed.

<b>Use case Number</b>	UC005
<b>Use case Name</b>	System processes a function.
<b>Goal in context</b>	-
<b>Actors and their interest</b>	<ul style="list-style-type: none"> <li>● System being developed.</li> </ul>
<b>Preconditions</b>	<ul style="list-style-type: none"> <li>● The system is inside the process of a cell with formula while opening a file or while changing a cell.</li> <li>● The system detects in the postfix the function PROMEDIO as an operand inside the formula.</li> </ul>
<b>Postconditions</b>	A spreadsheet is available in the system if the user wants to modify something.
<b>Basic Flow</b>	<ol style="list-style-type: none"> <li>1. The system recovers the value of all the arguments of the function.</li> <li>2. The system sums all the values and divides them by the number of values.</li> <li>3. The system returns the value of this operand to who ask for it.</li> </ol>
<b>Extensions</b>	<ol style="list-style-type: none"> <li>1.b An argument of the function is an empty cell. <ol style="list-style-type: none"> <li>1. The system will treat it as a 0, counting for the average.</li> </ol> </li> </ol>
<b>Special Requirements</b>	All the data requirements shall be developed.

<b>Use case Number</b>	UC006
<b>Use case Name</b>	Evaluate Postfix
<b>Goal in context</b>	-

<b>Actors and their interest</b>	<ul style="list-style-type: none"> <li>• System</li> </ul>
<b>Preconditions</b>	<ul style="list-style-type: none"> <li>• The system has converted the list of tokens to components of formula.</li> </ul>
<b>Postconditions</b>	-
<b>Basic Flow</b>	<ol style="list-style-type: none"> <li>1. The system initializes the stack.</li> <li>2. The system pushes to the stack operands until find an operator.</li> <li>3. The system pops it to the top two numbers, using the first as the right operand and the second as the left.</li> <li>4. The system applies the operator to these operands.</li> <li>5. The system pushes back the result onto the stack.</li> <li>6. The system verifies that the list of FormulaContent objects is fully iterated.</li> <li>7. The system recovers the value from the stack.</li> </ol>
<b>Extension</b>	<p>2.a The system processes an operand:</p> <ol style="list-style-type: none"> <li>1. The system push its value into the stack.</li> <li>2. Jumps directly to 6.</li> </ol> <p>2.b The system detects an empty cell:</p> <ol style="list-style-type: none"> <li>1. The system considers this cell as a 0.</li> </ol> <p>4.a The system finds that the divisor is a 0.</p> <ol style="list-style-type: none"> <li>1. If it is file, displays an error message in the display of the file.</li> <li>2. If it is a cell, displays an error message.</li> </ol> <p>6.a The system detects that there is more FormulaContent objects inside the list.</p> <ol style="list-style-type: none"> <li>1. Continue the evaluation. Go to step 2.</li> </ol> <p>7.a The system detects that the stack has more than one number.</p> <ol style="list-style-type: none"> <li>1. Throws an exception saying that postfix generator isn't well implemented.</li> </ol>
<b>Special Requirements</b>	All the data requirements shall be developed