

Hello, my name is Alexandru Dabu and I will test the app you sent to me.

1.1 In order to test the app I would use both functional and non functional testing. The test scenarios would be:

- **Ui:** verify that every Ui element is properly displayed (colors used, font style and size, alignment and in case of text strings: the grammar or the correct symbol)
- **Direct functional:** verify that every button works as intended, both the math operations buttons and other buttons such as backspace and delete.
- **Non functional :** see that app is easy to understand and use and the user does not need to wait too much for the results to appear after pressing a button or doing a math operation.

A list of the actual tests **(a few examples)**:

Step	Action	Expected result	Actual result	Test result
1.Verify the application startup				
1.2	Launch the app with a double left mouse button click	The app launches	As expected	Pass
1.3	Launch the app with the „Enter” key from the keyboard	The app launches	As expected	Pass
1.4	Inspect the taskbar after launching the app	The app icon appears in the taskbar	As expected	Pass
1.5	Inspect the app screen in the foreground after launching it	Should appear a window with the app on the screen	The application launches only in the taskbar (minimized)	Fail

Step	Action	Expected result	Actual result	Test result
2. Verify that every button is displayed properly from a UI point of view				
2.1	Inspect button 1	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding number is as expected and consistent within the selected theme.	As expected	Pass
2.2	Inspect button 2	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding number is as expected and consistent within the selected theme.	Button don't has blue backgroud	Fail
2.3	Inspect button 3	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding number 	As expected	Pass

		is as expected and consistent within the selected theme.		
2.4	Inspect button 4	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding number is as expected and consistent within the selected theme.	As expected	Pass
2.5	Inspect button 5	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding number is as expected and consistent within the selected theme.	As expected	Pass
2.6	Inspect button 6	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding number 	As expected	Pass

		is as expected and consistent within the selected theme.		
2.7	Inspect button 7	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding number is as expected and consistent within the selected theme.	As expected	Pass
2.8	Inspect button 8	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding number is as expected and consistent within the selected theme.	As expected	Pass
2.9	Inspect button 9	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding number 	As expected	Pass

		is as expected and consistent within the selected theme.		
2.10	Inspect button 0	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding symbol is as expected and consistent within the selected theme.	As expected	Pass
2.11	Inspect button +	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding symbol is as expected and consistent within the selected theme.	As expected	Pass
2.12	Inspect button – from bottom right	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding symbol 	As expected	Pass

		is as expected and consistent within the selected theme.		
2.13	Inspect button :	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding symbol is as expected and consistent within the selected theme.	As expected	Pass
2.14	Inspect button *	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding symbol is as expected and consistent within the selected theme.	As expected	Pass
2.15	Inspect button X ²	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding symbol 	As expected	Pass

		is as expected and consistent within the selected theme.		
2.16	Inspect button ✓	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding symbol is as expected and consistent within the selected theme.	As expected	Pass
2.17	Inspect button Min	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • grammar is as expected and consistent within the selected theme.	As expected	Pass
2.18	Inspect button Equals	Every aspect: <ul style="list-style-type: none"> • colors used • font style • font size • alignment • grammar is as expected and consistent within the selected theme.	As expected	Pass

2.19	Inspect button – from top right	<p>Every aspect:</p> <ul style="list-style-type: none"> • colors used • font style • font size • alignment • corresponding symbol <p>is as expected and consistent within the selected theme.</p>	As expected	Pass
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Step	Action	Expected result	Actual result	Test result
3. Verify that every button at hover has blue background				
3.1	Move the cursor over button 1	Button should has a blue backgroud	As expected	Pass
3.2	Move the cursor over button 2	Button should has a blue backgroud	Button don't has blue backgroud	Fail
3.3	Move the cursor over button 3	Button should has a blue backgroud	As expected	Pass
3.4	Move the cursor over button 4	Button should has a blue backgroud	As expected	Pass
3.5	Move the cursor over button 5	Button should has a blue backgroud	As expected	Pass
3.6	Move the cursor over button 6	Button should has a blue backgroud	As expected	Pass
3.7	Move the cursor over button 7	Button should has a blue backgroud	As expected	Pass
3.8	Move the cursor over button 8	Button should has a blue backgroud	As expected	Pass
3.9	Move the cursor over button 9	Button should has a blue backgroud	As expected	Pass
3.10	Move the cursor over button 0	Button should has a blue backgroud	As expected	Pass
3.11	Move the cursor over button +	Button should has a blue backgroud	As expected	Pass
3.12	Move the cursor over button – from bottom right	Button should has a blue backgroud	As expected	Pass
3.13	Move the cursor over button :	Button should has a blue backgroud	As expected	Pass
3.14	Move the cursor over button *	Button should has a blue backgroud	As expected	Pass

3.15	Move the cursor over button X^2	Button should has a blue backgroud	As expected	Pass
3.16	Move the cursor over button $\sqrt{}$	Button should has a blue backgroud	As expected	Pass
3.17	Move the cursor over button Min	Button should has a blue backgroud	As expected	Pass
3.18	Move the cursor over button Equals	Button should has a blue backgroud	As expected	Pass
3.19	Move the cursor over button – from top right	Button should has a blue backgroud	As expected	Pass

Step	Action	Expected result	Actual result	Test result
Precond. The application is started				
4. Verify that input field accept letters(ex: abcd)				
4.1	Click on input field			
4.2	Click on „Backspace” or „Delete” button to delete the .0 from the input field	The input field is empty	As expected	Pass
4.3	Type letters	Should not accept letters	Can write letters	Fail

Step	Action	Expected result	Actual result	Test result
Precond. The application is started				
5. Verify that operation buttons can be inserted in the input field without numbers.(ex: +,-,;,*)				

5.1	Click on input field			
5.2	Click on „Backspace” or „Delete” button to delete the .0 from the input field	The input field is empty	As expected	Pass
5.3	press on +	Should not be inserted in the input field	it is inserted in the input field	Fail
5.4	press on :	Should not be inserted in the input field	it is inserted in the input field	Fail
5.5	press on – from top right	Should not be inserted in the input field	it is inserted in the input field	Fail
5.6	press on *	Should not be inserted in the input field	it is inserted in the input field	Fail

Step	Action	Expected result	Actual result	Test Result
Precond. The application is started				
6. Verify that can make multiple valid math operation in the same time(ex: 1+2+3-2=4)				
6.1	Click on „Backspace” or „Delete” button to delete the .0 from the input field	The input field is empty	As expected	Pass
6.2	press on 1	Should appear 1 in the input field	As expected	Pass
6.3	press on „+”	Should appear „+” in the input field	As expected	Pass
6.4	press on 2	Should appear 2 in the input field	As expected	Pass
6.5	press on „+”	Should appear „+” in the input field	As expected	Pass

6.6	press on 3	Should appear 3 in the input field	As expected	Pass
6.7	press on „-“ from top right	Should appear „-“ in the input field	As expected	Pass
6.8	press on 2	Should appear 2 in the input field	As expected	Pass
6.9	press on „=“	Should appear „=“ in the input field and give the result	the message WTF?! appears	Fail

Step	Action	Expected result	Actual result	Test result
7. Check if the app closes by pressing the “X” button from the top right				
7.1	Open the app	The app has opened	As expected	Pass
7.2	Click the “X” button from the top right	The window with the app should close	As expected	Pass

Step	Action	Expected result	Actual result	Test result
8. Verify that “Backspace” button works properly				
8.1	Open the app	The app has opened	As expected	Pass
8.2	Press button “Backspace”	Should delete number from input field from right to left	Delete number from input field from left to right	Fail

Step	Action	Expected result	Actual result	Test result
9. Verify that “Delete” button works properly				
9.1	Open the app	The app has opened	As expected	Pass
9.2	Press button “Delete”	Should delete number from input field from left to right	Delete number from input field from right to left	Fail

Step	Action	Expected result	Actual result	Test result
10. Check if the button "-" from the bottom right works properly				
10.1	Open the app	The app has opened	As expected	Pass
10.2	Press button "-" from bottom right	The app should minimize	As expected	Pass

1.2 This is a list of issue (bugs) that I found:

- 1.[Ui] There is a typo in the app name: "Calucator" instead of "Calculator"
- 2.[Ui] The app icon is the same as "My computer" instead of a generic calculator icon.
- 3.[Ui] A column of buttons is hidden on the default window size
- 4.[Ui][Functional] The window can be resized, both expanded and reduced generating extra space or hiding buttons from view.
- 5.[Ui] There is no decimal button (ex: "." or ",").
- 6.[Ui] At startup, the application launches only in the taskbar
- 7.[Ui] At startup, the first number in the input field is .0 instead of 0
- 8.[Functional] When the user starts typing numbers, it will continue after .0 (example: .052554)
- 9.[Ui] Missing clear button
- 10 [Ui] There are two buttons with the "-" symbol, with different functions
- 11.[Ui] There is both a "=" button and a "Equals" button.
- 12.[Ui] There is both a "-" button and a "Min" button.
- 13.[Ui] The input field size does not cover the entire area.
- 14.[Ui] At hover: All buttons get a blue background except the "2" button on the default theme ("theme1")

- 15.[Ui][Functional]The "=" (equals) button does not have a background hover color on any theme.
- 16.[Ui][Functional] When changing the theme to "theme2", the "Delete" button changes the font.
 - 16.1. [Ui][Functional] The "2" button can now change the background at hover, only on "theme2"
 - 16.2. [Ui][Functional] When changing the theme to "theme3", the numbers in the input field have the same white font and cannot be seen unless highlighted with the mouse.
 - 16.3. [Ui] When changing the theme to "theme3", at hover, the buttons become unreadable due to the font color vs background color
 - 16.4. [Ui][Functional] When changing the theme to "theme3", the "2" button has no blue background at hover.
 - 16.5. [Ui][Functional] When changing the theme to "theme3", the input field border does not change into black like the other buttons.
 - 16.6. [Ui][Functional] When changing the theme to "theme3", the "=" button's border does not change into black like the other buttons.
 - 16.7. [Ui] The symbol on the "+" button is not aligned properly.
- 17. [Ui] The multiplication symbol is an asterisk "*" instead of a "x".
- 18. [Functional] When resizing the window, the .0 from the input field gets cleared.
- 19. [Functional] The input field accepts letters
 - 19.1* [Functional] Attempting operations with letters instead of numbers will lead to an "Error"
- 20. [Functional] There is no character limit in the input field
- 21. [Functional] The "Backspace" button deletes the characters one by one only from left to right.
- 22. [Functional] The "Delete" button deletes the characters one by one from right to left. [Needs Clarification]
- 23. [Functional] Operation buttons can be inserted in the input field without numbers.
 - 23.1* [Functional] Clicking the "=" button after inserting only operations in the input field leads to a "WTF?!" message
- 24. [Ui][Functional] The "-" button which minimizes the app is located at bottom right instead of next to the "X" button.
- 25. [Functional] The "Equals" button does not work.
- 26. [Functional] After clicking the "Equals" button, the "=" symbol remains in the input field and further operations will lead to an Error message
- 27. [Functional] Click the "=" button after inserting any math operation character (only one) will lead to a crash
- 28. [Functional] Writing multiple valid math operations and then clicking the "=" button will lead to an "WTF?!" or "Eroare!" message (ex: 1+3+4-2 = "WTF?!")

Bug report (a few examples):

Title	Startup -> The application launches only in the taskbar
Bug ID / Reported by	#1 / A.Dabu
Step to reproduce	1.Open the application folder 2.Double click on Calculator.exe
Expected result	2.Should appear a window with the app on the screen
Actual result	2.The application launches only in the taskbar
Severity	Low
Priority	Low
Test Environment	Windows 10
Type	Functional
Screenshot	

Title	Math operation -> after multiple valid math operation in the same time
Bug ID / Reported by	#2 / A.Dabu
Step to reproduce	1. Open the app; 2. Delete the .0 from the input field; 3.press on 1; 4.press on „+“; 5.press on 2; 6.press on „+“; 7. press on 3; 8. press on „-“; 9. press on 2; 10. press on „=“;
Expected result	10.Should appear „=“ in the input field and give the result
Actual result	10.The message WTF?! appears
Severity	Major
Priority	Critical
Test Environment	Windows 10
Type	Functional
Screenshot	

Title	Click the "=" button -> after inserting any math operation character (only one) will lead to a crash
Bug ID / Reported by	#3 / A.Dabu
Step to reproduce	1. Open the app; 2. Delete the .0 from the input field; 3. Click on the "+" button; 4. Click on the "=" button.
Expected result	4. The app displays an Error message.
Actual result	4. The app will close itself (crash).
Severity	Blocker
Priority	Major
Test Environment	Windows 10
Type	Functional
Screenshot	

Title	Input field -> Input field accept letters
Bug ID / Reported by	#4 / A.Dabu
Step to reproduce	1.Open the app; 2. Delete the .0 from the input field; 3.Type letters
Expected result	3. Should not accept letters
Actual result	3. Can write letters
Severity	Medium
Priority	Medium
Test Environment	Windows 10
Type	Functional
Screenshot	

Title	Change theme -> When changing the default theme to theme2, only the font of the "Delete" button is changed
Bug ID / Reported by	#5 / A.Dabu
Step to reproduce	1.Open the app; 2.Press on Edit menu 3. Press on Themes
Expected result	3. Expected that default theme to change
Actual result	3. Only the font of "Delete" button is changed
Severity	Low
Priority	Medium
Test Environment	Windows 10
Type	Functional
Screenshot	

1.3 Improvements:

1. Missing button operations. More dedicated math operations buttons could be added (ex. Logarithm)
2. Order of buttons. Some buttons could have their orders exchanged for a more user friendly experience.
 - 2.1 Change positions of "0" and ":" buttons
 - 2.2 Change positions of "-" and "-" buttons. (The bottom right one minimizes the app and the top right one is the minus operation)
3. Do not allow letters in the input field. Using any letter already leads to an error so in order to not confuse the user, these shouldn't be allowed at all in the input field.
4. Do not display the "=" sign in the input field, or update it so that after clicking the "=" sign, it does not remain in the input field.
5. On "theme3" the background color at hover should be different so that the button symbols are easier to read
6. Implement new convertors and measurements.
7. When you open the folder with the app, it is much easier to be found if the icon of the app would be a calculator icon.