Test Plan for Windows Calculator

Standard Mode

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Introduction:

The Windows Calculator is a built-in tool in the Windows operating system that performs basic and advanced mathematical calculations. It includes modes for standard calculations, scientific functions, programmer tasks, and unit conversions. The calculator is designed for everyday use, providing a user-friendly interface for quick and accurate computations.

Purpose:

The objective of this test plan is to ensure that the Windows Calculator application meets the required functionality, performance, and user experience standards. The tests will help identify any defects or inconsistencies, providing valuable feedback for further development and improvement.

Test Environment:

- Device: Windows-based PC
- Operating System: Windows 11
- Software Under Test: Windows Calculator version 11.2405.2.0

Test Strategy:

The testing approach involves executing a series of predefined test cases and documenting the results. Each test case includes specific steps to be followed, expected outcomes, and a section for recording actual results. The test plan is designed to cover both common use cases and edge cases to provide a thorough assessment of the calculator's capabilities.

In Scoop:

In this test cycle the functions of the Calculator Standard Mode will be tested:

- Basic operations (addition, subtraction, multiplication, division).
- Advanced Operations (Square Root, Squaring, Reciprocal, Percentage)
- Clear (CE, C) and Backspace (←) functions.
- Memory functions (MS, MR, MC, M+, M-).
- Display functionality (correct input, operations, results).
- User interface (alignment, responsiveness).

Out of Scoop:

All the rest of the Calculator Modes will not be tested in this cycle:

- Scientific and Programmer modes.
- Advanced mathematical functions.
- Unit and currency conversions.
- Date calculations.
- Performance and stress testing.
- Cross-version compatibility.
- Security and data privacy.

Test Schedule:

The testing schedule will extend over 3 days, with one tester responsible for both writing the Software Test Documents and executing the test cases.

Problem Severity Classification:

High and Critical Severity issues are issues that cause crashes, data loss, incorrect results and don’t have acceptable workarounds.

Exit Criteria:

1. **Test Coverage Requirements Met the Schedule**

All necessary test cases must be executed to ensure that every functionality and scenario of the calculator's standard mode is thoroughly tested, with no significant uncovered areas.

2. **No High-Severity Defects Reported**

All high-severity defects (e.g., crashes, data loss, incorrect results) must be resolved or have acceptable workarounds, and no new high-severity issues should be identified during the testing cycle.

Test Cases Tree:

1. **Basic Operations**
    - 1.1. **Addition +**
        - 1.1.1. Addition
        - 1.1.2. Negative Number Addition
        - 1.1.3. Addition with Zero
        - 1.1.4. Decimal Addition
        - 1.1.5.Large Number Addition
    - 1.2. **Subtraction -**
        - 1.2.1. Subtraction
        - 1.2.2. Subtraction Resulting in Negative Number
        - 1.2.3. Subtraction of zero
        - 1.2.4. Decimal Subtraction
        - 1.2.5. Large Number Subtraction
    - 1.3. **Multiplication X**
        - 1.3.1. Multiplication
        - 1.3.2. Multiplication of Negative Number
        - 1.3.3. Decimal Multiplication
        - 1.3.4. Multiplication of Zero
        - 1.3.5. Large Number Multiplication
    - 1.4. **Division ÷**
        - 1.4.1. Division
        - 1.4.2. Division by One
        - 1.4.3. Division Resulting in Infinite Decimal
        - 1.4.4. Decimal Division
        - 1.4.5. Division by Zero
        - 1.4.6. Large Number Division
2. **Advanced Operations**
    - 2.1. **Square Root** $\sqrt[2]{x}$
        - 2.1.1. Square Root of Positive Number
        - 2.1.2. Square Root of Zero
        - 2.1.3. Square Root of Negative Number
        - 2.1.4. Square Root Resulting in Decimal
    - 2.2. **Squaring** x^2
        - 2.2.1. Squaring
        - 2.2.2. Squaring Negative Number
        - 2.2.3. Squaring Zero
        - 2.2.4. Squaring Decimal Number
        - 2.2.5. Squaring Large Number
        - 2.2.6. Squaring Small Decimal Number
    - 2.3. **Reciprocal** $1/x$
        - 2.3.1. Reciprocal
        - 2.3.2. Negative Number Reciprocal

Test Cases and Test Scenarios:

This test description includes a variety of test cases to cover fundamental and advanced functionalities of the Windows Calculator, based on the test cases tree.

Section 1: Basic Operations		
TC01	**Addition**	**Steps:** Open Calculator in Standard mode. Enter 5, press +, enter 3, and press =.
	Expected Result: 8	
	Actual Result: 8 **(Pass)**	
TC02	**Negative Number Addition**	**Steps:** Enter -7, press +, enter 5, and press =.
	Expected Result: -2	
	Actual Result: -2 **(Pass)**	
TC03	**Addition with Zero**	**Steps:** Enter 0, press +, enter 0, and press =.
	Expected Result: 0	
	Actual Result: 0 **(Pass)**	
TC04	**Decimal Addition**	**Steps:** Enter 2.5, press +, enter 3.7, and press =.
	Expected Result: 6.2	
	Actual Result: 6.2 **(Pass)**	
TC05	**Large Number Addition**	**Steps:** Enter 123456789, press +, enter 987654321, and press =.
	Expected Result: 1,111,111,110	
	Actual Result: 1,111,111,110 **(Pass)**	
TC06	**Subtraction**	**Steps:** Enter 9, press -, enter 4, and press =.
	Expected Result: 5	
	Actual Result: 5 **(Pass)**	
TC07	**Subtraction Resulting in Negative Number**	**Steps:** Enter 3, press -, enter 7, and press =.
	Expected Result: -4	

	Actual Result: -4 **(Pass)**	
TC08	**Subtraction of zero**	**Steps:** Enter 0, press -, enter 0, and press =.
	Expected Result: 0	
	Actual Result: 0 **(Pass)**	
TC09	**Decimal Subtraction**	**Steps:** Enter 5.7, press -, enter 2.3, and press =.
	Expected Result: 3.4	
	Actual Result: 3.4 **(Pass)**	
TC10	**Large Number Subtraction**	**Steps:** Enter 123456789, press -, enter 987654321, and press =.
	Expected Result: -864,197,532	
	Actual Result: -864,197,532 **(Pass)**	
TC11	**Multiplication**	**Steps:** Enter 4, press X, enter 3, and press =.
	Expected Result: 12	
	Actual Result: 12 **(Pass)**	
TC12	**Multiplication of Negative Number**	**Steps:** Enter -4, press X, enter 3, and press =.
	Expected Result: -12	
	Actual Result: -12 **(Pass)**	
TC13	**Decimal Multiplication**	**Steps:** Enter 0.5, press X, enter 0.2, and press =.
	Expected Result: 0.1	
	Actual Result: 0.1 **(Pass)**	
TC14	**Multiplication of Zero**	**Steps:** Enter 0, press X, enter 0, and press =.
	Expected Result: 0	
	Actual Result: 0 **(Pass)**	
	Multiplication by Zero	**Steps:**

TC15		Enter 0, press X, enter 100, and press =.
	Expected Result: 0	
	Actual Result: 0 **(Pass)**	
TC16	**Large Number Multiplication**	**Steps:** Enter 123, press X, enter 456, and press =.
	Expected Result: 56,088	
	Actual Result: 56,088 **(Pass)**	
TC17	**Division**	**Steps:** Enter 10, press ÷, enter 2, and press =.
	Expected Result: 5	
	Actual Result: 5 **(Pass)**	
TC18	**Division by One**	**Steps:** Enter 15, press ÷, enter 1, and press =.
	Expected Result: 15	
	Actual Result: 15 **(Pass)**	
TC19	**Division Resulting in Infinite Decimal**	**Steps:** Enter 1, press ÷, enter 3, and press =.
	Expected Result: 0.333333333...	
	Actual Result: 0.3333333333333333 **(Pass)**	
TC20	**Decimal Division**	**Steps:** Enter 5.5, press ÷, enter 2, and press =.
	Expected Result: 2.75	
	Actual Result: 2.75 **(Pass)**	
TC21	**Division by Zero**	**Steps:** Enter 5, press ÷, enter 0, and press =.
	Expected Result: Cannot divide by zero	
	Actual Result: Cannot divide by zero **(Pass)**	
TC22	**Large Number Division**	**Steps:** Enter 789, press ÷, enter 456, and press =.
	Expected Result: 1.730263157894737	

	Actual Result: 1.730263157894737 **(Pass)**	
Section 2: Advanced Operations		
TC23	**Square Root of Positive Number**	**Steps:** Enter 16 and press $\sqrt[2]{x}$
	Expected Result: 4	
	Actual Result: 4 **(Pass)**	
TC24	**Square Root of Zero**	**Steps:** Enter 0 and press $\sqrt[2]{x}$
	Expected Result: 0	
	Actual Result: 0 **(Pass)**	
TC25	**Square Root of Negative Number**	**Steps:** Enter -9 and press $\sqrt[2]{x}$
	Expected Result: Invalid input	
	Actual Result: Invalid input **(Pass)**	
TC26	**Square Root Resulting in Decimal**	**Steps:** Enter 2 and press $\sqrt[2]{x}$
	Expected Result: 1.414213562373095	
	Actual Result: 1.414213562373095 **(Pass)**	
TC27	**Squaring**	**Steps:** Enter 2 and press x^2.
	Expected Result: 4	
	Actual Result: 4 **(Pass)**	
TC28	**Squaring Negative Number**	**Steps:** Enter -2 and press x^2.
	Expected Result: 4	
	Actual Result: 4 **(Pass)**	
TC29	**Squaring Zero**	**Steps:** Enter 0 and press x^2.
	Expected Result: 0	
	Actual Result: 0 **(Pass)**	

TC30	**Squaring Decimal Number**	**Steps:** Enter 0.25 and press x^2.
	Expected Result: 0.0625	
	Actual Result: 0.0625 **(Pass)**	
TC31	**Squaring Large Number**	**Steps:** Enter 123456789 and press x^2.
	Expected Result: 1.524157875019052e+16	
	Actual Result: 1.524157875019052e+16 **(Pass)**	
TC32	**Squaring Small Decimal Number**	**Steps:** Enter 0.000001 and press x^2.
	Expected Result: 0.000000000001	
	Actual Result: 0.000000000001 **(Pass)**	
TC33	**Reciprocal**	**Steps:** Enter 5, Press $^1/x$.
	Expected Result: 0.2	
	Actual Result: 0.2 **(Pass)**	
TC34	**Negative Number Reciprocal**	**Steps:** Enter -4, Press $^1/x$.
	Expected Result: -0.25	
	Actual Result: -0.25 **(Pass)**	
TC35	**Decimal Number Reciprocal**	**Steps:** Enter 2.5, Press $^1/x$.
	Expected Result: 0.4	
	Actual Result: 0.4 **(Pass)**	
TC36	**Negative Decimal Number Reciprocal**	**Steps:** Enter -1.5, Press $^1/x$.
	Expected Result: -0.6666666666666667	
	Actual Result: -0.6666666666666667 **(Pass)**	
TC37	**Zero Reciprocal**	**Steps:** Enter 0, Press $^1/x$.

	Expected Result: Cannot divide by zero	
	Actual Result: Cannot divide by zero **(Pass)**	
TC38	**Large Number Reciprocal**	**Steps:** Enter 1000000, Press 1/x.
	Expected Result: 0.000001	
	Actual Result: 0.000001 **(Pass)**	
TC39	**Very Small Decimal Number Reciprocal**	**Steps:** Enter 0.0000001, Press 1/x.
	Expected Result: 10,000,000	
	Actual Result: 10,000,000 **(Pass)**	
TC40	**Percentage**	**Steps:** Enter 200, press x, enter 50, press % and press =
	Expected Result: 100	
	Actual Result: 100 **(Pass)**	
TC41	**Percentage of Negative Number**	**Steps:** Enter 400, press x, enter -25, press % and press =
	Expected Result: -100	
	Actual Result: -100 **(Pass)**	
TC42	**Percentage of Zero**	**Steps:** Enter 0, press x, enter 100, press % and press =
	Expected Result: 0	
	Actual Result: 0 **(Pass)**	
TC43	**Percentage of a Decimal Number**	**Steps:** Enter 80, press x, enter 12.5, press % and press =
	Expected Result: 10	
	Actual Result: 10 **(Pass)**	
TC44	**Large Number Percentage**	**Steps:** Enter 300, press x, enter 33.33, press % and press =
	Expected Result: 200,000	
	Actual Result: 200,000 **(Pass)**	

TC45	**Percentage Result Leading to Fraction**	**Steps:** Enter 1000000, press x, enter 20, press % and press =
	Expected Result: 99.99	
	Actual Result: 99.99 **(Pass)**	
TC46	**Percentage of more then 100%**	**Steps:** Enter 200, press x, enter 150, press % and press =
	Expected Result: 300	
	Actual Result: 300 **(Pass)**	
Section 3: Clear Entry, Clear and Backspace		
TC47	**Clear Entry a Single Digit**	**Steps:** Enter 7 and press CE
	Expected Result: Display should be empty and input line should show 0	
	Actual Result: Display is empty and input line show 0 **(Pass)**	
TC48	**Clear Entry a Multi-Digit Entry**	**Steps:** Enter 123456789 and press CE
	Expected Result: Display should be empty and input line should show 0	
	Actual Result: Display is empty and input line show 0 **(Pass)**	
TC49	**Clear Entry After an Operation**	**Steps:** Enter 50, press +, enter 25 and press CE
	Expected Result: Display should show 50 + (cleared the 25 but kept 50).	
	Actual Result: Display is showing 50 + (cleared the 25 but kept 50). **(Pass)**	
TC50	**Clear Entry After a Decimal Entry**	**Steps:** Enter 12.34 and press CE
	Expected Result: Display should be empty and input line should show 0	
	Actual Result: Display is empty and input line show 0 **(Pass)**	
TC51	**Clear Entry After a Complex Expression**	**Steps:** Enter 2, press x, enter 3, press +, enter 4 and press CE
	Expected Result: Display should show 6+ (2x3) and input line should show 0 (last entry 4 cleared)	
	Actual Result: Display show 6+ (2x3) and input line show 0 (last entry 4 cleared) **(Pass)**	
TC52	**Clear After a Single Entry**	**Steps:**

		Enter 8 and press C
	Expected Result: Display should be empty and input line should show 0	
	Actual Result: Display is empty and input line show 0 **(Pass)**	
TC53	**Clear After Multiple Entries**	**Steps:** Enter 123456 and press C
	Expected Result: Display should be empty and input line should show 0	
	Actual Result: Display is empty and input line show 0 **(Pass)**	
TC54	**Clear After an Operation**	**Steps:** Enter 30, press x, enter 15 and press C
	Expected Result: Display should be empty and input line should show 0	
	Actual Result: Display is empty and input line show 0 **(Pass)**	
TC55	**Clear After a Decimal Entry**	**Steps:** Enter 0.025 and press C
	Expected Result: Display should be empty and input line should show 0	
	Actual Result: Display is empty and input line show 0 **(Pass)**	
TC56	**Clear After a Complex Expression**	**Steps:** Enter 5, press x, enter 9 press -, enter 3 and press C
	Expected Result: Display should be empty and input line should show 0	
	Actual Result: Display is empty and input line show 0 **(Pass)**	
TC57	**Backspace Delete a Single Digit Entry**	**Steps:** Enter 5 and press Backspace <x]
	Expected Result: Display should be empty and input line should show 0	
	Actual Result: Display is empty and input line show 0 **(Pass)**	
TC58	**Backspace Delete After an Operation**	**Steps:** Enter 123, press +, enter 456 and press Backspace <x] 3 times
	Expected Result: Display should show 123+ and input line should show 0	
	Actual Result: Display is showing 123+ and input line show 0 **(Pass)**	
TC59	**Backspace Delete Digits After Decimal Point**	**Steps:** Enter 1.2 and press Backspace <x]
	Expected Result: Display should be empty and input line should show 1.	
	Actual Result: Display is empty and input line show 1. **(Pass)**	

Section 4: Memory Functions

TC60	**M+ (Memory Add)**	**Steps:** Enter 5, press +, enter 3, press =, press M+ and press MR
	Expected Result: Display should be empty and input line should show 8	
	Actual Result: Display is empty and input line show 8. **(Pass)**	
TC61	**M- (Memory Subtract)**	**Steps:** Enter 10, press -, enter 2, press =, press M- and press MR
	Expected Result: Display should be empty and input line should show 0	
	Actual Result: Display is empty and input line show 0. **(Pass)**	
TC62	**MC (Memory Clear)**	**Steps:** Enter 2, press +, enter 2, press =, press M+ Press MR and press MC
	Expected Result: The MR and MC buttons should be disabled, indicating that the memory has been cleared and there's no value to recall and input line should show 4	
	Actual Result: The MR and MC buttons are disabled, indicating that the memory has been cleared and there's no value to recall and input line show 4 **(Pass)**	
TC63	**MR (Memory Recall)**	**Steps:** Enter 10, press M+, enter 8, press + Press MR
	Expected Result: Display should show 8+ and input line should show 10, the recall value	
	Actual Result: Display show 8+ and input line show 10 **(Pass)**	
TC64	**MS (Memory Store)**	**Steps:** Enter 25, press MS to store the value in memory Enter 10, press = and press MR
	Expected Result: Display should show 10= and input line should show 25, the stored value	
	Actual Result: Display show 10= and input line show 25 **(Pass)**	
TC65	**M^{v} - Memory window**	**Steps:** Press M^{v}
	Expected Result: A window with the memory should be open	
	Actual Result: The memory window open **(Pass)**	
	Section 5: Other Functions	
TC66	**Enter the Keep on Top function**	**Steps:** Press the 'Keep on Top' Button

	Expected Result: The Calculator should jump to top right of the screen without memory buttons	
	Actual Result: The Calculator moves to the top right of the screen and no memory buttons **(Pass)**	
TC67	**Exit the Keep on Top function**	**Steps:** Press the 'Keep on Top' Button, press it again to change it back
	Expected Result: The Calculator should jump back to original spot	
	Actual Result: The Calculator jumps back to original spot **(Pass)**	
TC68	**History**	**Steps:** Press the 'History' Button
	Expected Result: A history window should be open	
	Actual Result: A history window opens **(Pass)**	
TC69	**Switch from History to Memory**	**Steps:** Enlarge the window from the square icon on the top menu
	Expected Result: The calculator window should be showing full screen, and on top there should be two tabs of 'History' and 'Memory'	
	Actual Result: The calculator window is on full screen, and on top there are two tabs of 'History' and 'Memory' **(Pass)**	
Section 6: Other Testings		
TC70	**GUI Testing**	**Steps:** Verify that all buttons on the calculator respond correctly to user interactions and that all are aligned and in the same font size and style
	Expected Result: All buttons should response, align and have the same font size and style	
	Actual Result: All buttons response, aligned and with the same font size and style **(Pass)**	
TC71	**Performance Testing**	**Steps:** Enter a large multiplication 123456789 X 987654321 press =
	Expected Result: Calculation completes in under 1 second	
	Actual Result: Calculation completed in 0.8 seconds **(Pass)**	
TC72	**Usability Testing**	**Steps:** Test how easy and intuitive the calculator is to use and evaluate the overall user experience, navigation, and interface clarity.
	Expected Result: App UX should be easy to use in all functions without unnecessary steps	
	Actual Result: App UX is easy to use in all functions without unnecessary steps **(Pass)**	