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**Software Engineer II Project**

1) Goal of the project:

* Create a scientific calculator that performs standard arithmetic operations, high-level mathematics, Binary and Hexadecimal conversions, and their operations.
* The calculator has a Graphical User Interface that is user-friendly and easy to use.

2) Potential Users:

* This calculator is made with the intent to help a range of users from college students to store owner.
* Anyone who needs to calculate and perform arithmetic operations can benefit from the standard calculator operations.
* The higher math procedures can help high school and college students who are taking Math classes.
* Finally, the functions to convert and perform arithmetic operations on Binary and Hexadecimal can be beneficial for students major in Computer Science, Computer Engineering, Electrical Engineering and even the professionals in those fields.

3) implemented functionalities (use cases) by the project (each functionality (use case) needs to be described in one paragraph):

* The standard mathematical operations consist of five operations. The first is an addition function where the first input and second input are taken as “X” and “Y” values. They are then added together and then result of the addition is shown in the GUI. The second is a subtraction function where the first input and second input are taken as “X” and “Y” values. "X” is then subtracted by “Y” and then result of the subtraction is shown in the GUI. The third is a multiplication function where the first input and second input are taken as “X” and “Y” values. They are then multiplied together and then result of the multiplication is shown in the GUI. The second is a division function where the first input and second input are taken as “X” and “Y” values. "X” is then divided by “Y” and then result of the division is shown in the GUI. The fifth is an absolute value function where the first input is taken as the “X” value. The unsigned or positive value of "X” is then taken and the result is shown in the GUI.
* The higher mathematical operations consist of ten operations with the result of each operation being displayed in the GUI. The first is a square function where the first input is taken as the “X” value, squared and then result is shown in the GUI. The second operation is an exponential function where the first input “X” is a value which is raised to the “nth” power where “nth” refers to the second input’s value (“n”). The third operation is the value 10 raised to a “nth” power where “nth” refers to the value from the first input. The fourth operation is a logarithmic function where the first input is logarithmized with base 10. The fifth operation is the natural logarithm function where the first input is logarithmized with base being euler’s number “e”. The sixth operation is a trigonometric function which takes the first input value in radians and finds the sine of that value in radians. The seventh operation is also a trigonometric function which takes the first input value in radians and returns the cosine of that value in radians. The eighth operation is the last trigonometric function which takes the first input “X” in radians and finds the tangent of that value in radians. The ninth operation is a square root function which takes the first input “X” and finds the square root of that value. The last operation is also a root function which takes the first input “X” and the second input “n” and finds the “nth” root of “X” and returns the value. These higher mathematical functions are only compatible with decimal values.
* The function to convert and perform arithmetic operations on Binary and Hexadecimal number consists of ten operations. The first functionality is converting a Binary number to a Decimal number. When user press the “Bin2Dec” button, this function is activated as the first input is taken as a Binary number and converted into a Decimal, and the result is shown in the result text field. The second functionality is converting a Binary number to a Hexadecimal number. Similarly, when user press the “Bin2Hex” button, this function is activated. The first input is then taken as a Binary number and converted into a Hexadecimal, and the result is shown in the result text field. The third functionality is converting a Decimal number to a Binary number. When user press the “Dec2Bin” button, this function is activated. The first input is then taken as a Decimal number and converted into a Binary number, and the result is shown in the result text field. The fourth functionality is converting a Decimal number to a Hexadecimal number. When user press the “Dec2Hex” button, this function is activated. The first input is then taken as a Decimal number and converted into a Hexadecimal number, and the result is shown in the result text field. The fifth functionality is converting a Hexadecimal number to a Binary number. When user press the “Hex2Bin” button, this function is activated. The first input is then taken as a Hexadecimal number, converted into a Decimal number, and then finally converted into a Binary number, and the result is shown in the result text field. The sixth functionality is converting a Binary number to a Hexadecimal number. When user press the “Bin2Hex” button, this function is activated. The first input is then taken as a Binary number, converted into a Decimal number, and then finally converted into a Hexadecimal number, and the result is shown in the result text field. The seventh functionality is performing addition on two Binary numbers. When user press the “Bin Addition” button, this function is activated. The first input and second input are then taken as Binary values, converted into Decimal numbers, added together, and then finally converted into Binary numbers. The result is then shown in the result text field. The eighth functionality is performing subtraction on two Binary numbers. When user press the “Bin Subtraction” button, this function is activated. The first input and second input are then taken as Binary values, converted into Decimal numbers, then the first input is subtracted by the second input, and finally they are converted back into Binary numbers. The result is then shown in the result text field. The ninth functionality is performing addition on two Hexadecimal numbers. When user press the “Hex Addition” button, this function is activated. The first input and second input are then taken as Hexadecimal values, converted into Decimal numbers, added together, and then finally converted back into Hexadecimal numbers. The result is then shown in the result text field. The tenth functionality is performing subtraction on two Hexadecimal numbers. When user press the “Hex Subtraction” button, this function is activated. The first input and second input are then taken as Hexadecimal values, converted into Decimal numbers, then the first input is subtracted by the second input, and finally they are converted back into Hexadecimal numbers. The result is then shown in the result text field.

4) The GitHub link of the project:

* <https://github.com/SoftEng-2-aramin/soft2project>

5) Contribution of each teammate. Who implemented what part?

* We designed and created the GUI together.
* Alex White implemented the Standard Mathematical operations. (username: whitelunick)
* Faus Palting implemented the Higher Mathematical operations. (username: fauspa, fpalting)
* Vu Pham implemented the function to convert and perform arithmetic operations on Binary and Hexadecimal number. (username: vupham272)