This program performs Advanced Boolean Algebra like Shannon Co-factoring, Boolean Difference, Consensus, Smoothing function on a given SOP for the entered splitting variable.

The program contains two parts - Finding the Shannon cofactors and the finding the rest.

Common input for both parts is the SOP function.

Shannon Co-factoring:

To find the co-factor, a variable or a cube can be entered as input. For example, sample output:

"This program is to generate shanon co-factors of a given Boolean function.

Boolean function is given as a CSV file with rows as cubes and coloumns as literals.

For uncomplemented literal, represent using lower case and for complemented literal, represent using upper case.

Enter the function: abc+Abc+aBc+abC

Enter splitting variable/cube: AB

f_AB = 0"

Another example:

"This program is to generate shanon co-factors of a given Boolean function.

Boolean function is given as a CSV file with rows as cubes and coloumns as literals.

For uncomplemented literal, represent using lower case and for complemented literal, represent using upper case.

Enter the function: ab+Bcd+bD+ABD+ad

Enter splitting variable/cube: D

f_D = ab+b+AB"

Other functions:

After finding co-factors, it asks again for the splitting variable. Now only one variable needs to be entered. For example:

"Continue with finding Boolean difference, Consensus and Smoothing function. Enter the splitting variable: b

Boolean difference of the function with respect to b is: (ac+Ac+aC)^(ac)

Consensus of the function with respect to b is: ac

Smoothing function of the function with respect to b is: ac+Ac+aC"

Another example:

"Continue with finding Boolean difference, Consensus and Smoothing function. Enter the splitting variable: D

Boolean difference of the function with respect to D is: (ab+b+AB)^(ab+Bc+a)

Consensus of the function with respect to D is: ba+BcA

Smoothing function of the function with respect to D is: ab+b+AB+Bc+a"

Further, the functions can be modified to simplify the final results using basic Boolean algebra. The XOR function can be expanded and further simplified.