LAB 05

TITLE:

SIMPLIFY BOOLEAN EXPRESSION TO MINIMUM NUMBER OF LITTERALS.

OBJECTIVES:

Make large Boolean expression to small ones by applying different laws to solve them easily.

EQUIPMENTS:

AND IC (7408)

OR IC (7432)

NOT (7304)

1. **AB+A(B+C)+B(B+C)**

   sol:

   AB+AB+AC+BB+BC

   AB+AC+B+BC

   A(B+C)+B(1+C)

   AB+AC+B

   B(A+1)+AC

   B+AC (Reduced)

TRUTH TABLE OF ORIGNAL EQUATION:

A	B	C	AB	B+C	A(B+C)	B(B+C)	AB+A(B+C)+B(B+C)
0	0	0	0	0	0	0	0
0	0	1	0	1	0	0	0
0	1	0	0	1	0	1	1
0	1	1	0	1	0	1	1
1	0	0	0	0	0	0	0
1	0	1	0	1	1	0	1
1	1	0	1	1	1	1	1
1	1	1	1	1	1	1	1

TRUTH TABLE OF REDUCED EQUATION:

A	B	C	AC	B+AC
0	0	0	0	0
0	0	1	0	0
0	1	0	0	1
0	1	1	0	1
1	0	0	0	0
1	0	1	1	1
1	1	0	0	1
1	1	1	1	1

2. AB+AC(D+D$^{/}$)

sol:

AB+AC

A(B+C) (Reduced)

TRUTH TABLE OF RIGNAL EQUATION:

A	B	C	D	D$^{/}$	AB	AC	D+D$^{/}$	AC(D+D$^{/}$)	AB+AC(D+D$^{/}$)
0	0	0	0	1	0	0	1	0	0
0	0	0	1	0	0	0	1	0	0
0	0	1	0	1	0	0	1	0	0
0	0	1	1	0	0	0	1	0	0
0	1	0	0	1	0	0	1	0	0
0	1	0	1	0	0	0	1	0	0
0	1	1	0	1	0	0	1	0	0
0	1	1	1	0	0	0	1	0	0
1	0	0	0	1	0	0	1	0	0
1	0	0	1	0	0	0	1	0	0
1	0	1	0	1	0	1	1	1	1
1	0	1	1	0	0	1	1	1	1
1	1	0	0	1	1	0	1	0	1
1	1	0	1	0	1	0	1	0	1
1	1	1	0	1	1	1	1	1	1
1	1	1	1	0	1	1	1	1	1

TRUTH TABLE OF REDUCED EQUATION:

A	B	C	B+C	A(B+C)
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	1	0
1	0	0	0	0
1	0	1	1	1
1	1	0	1	1
1	1	1	1	1

3-ABC+A'+ABC'

Simplification:

=AB(C+C')+A'

=AB+A'

TRUTH TABLE:

A	B	C	A'	C'	ABC	ABC'	ABC+A'+ABC'
0	0	0	1	1	0	0	1
0	0	1	1	0	0	0	1
0	1	0	1	1	0	0	1
0	1	1	1	0	0	0	1
1	0	0	0	1	0	0	0
1	0	1	0	0	0	0	0
1	1	0	0	1	0	1	1
1	1	1	0	0	1	0	1

AB	AB+A'
0	1
0	1
0	1
0	1
0	0
0	0
1	1
1	1

LOGIC Diagram:

CONCLUSION:

we observed that the choice of simplification method can significantly impact the resulting expression, and in some cases, manual manipulation might be more effective than automated algorithms. Additionally, we learned the importance of identifying redundant terms and exploiting algebraic properties to achieve the most concise form.