Boolean Algebra

L.O.: To understand the rules of Boolean algebra and De Morgan’s Law

|  |  |
| --- | --- |
| A.B = B.A | The order in which two variables are ANDed makes no difference |
| A+B = B+A | The order in which two variables are ORed makes no difference |
| A.0 = 0 | A variable ANDed with 0 equals 0 |
| A+1 = 1 | A variable ORed with 1 equals 1 |
| A+0 = A | A variable ORed with 0 equals the variable |
| A.1 = A | A variable ANDed with 1 equals the variable |
| A.A = A | A variable ANDed with itself equals the variable |
| A+A = A | A variable ORed with itself equals the variable |
| A.Ā = 0 | A variable ANDed with its inverse equals 0 |
| A+ Ā = 1 | A variable ORed with its inverse equals 1 |
| Ā = A | A variable that is double inversed equals the variable |
| (A.B).C = A.(B.C) | It makes no difference how the variables are grouped together when ANDed |
| (A+B)+C = A+(B+C) | It makes no difference how the variables are grouped together when ORed |
| A.(B + C) = A.B + A.C | The expression can be distributed or factored out meaning that variables can be moved in and out of brackets either side of the expression. In English, this expression would be A AND (B OR C) = (A AND B) OR (A AND C). |

# De Morgan’s Law

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  |  |  | | --- | --- | --- | | A | B | Q | | 0 | 0 | 0 | | 0 | 1 | 1 | | 1 | 0 | 1 | | 1 | 1 | 1 | |
|  | |  |  |  | | --- | --- | --- | | A | B | Q | | 0 | 0 | 0 | | 0 | 1 | 0 | | 1 | 0 | 0 | | 1 | 1 | 1 | |