| Boolean Algebra Rules |  |
| :---: | :---: |
| $A+0=A$ |  |
| $A+1=1$ |  |
| $\mathrm{A} \times 0=0$ |  |
| $\mathrm{A} \times 1=\mathrm{A}$ |  |
| $A+A=A$ |  |
| $A+A^{\prime}=1$ |  |
| $A \times A=A$ |  |
| $A \times A^{\prime}=0$ |  |
| $\mathrm{A}^{\prime \prime}=\mathrm{A}$ |  |
| $A+A^{\prime} B=A+B$ |  |
| $A+A B=A(1+B)=A(1)=A$ |  |
| $(\mathrm{A}+\mathrm{B})(\mathrm{A}+\mathrm{C})=\mathrm{A}+\mathrm{BC}$ |  |
| $A+B=B+A$ |  |
| $A B=B A$ |  |
| $A+B+C=A+(B+C)$ |  |
| $A(B+C)=A B+A C$ |  |
| Laws |  |
| Communative Law | $A \times B=B \times A$ |
|  | $A+B=B+A$ |
| Associative Law | $A \times(B \times C)=(A \times B) \times C$ |
|  | $A+(B+C)=(A+B)+C$ |
| Distributive Law | $A \times(B+C)=A \times B+A \times C$ |
|  | $A+B \times C=(A+B)(A+C)$ |


| DeMorgan Rules |
| :--- |
| $(A B)^{\prime}=A^{\prime}+B^{\prime}$ |
| $(A+B)^{\prime}=A^{\prime} B^{\prime}$ |
| $Y^{\prime}=A^{\prime} \times B \times C$ |
| $Y=\left(A^{\prime} \times B \times C\right)^{\prime}$ |
| $Y=A \times B^{\prime} \times C^{\prime}$ |
| $(A \times B \times C)^{\prime}=A^{\prime}+B^{\prime}+C^{\prime}$ |
| $(A+B+C)^{\prime}=A^{\prime} \times B^{\prime} \times C^{\prime}$ |


| Theorems |  |
| :--- | :--- |
| Theorem 1 | $\mathrm{X}+\mathrm{X} \cdot \mathrm{Y}=\mathrm{X}$ |
| Theorem 2 | $\mathrm{X}+\mathrm{X}^{\prime} \cdot \mathrm{Y}=\mathrm{X}+\mathrm{Y}$ |
| Theorem 3 | $\mathrm{X} \cdot \mathrm{Y}+\mathrm{X}^{\prime} \cdot \mathrm{Z}+\mathrm{Y} \cdot \mathrm{Z}=\mathrm{X} \cdot \mathrm{Y}+\mathrm{X}^{\prime} \cdot \mathrm{Z}$ |
| Theorem 4 | $\mathrm{X}(\mathrm{X}+\mathrm{Y})=\mathrm{X}$ |
| Theorem 5 | $\mathrm{X}\left(\mathrm{X}^{\prime}+\mathrm{Y}\right)=\mathrm{X} \cdot \mathrm{Y}$ |
| Theorem 6 | $(\mathrm{X}+\mathrm{Y})\left(\mathrm{X}+\mathrm{Y}^{\prime}\right)=\mathrm{X}$ |
| Theorem 7 | $(\mathrm{X}+\mathrm{Y})\left(\mathrm{X}^{\prime}+\mathrm{Z}\right)=\mathrm{X} \cdot \mathrm{Z}+\mathrm{X}^{\prime} \cdot \mathrm{Y}$ |
| Theorem 8 | $(\mathrm{X}+\mathrm{Y})\left(\mathrm{X}^{\prime}+\mathrm{Z}\right)(\mathrm{Y}+\mathrm{Z})=(\mathrm{X}+\mathrm{Y})\left(\mathrm{X}^{\prime}+\mathrm{Z}\right)$ |

Binary \& Gray Code

| Decinal mumbers | Binary code | Eray code |
| :--- | :--- | :--- |
| 0 | 0000 | 0000 |
| 1 | 0001 | 0001 |
| 2 | 0010 | 0011 |
| 3 | 0011 | 0010 |
| 4 | 0100 | 0110 |
| 5 | 0101 | 0111 |
| 6 | 0110 | 0101 |
| 7 | 0111 | 0100 |
| 8 | 1000 | 1100 |
| 9 | 1001 | 1101 |
| 10 | 1010 | 1111 |
| 11 | 1100 | 1110 |
| 12 | 1101 | 1010 |
| 13 | 1110 | 1001 |
| 14 | 1111 | 1000 |
| 15 |  |  |

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