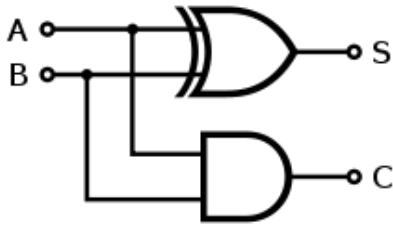


**Assignment 14: Digital Electronics: Adder, Subtractor, K-map**

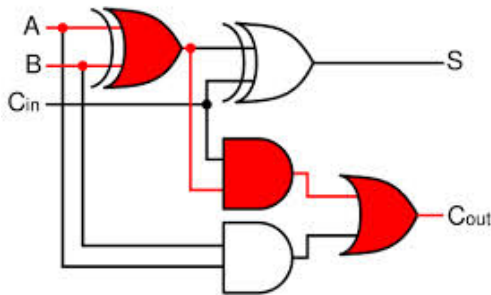
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**Q1: What are binary adders? What are its types?**

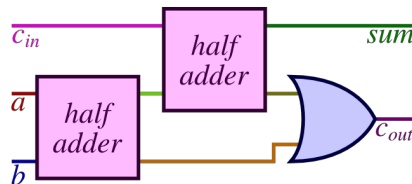
**Q2: What is a half adder? How is it designed? Give its truth table.**



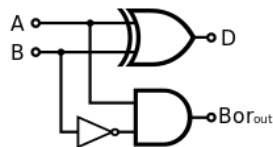
**Q3: What is a full adder? How is it designed? Give its truth table.**



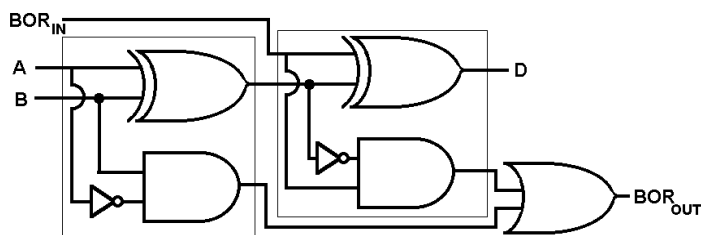
**Q4: Can one design a full adder circuit using two half adder circuits?**



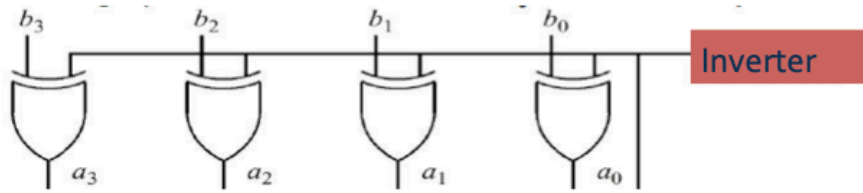
**Q5: What is a half subtractor? How is it designed? Give its truth table.**



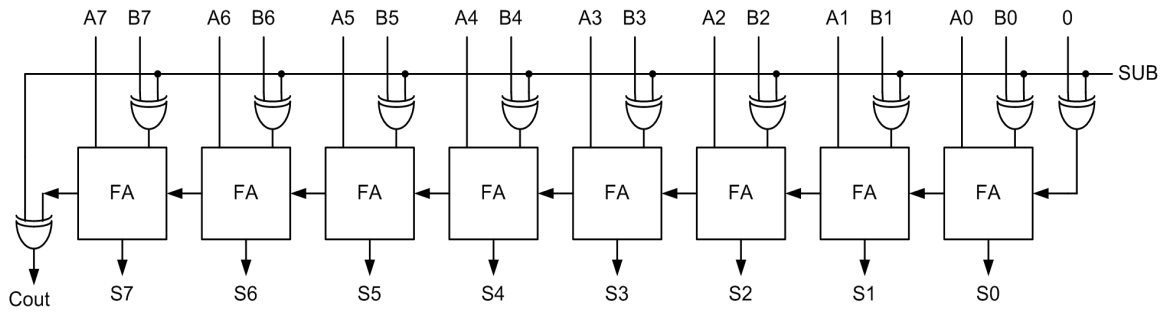
**Q6: What is a Full subtractor? How is it designed? Give its truth table.**



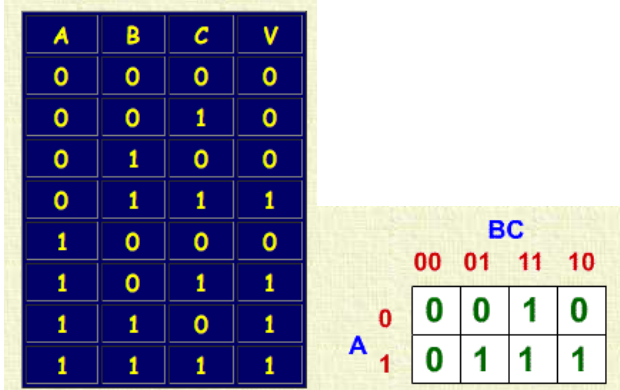
**Q7: What is a controlled inverter? Explain its functioning.**



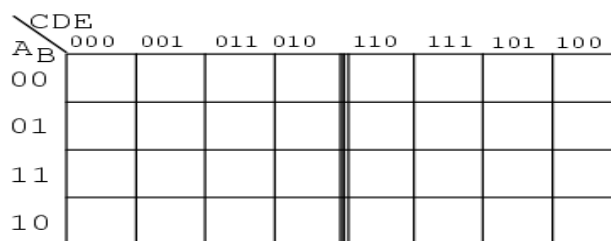
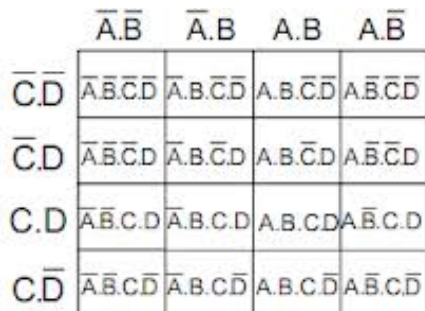
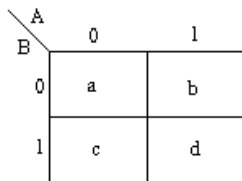
**Q8: What is an 8-bit Adder-Subtractor? Draw its circuit and explain its functioning.**



**Q9: What is Karnaugh Map?**



**Q10: Draw Karnaugh Map, which have 2,3, 4 or more variables.**



**Q11: What is the importance of the use of K-maps?**

**Q12: Name two ways of using a Kanough Map and explain them.**

**Q13: What is the method of writing Boolean Expression using K-map?**

**14: Explain rules of simplification in a K-map.**

**Q15: Make a K-Map for following given outputs and reduce them.**

(i)

$$\text{Out} = \overline{A}\overline{B}CD + \overline{A}BCD + ABCD + A\overline{B}CD + AB\overline{C}\overline{D} + AB\overline{C}D + ABC\overline{D}$$

(ii)

$$\text{Out} = \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}C\overline{D} + A\overline{B}\overline{C}\overline{D} + A\overline{B}C\overline{D}$$

(iii)

$$\text{Out} = \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}\overline{C}D + \overline{A}\overline{B}CD + \overline{A}\overline{B}C\overline{D} + A\overline{B}\overline{C}\overline{D} + A\overline{B}\overline{C}D + A\overline{B}CD + A\overline{B}C\overline{D}$$

(iv)

$$\text{Out} = \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}\overline{C}D + \overline{A}\overline{B}CD + \overline{A}\overline{B}C\overline{D} + B\overline{C}\overline{D} + BC\overline{D} + A\overline{B}\overline{C}\overline{D} + A\overline{B}D + A\overline{B}C\overline{D}$$

(v)

$$\text{Out} = \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}C\overline{D} + A\overline{B}\overline{C}\overline{D} + ABCD$$