CS232 Week3 Q1

Vedang Dhirendra Asgaonkar 200050154

January 2022

1 Design of One Bit Half Adder

We have the following formulae for sum and carry:

$$sum = a \oplus b$$
$$cout = a \cdot b$$

2 Design of One Bit Full Adder

We first add a and b using the one bit half adder. Then, to its sum we add the cin using the one bit half adder to produce the sum. We use the fact that only one of these additions produce a carry, and OR together the carries to make the cout.

$$sum1, carry1 = \text{OneBitHalfAdd}(a, b)$$
$$sum, carry2 = \text{OneBitHalfAdd}(cin, sum1)$$
$$cout = carry1 + carry2$$