Truth table for 1-bit full adder:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Inputs | | | Outputs | |
| X | Y | Carry-In | Sum | Carry-Out |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 1 |
| 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 |

**Table 1:** K-Map for sum

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| AB C | 00 | 01 | 11 | 10 |  |
| 0 | 0 | 1 | 0 | 1 | Sum = X0’X1’X2 + X0’X1X2’ + X0X1X2 + X0X1’X2’ | |
| 1 | 1 | 0 | 1 | 0 |  |

**Table 2:** K-Map for Carry-out

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| AB C | 00 | 01 | 11 | 10 |  |
| 0 | 0 | 0 | 1 | 0 | Y0 = X1X2 + X0X1 + X0X2 | |
| 1 | 0 | 1 | 1 | 1 |  |

4-Bit full adder circuit:

Chart, diagram, box and whisker chart

Description automatically generated