|  |  |  |  |
| --- | --- | --- | --- |
| inputs |  | outputs |  |
| A | B | SUM | CARRY |
| 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |

TRUTH TABLE FOR HALF ADDER

Sum= A xor B

Carry= A and B

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | INPUTS |  | OUTPUTS |  |
| A | B | C IN | SUM | C 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 |

TRUTH TABLE FOR FULL ADDER

Sum= A xor B xor Cin

C out= AB + BCin + ACin

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | DIFFRANCE | BORROW |
| 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |

TRUTH TABLE FOR HALF SUBTRACTER

DIFFRANCE= A xor B

BORROW= A’B

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | INPUT |  | OUTPUT |  |
| A | B | Cin | Difference | Borrow |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 |

Difference= A’B’Cin + AB’Cin’+ A’BCin’ + ABCin

Borrow= A’Cin + A’B + BCin