2.4 Boolean Logic

Truth tables show all possible input permutations and the corresponding outputs for a logic system. If a logic system has n inputs, it will have 2^n possible input permutations. This equals the number of rows in the truth table, for example with three inputs it will have 2^3 = 2 × 2 × 2 = 8 rows

A NOT gate reverses the input given to it. If a 0 is input, a 1 will be output and vice versa

A	P
0	1
1	0

The diagram used to denote a NOT gate is shown in Figure 2.4.2.

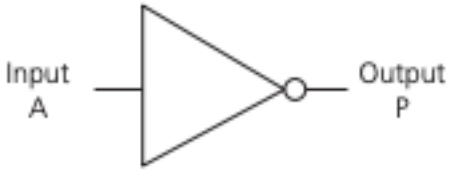

Figure 2.4.2 A NOT gate

An AND gate gives a 1 output only if both inputs are 1s. Any other inputs (0,0 / 0,1 / 1,0) give a 0 output.

A	B	P
0	0	0
0	1	0
1	0	0
1	1	1

The diagram used to denote an AND gate is shown in Figure 2.4.3.

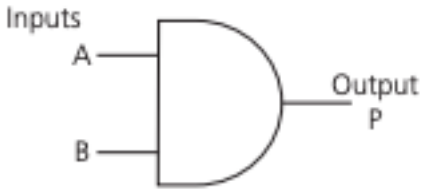

Figure 2.4.3 An AND gate

An OR gate gives a 1 output if either (or both) inputs are 1s. If both inputs are 0s, the output will be 0

A	B	P
0	0	0
0	1	1
1	0	1
1	1	1

The diagram used to denote an OR gate is shown in Figure 2.4.4.

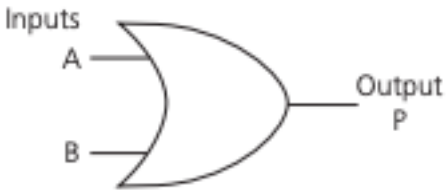

Figure 2.4.4 An OR gate

Combining Gates

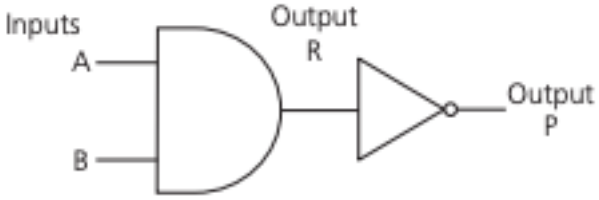

Figure 2.4.5 An AND gate connected to a NOT gate

A	B	R = (A AND B)	P = (NOT R)
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0