Topic 18 Logic – Summary

Vocabulary

command (n): an instruction given to a computer program or operating system to perform a specific task.

boolean (adj): anything that relates to, uses, or operates on the two-state (`true` / `false`) logic.

condition (n): an expression that evaluates to either `true` or `false`. A condition is used to control the flow of execution in a program by deciding whether a certain block of code should run or not. A condition is used in statements containing `if`, `while`, and `for`, etc.

truth table (n): a table showing all the possible combinations of inputs and outputs of an operator or expression.

logic circuit (n): an electronic circuit that performs boolean logic operations on binary inputs to produce binary outputs. It is the physical implementation of boolean algebra.

bug (n): an error or flaw in a computer program.

operator precedence (n): the order in which you apply the operators in a mathematical equation

Concepts

Truth Tables

Be sure you have the truth table for `NOT`, `AND` and `OR` memorized. Although it likely won't be asked on the Pearson exam, the other common logic operator is the `XOR` (exclusive or) operator.

A	B	NOT B	A AND B	A OR B	A XOR B
0	0	1	0	0	0
0	1	0	0	1	1
1	0		0	1	1
1	1		1	1	0

Order of Precedence

If you look at the truth tables for `AND` and `OR`, you'll see that `AND` is similar to multiplication (`0 × 1 = 0`, and `0 AND 1 = 0`, etc.) while `OR` is similar to addition (with the exception that `1 OR 1 = 1` while `1 + 1 = 2`). Remember this will help you memorize the ***order of operations*** as well as the ***distributive law***:

Order of Operations	
1	brackets
2	`NOT`
3	`AND` (×)
4	`OR` (+)

Distributive law

Arithmetic (as you know from math class):

```
a·(b + c) = (a·b) + (a·c)
```

Boolean logic:

```
a AND ( b OR c ) = (a AND b) OR (a AND c)
```