

Boolean algebra summary

The following material is not all covered in BHSawesome and isn't explicitly called out in the AP CSA curriculum. However, the exam may include questions that can be very quickly solved if you are comfortable manipulating boolean expressions and only solved much more tediously by plugging in values and tracing if you are not. If you're shooting for a 5 on the exam, you may want to spend some time with boolean algebra. (Note: = and ≠ below, outside of the Java expressions, are used in their mathematical, not Java, sense.)

Operator precedence

- `()`
- `!`
- `&&`
- `||`

Identities

- `true && a = a`
- `false || a = a`
- `a && a = a`
- `a || a = a`
- `!!a = a`

Tautologies and contradictions

- `a || !a = true`
- `a && !a = false`

Commutative properties

- `a && b = b && a`
- `a || b = b || a`

Distributive properties

- `a && (b || c) = a && b || a && c`
- `a || b && c = (a || b) && (a || c)`

De Morgan's Laws

- `!(a && b) = !a || !b`
- `!(a || b) = !a && !b`

Negations

- `x ≠ !x`
- `a == b ≠ a != b`
- `a != b ≠ a == b`
- `a < b ≠ a >= b`
- `a < b ≠ a >= b`