**Logic and Computer Architecture**

**Boolean Logic: Lesson 1**

Boolean is a manipulation of objects that can take two values, true and false.

X= true

Y= False

Truth tables: AND: if x and y is 1 that it is 1, otherwise if not then it is always going to be 0

A table with numbers and symbols

Description automatically generated

Due to the AND both of x and y are 1 so they have both changed

Because of the AND, rule due to them no being 1 they have not changed at all have stayed the same to 0

Truth tables or: if x or y is 1 that mean it is 1 or both them are 1 it would mean that is 1, otherwise then it would be 0.

A table with numbers and symbols

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Because one of x and y is 1 the output which is x

Negation: if X value is 1 then the value of X would flip to zero.

**Complex Boolean expressions**

**First within the Boolean logical expressions is within the brackets**

**The Next thing within the Boolean logical expressions is do the NOT**

**The next thing later within the Boolean logical expressions is to the AND**

**The last thing within the Boolean logical expressions is to do the OR**

**Boolean Algebra**

In Boolean Algebra we always want to simplify the expressions, so when we get to building the circuits it easier to build the circuits, consume less power and it also able to run faster than the complex circuits.

There are multiple Boolean identities that help us.

Demorgans Law allows us to do negations differently

Boolean Algebra Simplification

Simplify xy+xy

X+X=X

Y+Y=Y

=XY

This is due to impdent law

Karnaugh Maps

Kmaps is a matrix consisting of rows and columns that represent output values of the Boolean functions.

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