

## Lesson 06\_Logic Gates

### Unit: Computer Architecture

#### Lesson Title: Logic Gates Introduction

**IB Syllabus Alignment:** 2.1.11 Define the Boolean operators: AND, OR, NOT, NAND, NOR and XOR. 1  
LINK Introduction to programming, approved notation sheet. 2.1.12 Construct truth tables using the  
above operators

SWBAT/IB Teaching Standard for Assessment.

Do Now / Coding Component (2 minutes Turn-and-Talk) : Discuss and jot down what does  
the following code do and what are the outputs.

```
//parameters a and b can only have the values of 0 or 1
public boolean logic1(int a, int b){

    if(!(a==b)) return true;

    else return false;
}
```

Teaching notes: Reemphasize the input-computing-output components of the task.

#### Part A. Introducing the Lesson (5 minutes)

You can "define" boolean operators by:

1. In a dictionary, Boolean Logic, or Boolean Math way.
2. How they are applied in a specific programming languages like python/java.
3. A truth table.
4. How they operate as actual circuit logic gates.

The details will follow in this assessment statement and the next, but as an overview,  
and as a very useful "second spiral" just before a test/exam, students will analyze and  
research the following questions..

Question:

- (a.) Define the AND boolean operator according to Boolean logic.
- (b.) Define the AND boolean operator as it is used in compound conditions in the Java programming language.
- (c.) Define the AND boolean operator by truth table.
- (d.) Define the AND logic gate used in microprocessors.

Part B. Student Centered Activity. (20 minutes)

Research Tasks (includes ATL Components - Research, Communication, Time Management)

Students in small groups will be assigned to prepare 5-10 minutes discussions on the following topics:

Group 1: Research and discuss the diagram, truth table and operations of the AND gate.

Group 2: Research and discuss the diagram, truth table and operations of the OR gate.

Group 3: Research and discuss the diagram, truth table and operations of the NOT gate.

Group 4: Research and discuss the diagram, truth table and operations of the XOR gate.

Part C. Whole Group Lesson Component /Harkness Protocol (15 minutes)

Each of the groups will present their work in 2-3 minute presentation blocks.

Part D: Assigned reading for next day discussion -

<https://www.anandtech.com/show/1647/10>