Lesson 07_Logic Gates

Unit: Computer Architecture

Lesson Title: Logic Gates truth tables and Diagrams

IB Syllabus Alignment: 2.1.13 Construct a logic diagram using AND,

OR, NOT, NAND, NOR and XOR gates.

SWBAT/IB Teaching Standard for Assessment.
Do Now / Coding Component (2 minutes Turn-and-Talk) :

Play parts of video from: (1) Logic Gates and Truth Tables - YouTube

That summarizes NOT, OR & AND Gates.

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Students must produce a real life example that relates to the 3 gates.

Example given in video: a front doorbell pressed and back door bell pressed similar to OR Gate.

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

Part A. Introducing the Lesson (5 minutes)

Show how the following website works and will help in learning this topic:

Wolfram|Alpha Widget: Boolean Algebra Calculator (wolframalpha.com)

Part B. Student Centered Activity. (20 minutes)

- Students will work in pairs to complete the worksheet to show full understanding of the combination of logic gates with its truth tables.

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: Homework assignment:

Observe the following python code and create a similar code that will represent the OR and XOR gate:

```
def AND (a, b):

    if a == 1 and b == 1:
        return True
    else:
        return False

# Driver code
if __name__=='__main__':
    print(AND(1, 1))

    print("+---------------+----------------+")
    print(" | AND Truth Table | Result |")
    print(" A = False, B = False | A AND B =",AND(False,False)," | ")
    print(" A = False, B = True | A AND B =",AND(False,True)," | ")
    print(" A = True, B = False | A AND B =",AND(True,False)," | ")
    print(" A = True, B = True | A AND B =",AND(True,True)," | ")
```