### 1. Shady Business with Venn Diagrams…

For each of the following Venn Diagrams complete the **inclusion** sentence using words like **IN, NOT, AND**, **OR**, to describe what qualifies for **set membership** in the shaded area(s).

|  |  |  |
| --- | --- | --- |
| a) |  | For example, an element of the shaded area is…**IN (true)** the set **A**Logic Name**: EQU/BUFF/ IN** |
| b) |  | An element of the shaded area is…**NOT IN** the set **A**Logic Name**: NOT/NIN** |
| c) |  | An element of the shaded area is…A **OR** BLogic Name**: OR** |
| d) |  | An element of the shaded area is…**NOT (**A **OR** B)Logic Name**: NOR**Logic Name**:\_\_\_\_\_\_** |
| e) |  | An element of the shaded area is…A **AND** BLogic Name**: AND**Logic Name**:\_\_\_\_\_\_** |
| f) |  | An element of the shaded area is…**NOT (** A **AND** B **)**Logic Name**: NAND** |
| g) |  | An element of the shaded area is…**EXCLUSIVE OR**Logic Name**: XOR** |
| h) |  | An element of the shaded area is…**NOT (EXCLUSIVE OR)**Logic Name**: XNOR** |

### 2. Representing Venn Diagrams as Binary Numbers…

a) In our last class we let set **U** be the **universe** of all RSGC students. Let set **A** stand for the set of all Grade 5 students and set ­­­­**B** be set of students that like *Brussels sprouts*. A really simple way to create a binary number from a Venn Diagram is to let **1** stand for whether someone is in the set and **0** if they are not in the set. Using this strategy the diagram from Question 2 in our previous worksheet can be coded in Binary shown below.

|  |  |
| --- | --- |
| **Venn Diagram of Two Sets** | **Binary Representation of Venn Diagram** |
|  |

|  |  |
| --- | --- |
| **Base 10** | **A B** |
| **0** | **0 0** |
| **1** | **0 1** |
| **2** | **1 0** |
| **3** | **1 1** |

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b) In this next exercise you are asked to extend your understanding of the previous question to include **three** sets.

 You might start by filling in the counting sequence of binary numbers in the **second** column of the table below right, before filling in the equivalent base 10 (decimal) number in the **first** column.

Finally, use your understanding of the previous question to place the correct decimal number in the appropriate coloured region in the Venn Diagram.

|  |  |
| --- | --- |
| **Venn Diagram of Three Sets** | **Binary Representation of Venn Diagram** |
|  |

|  |  |
| --- | --- |
| **Base 10** | **A B C** |
| **0** | **0 0 0** |
|  |  |
|  |  |
|  |  |
|  |  |
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**Reference**: <https://github.com/lawrancej/COMP278-2014/blob/master/lectures/lecture3.adoc>