Task 1: Data Rep. and Boolean logic

Save this document in your repository for Unit 2 with name: **data\_rep\_boolean\_log.md**

## [🤔](https://emojipedia.org/thinking-face/)Resources (Learning Log):

| 4 | [Notes Topic 2:](https://docs.google.com/document/d/16ZTj6Sz8Av3vaKwGk12HYuuz8LbhGmRnWeuu5m2stzU/edit?usp=sharing) | Computer Architecture |
| --- | --- | --- |
| 5 | [Boolean Algebra](https://youtu.be/gI-qXk7XojA) | Video about boolean algebra |
| 6 | [Examples Base Conversion](https://drive.google.com/file/d/158TsjgdWiaaHz3Vsq7dMtlYg0m00bLfe/view?usp=sharing) | Whiteboard notes on conversion of numbers with different bases |

## 

**Boolean Logic**

Draw the circuit for the boolean equations provided

| Boolean Equation | Circuit |
| --- | --- |
| AB+ |  |
|  |  |
| ((not A) and B) or (A and B) |  |
|  |  |
| **[HL]** |  |

**Get the Equation**

Write the boolean equation for the circuit shown

| C = + |
| --- |
| out = \* |
| LED = |

**Truth table**

Write the truth table for the equations below

| Boolean Equation | Truth Table |
| --- | --- |
| X = A and B |  |
| Out = input1 or input2 |  |
| Light = |  |
| PARITY = A⊕B⊕C | #Parity checker |
| **[HL]**  Login = |  |

X = A and B

| A | B | X |
| --- | --- | --- |
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

Out = input1 or input2

| input1 | input2 | Out |
| --- | --- | --- |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

Light =

| S1 | S2 | S3 |  |  |  | Light |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 0 | 0 | 1 |

PARITY = A⊕B⊕C

| A | B | C | A⊕B | A⊕B⊕C |
| --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 | 1 |
| 1 | 0 | 1 | 1 | 0 |
| 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 1 | 0 | 1 |

Login =

|  |  |  |  |  |  |  | Login |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 |
| 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |

**Data Conversion**

Information can be represented in different systems, for example the number 10 in decimal (system base 10) can be represented in binary (system base 2) as 1010 or 12 in base 8.

It is critical for you to understand how to represent information in different ways, this will help you visualize how the computer processes data.

| Original Number | Convert to |
| --- | --- |
| 256 (Decimal) | Base 2 (Binary)  Base 4  Base 6 |
| 433 (Base 5) | Base 10 (Decimal)  Base 8 (Octal)  Base 16 (Hexadecimal) |
| FA32 (Base 16) | Base 10  Base 2  Base 8 |