NOTE: Use of internet is permitted **only** to access software website, calculators are permitted, and your answers must include worked solutions. If you require extra sheet(s) please write your name and student number at the top of each additional sheet.

<https://logic.ly/>

**Part A**

**Objective**

Understand various logic gates

|  |
| --- |
| Draw a labelled Gate Symbol, Functional Notation and truth table for the gates listed in the table below: |
| |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Inputs** | | **Output(s) Truth Table** | | | | | | **A** | **B** | **AND** | **OR** | **XOR** | **NAND** | **NOR** | | **0** | **0** | 0 | 0 | 0 | 1 | 1 | | **0** | **1** | 0 | 1 | 1 | 1 | 0 | | **1** | **0** | 0 | 1 | 1 | 1 | 0 | | **1** | **1** | 1 | 1 | 0 | 0 | 0 | | **Gate**  **Symbol** | |  |  |  |  |  | | **Functional**  **Notation** | |  |  |  |  |  | |

**Part B**

**Objective**

Construct a logic circuit

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Construct the logic circuit below using Lab Logic and detail the functional notation and truth table for a two input **AND** gate.   |  |  |  |  | | --- | --- | --- | --- | |  | Switches | AND Gate | LED Output | |  | | | | |
|  |

**Part C**

**Objective**

Understand the construction of Logic Gates from various combinations of logic gates

|  |  |  |
| --- | --- | --- |
| Using Lab Software prove that combining and **AND** and a **NOT** constructs a **NAND** Gate | | |
|  | | |
| Demonstrated to lecturer | YES | NO |
|  |  |

**Part D**

**Objective**

Understand the construction of Logic Circuits from various combinations of logic gates

|  |  |  |
| --- | --- | --- |
| Write a logic statement that corresponds to the following circuit | | |
|  | | |
| Demonstrated to lecturer | YES | NO |
|  |  |

**Part E**

**Objective**

Understand the construction of Logic Circuits from Logic Statements

|  |  |  |
| --- | --- | --- |
| Draw a logic circuit that represents the following logic statement  **X = 1**  ***if (A is NOT 1 AND B is 1) AND (A is NOT 1 AND C is NOT 1) OR (B is 1 AND C is 1)*** | | |
|  | | |
| Demonstrated to lecturer | YES | NO |
|  |  |

**Part F**

**Objective**

Understand Logic Circuits

|  |  |  |
| --- | --- | --- |
| Complete truth table for the logic circuit below | | |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | **A** | **B** | **C** | Working Space | **X** | | **0** | **0** | **0** |  | **1** | | **1** | **0** | **0** |  | **0** | | **0** | **1** | **0** |  | **1** | | **0** | **0** | **1** |  | **1** | | **1** | **1** | **0** |  | **1** | | **0** | **1** | **1** |  | **1** | | **1** | **0** | **1** |  | **1** | | **1** | **1** | **1** |  | **1** | | | |
| Demonstrated to lecturer | YES | NO |
|  |  |

**Commit practical report at the end of session and ensure it has been checked**

|  |  |  |  |
| --- | --- | --- | --- |
| **Student Name** | **Karolis Grigaliunas** | **Student Number** | **C00287940** |
| **Date** | **18/10/23** | **Checked** |  |
| **Group** | **A / B** |  |  |