**Lab Report No 2**

**Digital Logic Design**



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**Task 1 – 1:**

## **Solution:**

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| **The code** |
|  |
| **The results (Screenshot)** |
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**Task 1 – 2:**

## **Solution:**

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| **The code** |
|  |
| **The results (Screenshot)** |
|  |

**Task 2 – 1:**

## **Solution:**

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| **Brief description (3-5 lines)** |
| Simplification of:  ~ (A and B) and (~A or B) and (~B or B) |
| **The code** |
| ~ (A and B) and (~A or B) and (~B or B)  ~ (A and B) can be simplified using De Morgan's law:  ~ (A and B) = ~A or ~B  So, the expression becomes:  (~A or ~B) and (~A or B) and (~B or B)  (~B or B) can be simplified using the identity law:  ~B or B = 1  So, the expression becomes:  (~A or ~B) and (~A or B) and 1  We can simplify this further using the distributive law:  (~A or ~B) and (~A or B) = ~A  Therefore, the final simplified expression is:  ~A and 1  Which can be further simplified to:  ~A |
| **The results (Screenshot)** |
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**Task 2 – 2:**

## **Solution:**

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| **Brief description (3-5 lines)** |
| Simplification of:  (A or C) and ((A and D) or (A and ~D)) or (A and C) or C |
| **The code** |
| (A or C) and ((A and D) or (A and ~D)) or (A and C) or C  We can simplify this expression using the distributive law:  (A or C) and ((A and D) or (A and ~D)) = A or (C and ((A and D) or (A and ~D)))  So, the expression becomes:  A or (C and ((A and D) or (A and ~D))) or (A and C) or C  We can simplify further using the absorption law:  A or (A and C) = A  So, the expression becomes:  A or (C and ((A and D) or (A and ~D))) or C  We can simplify further using the distributive law again:  (C and ((A and D) or (A and ~D))) or C = C  So, the final simplified expression is:  A or C |
| **The results (Screenshot)** |
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**Task 2 – 3:**

## **Solution:**

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| **Brief description (3-5 lines)** |
| Simplification of:  ~A and (A or B) or (B or (A and A)) and (A or ~B) |
| **The code** |
| ~A and (A or B) or (B or (A and A)) and (A or ~B)  = (~A and A) or (~A and B) or (B or A) and (B or A) and (A or ~B)  = contradiction or (~A and B) or (B or A) and (A or ~B)  = (~A and B) or (B or A) and (A or ~B)  = (B and ~A) or (A and ~B) or (A or B)  = (A or B) |
| **The results (Screenshot)** |
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