Digital Logic Design with Arduino

Spoken Tutorial Project
http://spoken-tutorial.org
National Mission on Education through ICT
http://sakshat.ac.in

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Learning Objectives

- **Implement and verify the AND, OR and XOR operations in assembly**

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- Implement and verify the **AND, OR** and **XOR** operations in assembly

- Implement and verify simple **Combinational Logic**

Pre-requisites

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- **Electronics**

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- **Electronics**
- **Assembly language**

System Requirements

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- **Arduino UNO Board**

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- **Ubuntu Linux operating system 14.04**

External Devices

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- **Breadboard**

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- **Seven Segment Display**

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- **220 ohm Resistor**

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- Jumper Wires

Assignment 1

- Modify the values of **r16** and **r17** to verify the rest of the truth table of **AND**

- Replace the keyword **and** in the program with **or** to perform logical **OR** operation
- Replace the keyword **and** in the program with **xor** to perform logical **XOR** operation

A = W'
B = WX'Z' + W'X
C = WXY' + X'Y + W'Y
D = WXY + W'Z

Truth Table

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Z	Y	X	W	D	C	B	A
0	0	0	0	0	0	0	1
0	0	0	1	0	0	1	0
0	0	1	0	0	0	1	1
0	0	1	1	0	1	0	0
0	1	0	0	0	1	0	1
0	1	0	1	0	1	1	0
0	1	1	0	0	1	1	1
0	1	1	1	1	0	0	0
1	0	0	0	1	0	0	1
1	0	0	1	0	0	0	0

- **Change the values of W, X, Y and Z and verify different rows of the truth table**

Summary

- **Implement and verify the AND, OR and XOR operations in assembly**
- **Implement and verify simple Combinational Logic**

About the Spoken Tutorial Project

- Watch the video available at http://spoken-tutorial.org /What_is_a_Spoken_Tutorial
- It summarises the Spoken Tutorial project
- If you do not have good bandwidth, you can download and watch it

Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- **Conducts workshops using spoken tutorials**
- **Gives certificates to those who pass an online test**
- **For more details, please write to contact@spoken-tutorial.org**

Forum for specific questions

- **Do you have questions in THIS Spoken Tutorial?**
- **Please visit http://forums.spoken-tutorial.org**
- **Choose the minute and second where you have the question**
- **Explain your question briefly**
- **Someone from our team will answer them**

Acknowledgements

- **Spoken Tutorial Project is a part of the Talk to a Teacher project**
- **It is supported by the National Mission on Education through ICT, MHRD, Government of India**
- **More information on this Mission is available at http://spoken-tutorial.org /NMEICT-Intro**