Assembly Programming through Arduino

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

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IIT Bombay

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Learning Objectives

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- **Interface a Seven Segment Display to Arduino board**

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- **Write an assembly program to display a digit on Seven Segment Display**
- **Display a digit on the Seven Segment Display using 7447 IC**

Pre-requisites

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- **Electronics**

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- **Assembly language**

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- Arduino - ATmega328 Pin mapping

System Requirements

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- **Ubuntu Linux operating system 14.04**

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- **Arduino IDE**

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- Decoder (7447 IC)

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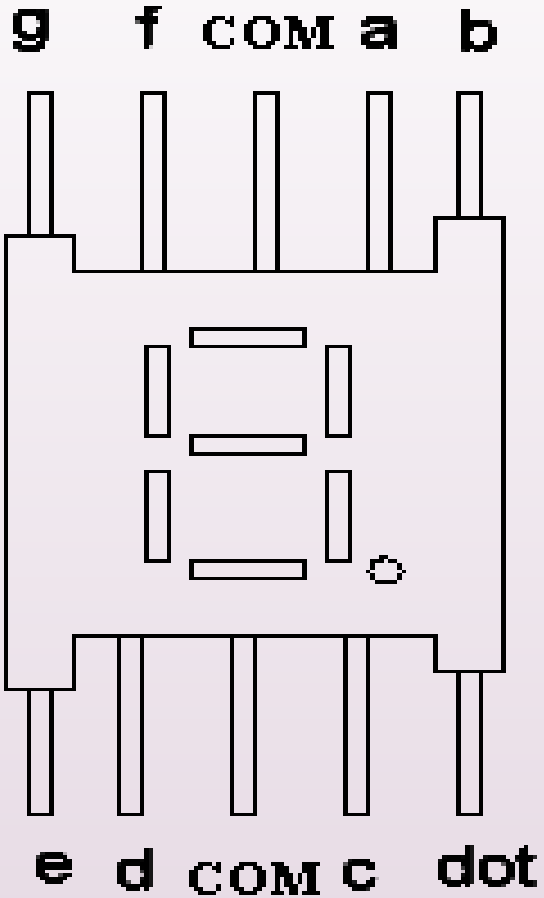
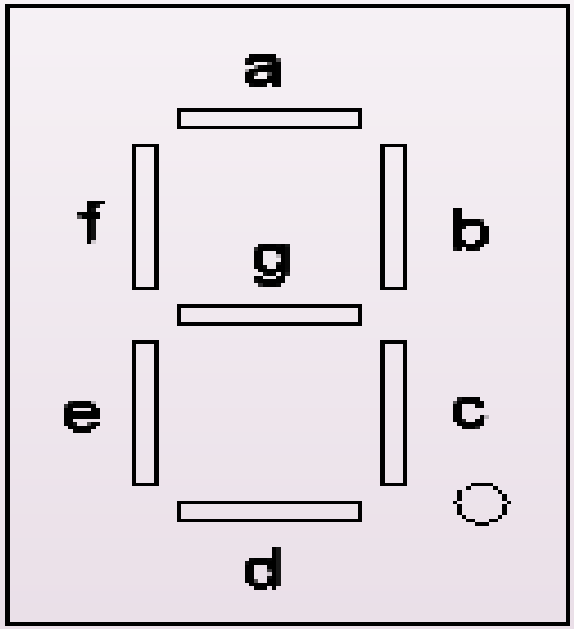
- Jumper Wires

Seven Segment Display

Seven Segment Display





Seven-Segment Display

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- **AVRA** is an assembler that will generate a hex file
- **AVRDUDE** is used to upload any hex file to the Arduino board

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- Download **m328Pdef.inc** file from the **Code files** link of this tutorial

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- This allows the user to use Register and Bit name when writing assembly programs

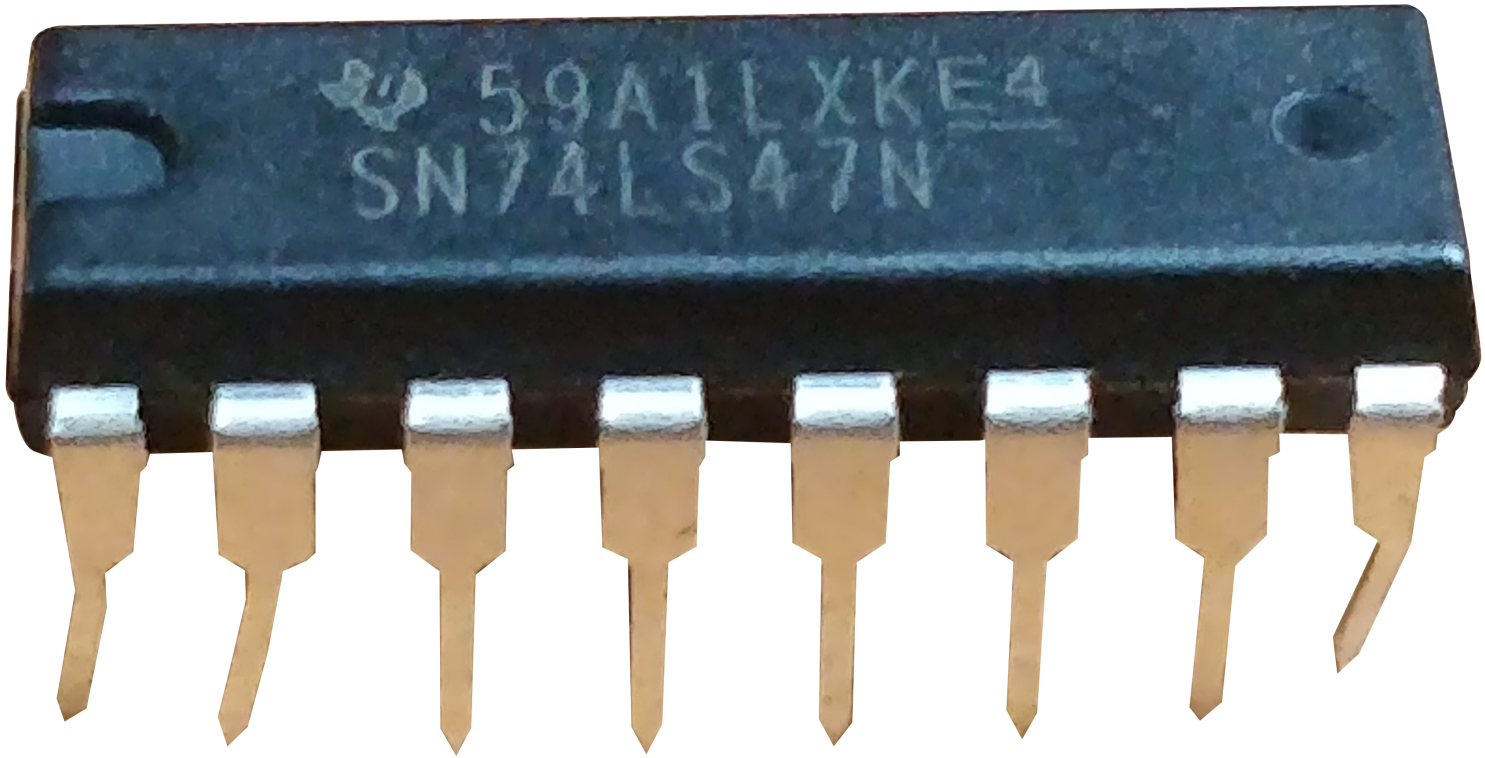
Assignment 1

- **Modify the same code to turn off the dot LED**

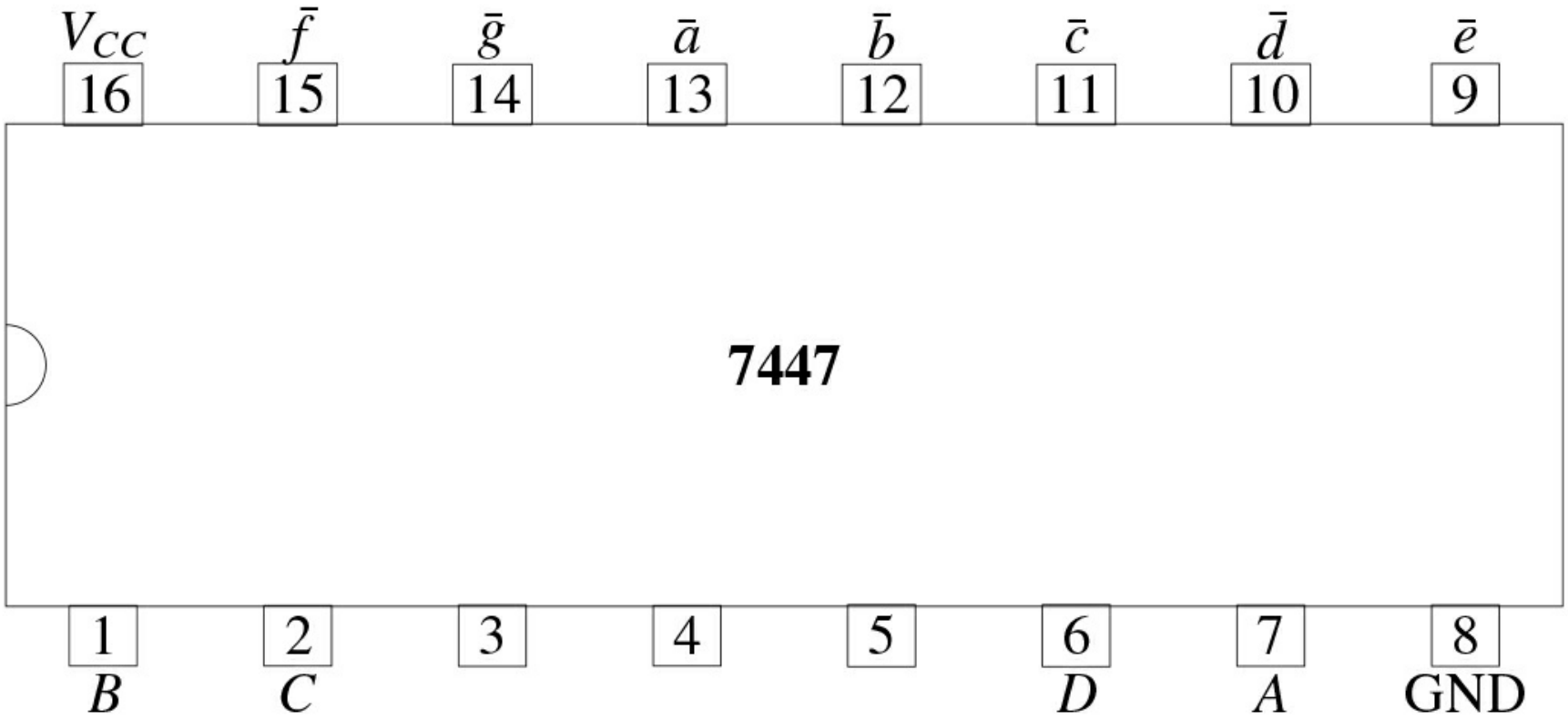
Assignment 2

- **Modify the above code to display any other digit from 0 to 9**

Decoder



7447 IC - Pins


V_{CC}
16
$\bar{f}$
15
$\bar{g}$
14
$\bar{a}$
13
$\bar{b}$
12
$\bar{c}$
11
$\bar{d}$
10
$\bar{e}$
9
7447
1
B
2
C
3
4
5
6
D
7
A
8
GND

Inputs - To display 5

Summary

- Interface a Seven segment Display to Arduino board
- Write an assembly program to display a digit on Seven Segment Display
- Display a digit on the Seven Segment Display using 7447 IC

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