

# AVR-GCC Programming through Arduino

Spoken Tutorial Project

<http://spoken-tutorial.org>

National Mission on Education through ICT

<http://sakshat.ac.in>

Spoken Tutorial & FOSSEE Team  
IIT Bombay

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# Learning Objectives



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- **Interface a Seven segment display to Arduino board**



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- **Interface a Seven segment display to Arduino board**
- **Write an AVR-GCC program to display a digit on Seven segment display**

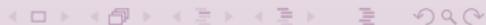


# Learning Objectives

- Interface a **Seven segment display** to **Arduino board**
- Write an **AVR-GCC** program to display a digit on **Seven segment display**
- Display digits **0 to 9** on the **Seven segment**



# Pre-requisites



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- **Electronics**



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- Electronics
- C programming
- AVR-GCC



# System Requirements



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- **Arduino UNO Board**

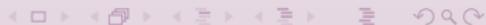


# System Requirements

- **Arduino UNO Board**
- **Ubuntu Linux operating system 14.04**



# AVR-GCC



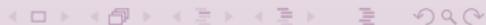
- **GCC stands for GNU Compiler Collection**



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- **It is a compiler which supports various programming languages**



# AVR-GCC



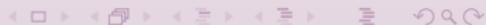
- **AVR-GCC is a part of GCC and supports compiling C programs for AVR microcontrollers**



- **AVR-GCC is a part of GCC and supports compiling C programs for AVR microcontrollers**
- **Since Arduino uses ATMEGA328P, this is a suitable compiler**



# External Devices



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- **Seven Segment Display**



# External Devices

- **Seven Segment Display**
- **220 ohm Resistor**



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- **Breadboard**



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- **Seven Segment Display**
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# External Devices

- **Seven Segment Display**
- **220 ohm Resistor**
- **Breadboard**
- **Arduino UNO Board**
- **Jumper Wires**



# Software Setup



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- We need to install **AVR-GCC** assembler and a **AVR-LIBC** library



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- **AVR-GCC** will generate a hex file and upload it to Arduino board



# Software Setup

- We need to install **AVR-GCC** assembler and a **AVR-LIBC** library
- **AVR-GCC** will generate a hex file and upload it to Arduino board
- **AVR-LIBC** contains the required library files that can be used in the program



# Make file for ATmega328P



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- Download the file **Makefile** from the **Code files** link of this tutorial



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# Make file for ATmega328P

- Download the file **Makefile** from the **Code files** link of this tutorial
- **Makefile** enables us to create a .hex file and upload it to Arduino
- Save the **Makefile** in the folder where you will be saving the C program



# Assignment

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



# Summary

- **Interface a Seven segment display to Arduino board**
- **Write an AVR-GCC program to display a digit on Seven segment display**
- **Display digits 0 to 9 on the Seven segment display**



# About the Spoken Tutorial Project

- Watch the video available at [http://spoken-tutorial.org/What\\_is\\_a\\_Spoken\\_Tutorial](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](mailto: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>

