

AVR-GCC Programming through Arduino

Spoken Tutorial Project

<http://spoken-tutorial.org>

National Mission on Education through ICT

<http://sakshat.ac.in>

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12 Febraury 2018



Learning Objectives



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- Interface a Seven segment display to Arduino board



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- Write an AVR-GCC program to display a digit on Seven segment display



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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
- Display digits 0 to 9 on the Seven segment



Pre-requisites



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To follow this tutorial, you should have basic knowledge of:



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- **Electronics**



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To follow this tutorial, you should have basic knowledge of:

- **Electronics**
- **C programming**
- **AVR-GCC**



System Requirements



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- **Arduino UNO Board**



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



AVR-GCC



- **GCC stands for GNU Compiler Collection**



AVR-GCC

- **GCC stands for GNU Compiler Collection**
- **It is a compiler which supports various programming languages**



AVR-GCC



AVR-GCC

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



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- 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**



External Devices

- Seven Segment Display
- 220 ohm Resistor
- Breadboard



External Devices

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



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
- 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>

