WinAVR 的背景

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Background 背景

GCC is a language compiler. It compiles various computer languages to the assembly language of a specific microprocessor target. In WinAVR, GCC can compile C and C++ to AVR assembly.

GCC 是一个编译器，它可以将多种语言编译成特定处理器的汇编代码。在 WinAVR 中，GCC 可以将 C/C++编译成 AVR 汇编。

GNU as (commonly referred to as gas) is the assembler. gas is configured to assemble a specific microprocessor assembly language into object code. In WinAVR, gas can assemble AVR assembly code into object code.

GNU as（通常称为 gas）是汇编器，它用来将特定处理器的汇编语言转化成目标代码。在 WinAVR 中，gas 可以将 AVR 汇编转化成目标代码。

GNU ld is the linker. In WinAVR, ld can link the resulting compiled object code and libraries into a final binary file. This binary file is in the ELF file format.

GNU ld 是连接器。在 WinAVR 中，ld 可以将编译出来的目标代码和库文件连接成最终的二进制文件。这里的二进制文件使用 ELF 文件格式。

GCC is also a "driver" program. GCC can automatically call gas (the assembler) and ld (the linker). GCC cannot build the final software without gas and ld.

GCC 同时还是一个“驱动”程序，它可以自动地调用 gas（汇编器）和 ld（连接器）。如果没有 gas 和 ld，GCC 并不能独自生成最终的软件产品。

GCC comes from one package of open source software. gas and ld are from a seperate, but tied, package of open source software called GNU Binutils (binary utilities).

GCC 是开源软件中的一个软件包，而 gas 和 ld 则来自开源软件的另一个独立的却又相关的 GNU Binutils（二进制工具）软件包。

Also in Binutils are other programs that are vital to creating software, such as objcopy wich can convert ELF files to other useful files such as Intel Hex or Motorola Hex files. Binutils contains ar which is used to create object code libraries (called archives).

Binutils contains the program size which is used to report various size information on the ELF or hex files. Because the WinAVR Binutils is configured for the AVR processor, all of its programs are prefixed with 'avr-'. This means that the WinAVR Binutils contains the programs: avr-as, avr-ld, avr-ar, avr-size, avr-objcopy, etc.

在 Binutils 中还有另外一些对创建软件十分重要的程序，比如 objcopy 可以将 ELF 文件转化为 Intel HEX 或者 Motorola HEX 等其它有用的文件格式，ar 则可以管理目标代码库（archives）， size 程序可以依据 ELF 文件或者 HEX 文件报告变量的大小的信息。因为 WinAVR 二进制工具被配置成用在 AVR 上，所有这些程序的名称都被加上了“avr-”的前缀，也就是说 WinAVR 二进制工具包括如下的一些程序：avr-as、avr-ld、avr-ar、avr-size、avr-objcopy 等等。

AVRLibC is another open source package that provides a Standard C Libraryfor the GCC compiler specifically for the AVR. With this project comes a lotof documentation on how to use the GCC toolset and the AVRLibC library toproduce software for the AVR. Don't forget to RTFM! :-)

AVRLibC 是另一个开源软件，它用来给 AVR 的 GCC 编译器提供标准 C 库。在这个工程中带了许多文档，说明了如何使用 GCC 工具和 AVRLibC 库来为 AVR 开发软件。不要忘记去阅读“讨厌”的手册（RTFM），:-)

There is one program that brings all of this together. This program is GNU make. make executes a makefile. A makefile is a text file that you write that lists and controls how something is made. It is most often used to control how software is made.

有一个程序把软件开发过程中用到的这些东东捆在了一起，它就是 GNU make。make 执行一个 makefile 脚本，它是你自己编写的一个文本文件，在其中列出了控制各玩意儿如何生成的命令行。make 经常被用来管理软件开发。

Each of these programs are Command Line Interface (CLI) tools. They are controlled by parameters or switches that are added to the command line. Or, in the case of make, by text files that are written and used as input.

所有这些程序都是基于命令行（Command Line Interface，CLI）的工具，它们使用命令行中附加的参数或者开关选项来控制程序的行为，或者像 make 那样，要用户编一个文本文件作为程序输入。

Most commercial software development toolsets have an Integrated Development Environment (IDE). This consists of a graphical user-interface (GUI) that contains a programming editor and graphical front-ends to compiler, assembler, linker, standard C library, and librarian programs. These front-ends consist of dialog boxes which allow you to set build options and a way of creating a list of files that are in a "project". These graphical front-ends hide and encapsulate the real command-line

compiler, assembler, linker, and standard library that are in the background of any software development toolset.

大多数商业软件开发工具有一个集成开发环境（Intefrated Development Environment，IDE），它提供一个图形用户接口（Graphical User Interface，GUI），在其中包括了程序编辑器和图形化的前端程序用来和编译器、汇编器、连接器、标准 C 库、建库工具接口。这些前端工具用对话框来让你设定各种选项并将一组文件加入某个“工程”（Project）。这些图形化的前端隐藏和封装了真正的命令行编译器、汇编器、连接器和标准库，而它们正在任何的软件开发工具的后台默默工作着。

WinAVR is a collection of open-source, software development tools from various projects. WinAVR does not have an IDE like a commerical toolset, yet. Because of this, learning to build software under GCC means that it would be best to learn how to use the make program and learn how to write makefiles.Learn the common flags that are used to control GCC which in turn can control gas and ld.

WinAVR 从多个项目中收集了一组开源软件开发工具，然而它不像商业工具那样具有 IDE 界面。 正因如此，学习在 GCC 下开发软件最好首先学习如何编写 makefile 来使用 make 工具，然后学习控制 GCC 的通用命令行选项，进一步学会控制 gas 和 ld。

Especially note that GCC and all GNU programs come from the Unix and Linux platforms. These programs have been ported to the Windows platform but generally behave for a Unix-like environment. If you are not used to a Unix-like environment it can possibly be frustrating. Read as much documentation as you can. Look at examples. Search the Internet. Many links are also provided below.

需要特别注意的是 GCC 和所有的 GNU 程序来自与 Unix 或者 Linux 平台，这些工具被移植到了 Windows 平台上却保留了类似 Unix 的工作环境，如果你不熟悉类似 Unix 环境可能会遭遇挫折。这是你需要阅读尽可能多的文档、研究例子、在 Internet 上搜索，另外本文的最后也提供了一些有用的连接。

Also remember that this software is updated and improved continually by manypeople who volunteer their precious time to provide some of the best software for absolutely no cost or obligation to you.

另外记住这个软件正被许多热心人持续地更新和改进，他们贡献了自己宝贵的时间，提供出最好的软件，然而却不需要你花一分钱和承担任何义务！

Above all, have fun!
就说这么多。乐趣和编程同在！