任务 37：WRTnode 的交叉编译环境

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实验名称：交叉编译　　实验类型：嵌入式开发　　学好：3120101849

一、实验目的

在树莓派或 Acadia 上实现一个 C 语言的交叉编译环境，能编译产生 WRTnode 用的 MIPS 程序。

二、 主要仪器设备

硬件：

- 实验主板一块
- 5V/1A 电源一个
- USB-TTL 串口线一根
- PC（Windows）一台
- 以太网线一根

软件：

- PC 上的 USB-TTL 串口线配套的驱动程序；
- PC 上的串口终端软件 putty；
- PC 上的 SSH 软件 SecureCRT。

三、 实验过程及结果

1. 安装必要的工具，包括 bison、flex、texinfo、ncurses 等

```
root@Acadia:~/temp/buildroot# sudo apt-get install bison
Reading package lists... Done
Building dependency tree
Reading state information... Done
bison is already the newest version.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
```

```
root@Acadia:~/temp/buildroot# sudo apt-get install flex
Reading package lists... Done
Building dependency tree
Reading state information... Done
flex is already the newest version.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
```

```
root@Acadia:~/temp/buildroot# sudo apt-get install texinfo
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  texlive-base texlive-latex-base texlive-generic-recommended
  texinfo-doc-nonfree
The following NEW packages will be installed:
  texinfo
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 432 kB of archives.
After this operation, 1118 kB of additional disk space will be used.
WARNING: The following packages cannot be authenticated!
  texinfo
Authentication warning overridden.
Get:1 http://ports.ubuntu.com/ubuntu-ports/ precise/main texinfo armhf 4.13a.dfs
g.1-8ubuntu2 [432 kB]
Fetched 432 kB in 6s (68.2 kB/s)
Selecting previously unselected package texinfo.
(Reading database ... 87779 files and directories currently installed.)
Unpacking texinfo (from .../texinfo_4.13a.dfsg.1-8ubuntu2_armhf.deb) ...
Processing triggers for man-db ...
Setting up texinfo (4.13a.dfsg.1-8ubuntu2) ...
```

```
root@Acadia:~/temp/buildroot# sudo apt-get install libncurses5-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
libncurses5-dev is already the newest version.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
```

2. 下载 buildroot 包，并用 sftp 传输到实验板

```
sftp> put buildroot-snapshot.tar.bz2
Uploading buildroot-snapshot.tar.bz2 to /root/temp/buildroot-snapshot.tar.bz2
  100% 2948KB   2948KB/s 00:00:00
e:/sftp/buildroot-snapshot.tar.bz2: 3019668 bytes transferred in 0 seconds (2948
 KB/s)
sftp>
```

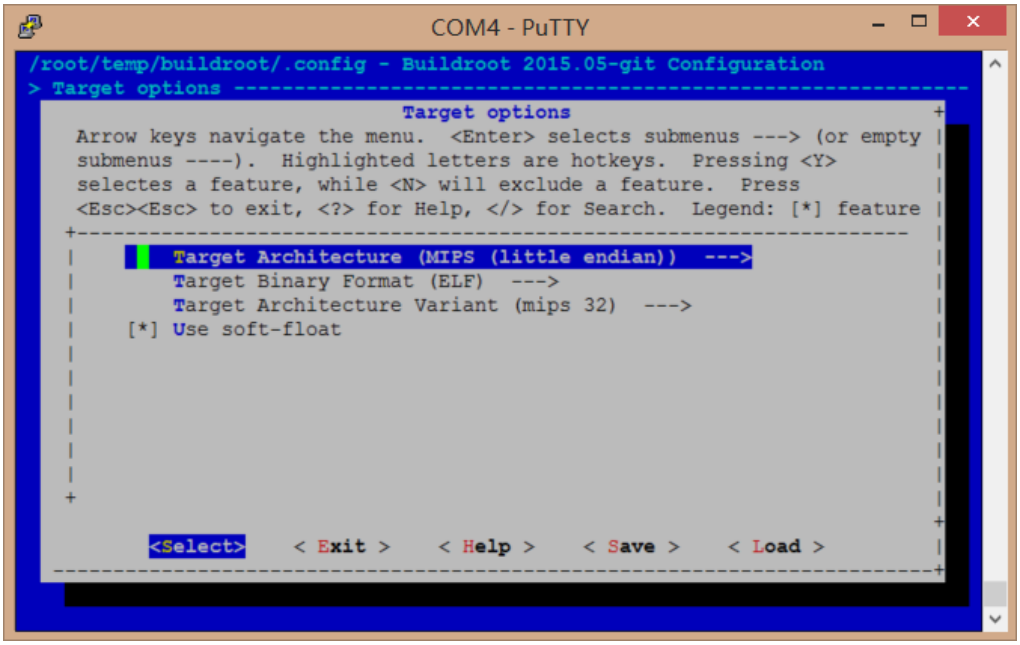
3. 使用 tar 命令解压包

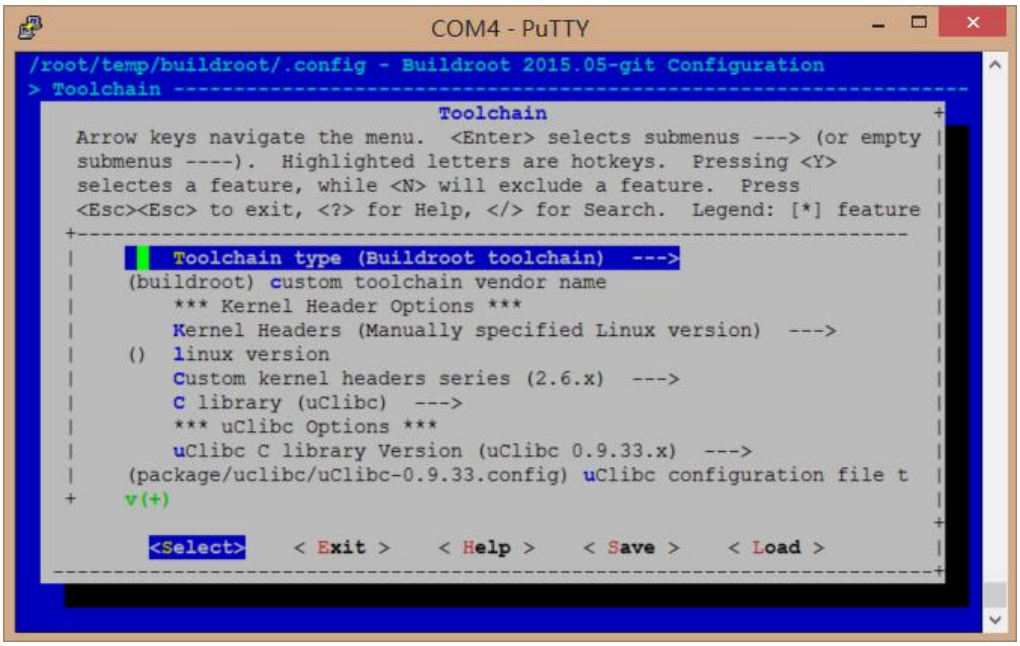
```
root@Acadia:~/temp# ls
buildroot  buildroot-snapshot.tar.bz2
root@Acadia:~/temp# tar -jxvf buildroot-snapshot.tar.bz2
```

4. 进入 buildroot 目录，并执行 make clean

```
root@Acadia:~/temp# cd buildroot
root@Acadia:~/temp/buildroot# ls
CHANGES     Config.in.legacy  README  boot     fs       support
COPYING     Makefile          arch    configs  linux    system
Config.in   Makefile.legacy   board   docs     package  toolchain
root@Acadia:~/temp/buildroot# make clean
rm -rf /root/temp/buildroot/output/target /root/temp/buildroot/output/images /ro
ot/temp/buildroot/output/host \
                /root/temp/buildroot/output/build /root/temp/buildroot/output/st
aging \
                /root/temp/buildroot/output/legal-info /root/temp/buildroot/outp
ut/graphs
root@Acadia:~/temp/buildroot#
```

5. 执行 make menuconfig，选择编译选项

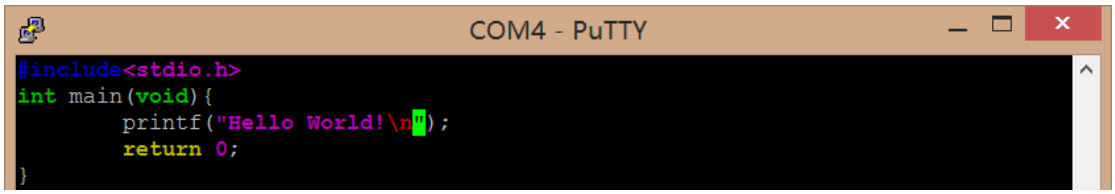




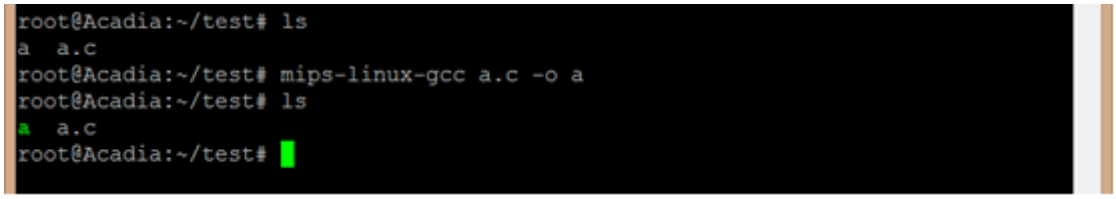
6. 使用 make 进行编译

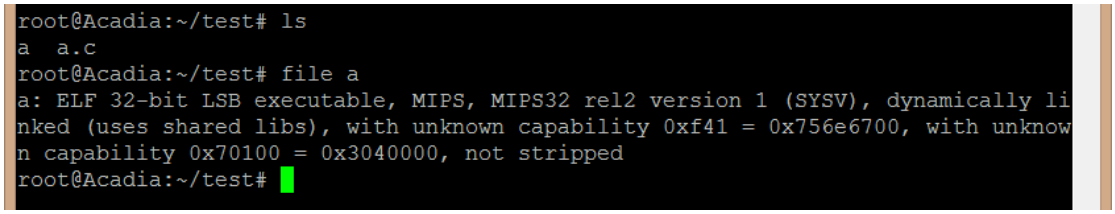
```
root@Acadia:~/temp/buildroot# make
mkdir -p /root/temp/buildroot/output/target
rsync -a --ignore-times --exclude .svn --exclude .git --exclude .hg --exclude .b
zr --exclude CVS \
```

7. 编译结束，编写程序

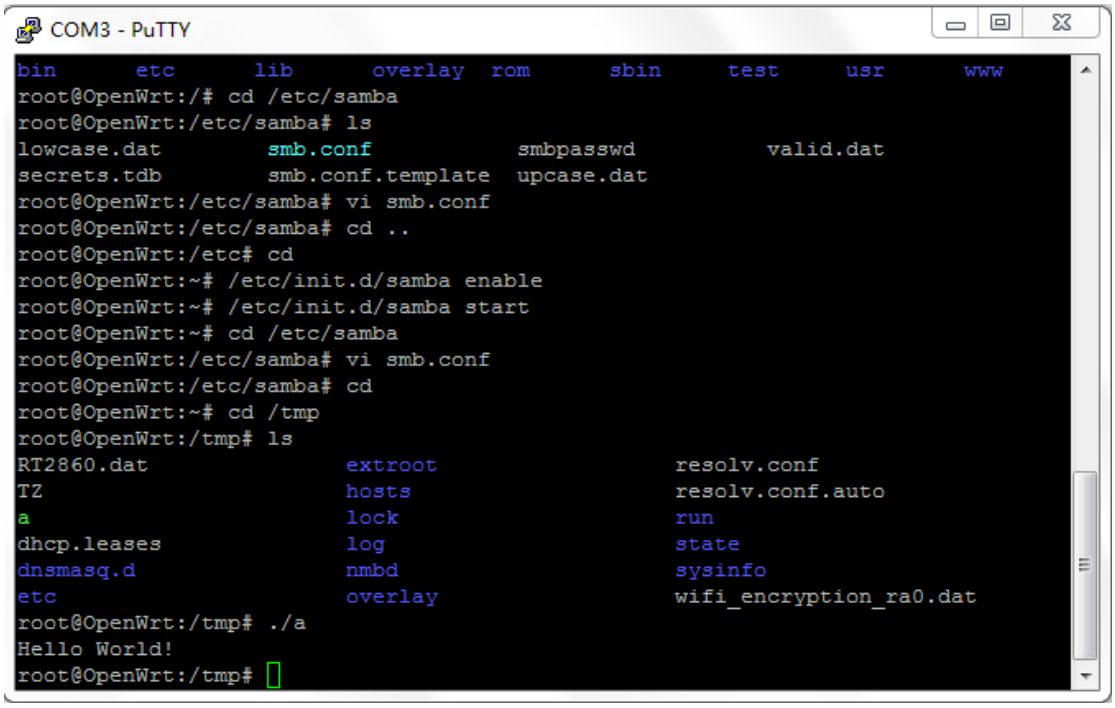


8. 编译成 mips 程序，可以看到文件信息表示程序是 MIPS 的





9. 放置到 WRTnode 板子上测试，查看运行结果



总结：

该实验其实为实验二的拓展，因为我的的原板子为 acadia，所以这次重新搭建了 MIPS 的交叉编译环境，感觉收获很多。