附加配置

我的 `qemu-4.1.1` 文件夹的绝对路径为 `\home\zzx\qemu-4.1.1`，在不使用root的情况下可以简写为 `~/qemu-4.1.1`

实验代码的目录为 `~/riscv64-ucore-labcodes`

在2.1.5.2.1之后，执行以下内容:

配置环境变量

```
1   vim ~/.bashrc
```

在最后一行写入

```
1   export PATH=~/qemu-4.1.1/riscv32-softmmu:~/qemu-4.1.1/riscv64-softmmu:$PATH
```

注意这里的路径要改成实际的qemu路径

退出并保存，刷新

```
1   source ~/.bashrc
```

在lab0上测试

进入实验目录

```
1   cd ~/riscv64-ucore-labcodes/lab0
```

安装依赖项

```
1   sudo apt-get install libncurses5
2   sudo apt-get install libpython2.7
```

在当前终端执行

```
1   make debug
```

这时候应该没有任何输出

在当前目录新建终端，执行

```
1   make gdb
```

输出为

```
1   GNU gdb (GDB) 8.0.50.20170724-git
```

```
  2  Copyright (C) 2017 Free Software Foundation, Inc.
  3  License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
  4  This is free software: you are free to change and redistribute it.
  5  There is NO WARRANTY, to the extent permitted by law.  Type "show copying"
  6  and "show warranty" for details.
  7  This GDB was configured as "--host=x86_64-linux-gnu --target=riscv64-unknown-
     elf".
  8  Type "show configuration" for configuration details.
  9  For bug reporting instructions, please see:
 10  <http://www.gnu.org/software/gdb/bugs/>.
 11  Find the GDB manual and other documentation resources online at:
 12  <http://www.gnu.org/software/gdb/documentation/>.
 13  For help, type "help".
 14  Type "apropos word" to search for commands related to "word".
 15  Reading symbols from bin/kernel...done.
 16  The target architecture is assumed to be riscv:rv64
 17  Remote debugging using localhost:1234
 18  0x0000000000001000 in ?? ()
 19  (gdb)
```

输入 `quit` 结束