

Pintos 环境搭建

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依赖安装

笔者使用的实验环境是VMware Workstation 15 Player上运行的Ubuntu 16.04

安装GNU binutils

安装成功后，终端运行*i386-elf-objdump -i*，应输出：

```
BFD header file version (GNU Binutils) 2.21.1
elf32-i386
  (header little endian, data little endian)
  i386...
```

如果未出现这一信息，则需要安装

首先下载该依赖包：终端执行*wget*

<http://ftpmirror.gnu.org/binutils/binutils-2.21.1.tar.bz2>

解压并安装：

```
tar xjf binutils-2.21.1.tar.bz2
cd binutils-2.21.1
./configure --prefix=/usr/local --target=i386-elf --disable-werror
make
sudo make install          # 这一步权限必不可少
cd ..
```

安装Bochs

这里采用的Bochs版本是2.6.7，而非Pintos推荐的2.2.6，因为过旧版本的bochs已经无法通过新版本gcc的编译

这里先将可能用到的依赖都安装验证一遍

```
sudo apt-get install build-essential
sudo apt-get install xorg-dev
sudo apt-get install bison
sudo apt-get install libgtk2.0-dev
sudo apt-get install libc6:i386 libgcc1:i386 libstdc++5:i386
libstdc++6:i386
sudo apt-get install libncurses5:i386
sudo apt-get install g++-multilib
```

安装过程中遇到一切(Y/n)选Y，需要输入账户密码时输入即可

下载bochs ([下载地址](#)) :

点击"bochs-2.6.7.tar.gz"下载

解压并安装:

```
tar xzf bochs-2.6.7.tar.gz
cd bochs-2.6.7
./configure --enable-gdb-stub
make
sudo make install # 这一步权限必不可少
```

Pintos安装

将老师提供的Pintos安装包复制进家目录下并解压

```
cd ~
tar xzf pintos.tar.gz
```

复制脚本

这一步需要把pintos/src/utils文件夹下的诸多脚本文件添加到环境变量PATH下

这里直接将它们复制至/usr/bin文件夹下

```
cd ~/pintos/src/utils # 进入pintos所在的文件夹
sudo cp backtrace /usr/bin
sudo cp pintos /usr/bin
sudo cp pintos-gdb /usr/bin
sudo cp pintos-mkdisk /usr/bin
sudo cp pintos-set-cmdline /usr/bin
sudo cp Pintos.pm /usr/bin
cd ../misc
sudo cp gdb-macros /usr/bin
```

安装pintos-gdb

首先编辑/usr/bin/pintos-gdb文件，将其中的常量 GDBMACROS 改为放置gdb-macros副本的路径（即：/usr/bin/gdb-macros）

```
sudo vi /usr/bin/pintos-gdb
# Modify the 4th line: GDBMACROS=/usr/bin/gdb-macros
```

然后设置脚本的执行权限

```
cd /usr/bin/
sudo chmod a+rx backtrace
sudo chmod a+rx pintos*
sudo chmod a+rx gdb-macros
sudo chmod a+rx Pintos.pm
test pintos-gdb # 如果未提示缺少gdb-macros则安装成功
```

编译utils

修改Makefile文件，将第5行的LDFLAGS改为LDLIBS

```
cd ~/pintos/src/utils
vi Makefile
# Modify the 5th line: LDFLAGS -> LDLIBS
```

make命令编译，并将支持文件导入/usr/bin

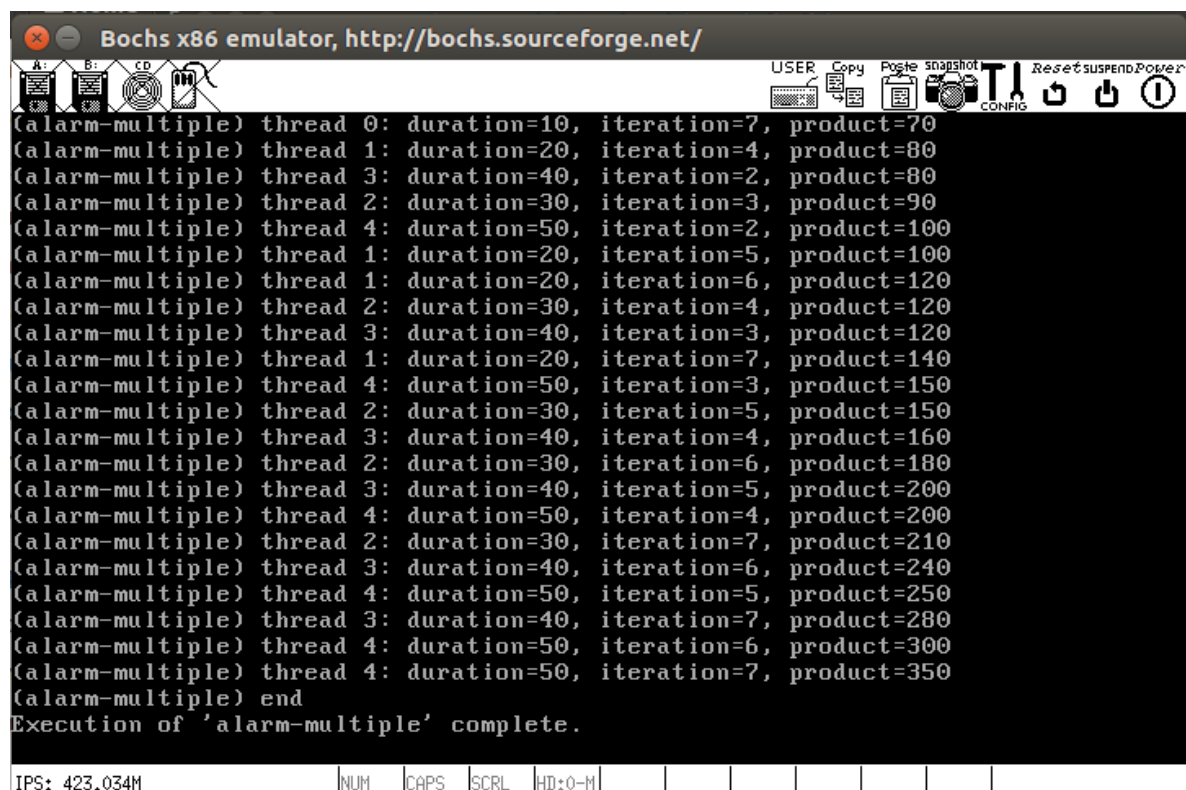
```
make
sudo cp squish-pty /usr/bin
sudo cp squish-unix /usr/bin
sudo chmod a+rx /usr/bin/squish*
```

安装并运行

执行如下命令：

```
cd ~/pintos/src/threads
make
cd build
../../utils/pintos -- run alarm-multiple
```

即可看到Pintos的运行界面



```
Bochs x86 emulator, http://bochs.sourceforge.net/
(alarm-multiple) thread 0: duration=10, iteration=7, product=70
(alarm-multiple) thread 1: duration=20, iteration=4, product=80
(alarm-multiple) thread 3: duration=40, iteration=2, product=80
(alarm-multiple) thread 2: duration=30, iteration=3, product=90
(alarm-multiple) thread 4: duration=50, iteration=2, product=100
(alarm-multiple) thread 1: duration=20, iteration=5, product=100
(alarm-multiple) thread 1: duration=20, iteration=6, product=120
(alarm-multiple) thread 2: duration=30, iteration=4, product=120
(alarm-multiple) thread 3: duration=40, iteration=3, product=120
(alarm-multiple) thread 1: duration=20, iteration=7, product=140
(alarm-multiple) thread 4: duration=50, iteration=3, product=150
(alarm-multiple) thread 2: duration=30, iteration=5, product=150
(alarm-multiple) thread 3: duration=40, iteration=4, product=160
(alarm-multiple) thread 2: duration=30, iteration=6, product=180
(alarm-multiple) thread 3: duration=40, iteration=5, product=200
(alarm-multiple) thread 4: duration=50, iteration=4, product=200
(alarm-multiple) thread 2: duration=30, iteration=7, product=210
(alarm-multiple) thread 3: duration=40, iteration=6, product=240
(alarm-multiple) thread 4: duration=50, iteration=5, product=250
(alarm-multiple) thread 3: duration=40, iteration=7, product=280
(alarm-multiple) thread 4: duration=50, iteration=6, product=300
(alarm-multiple) thread 4: duration=50, iteration=7, product=350
(alarm-multiple) end
Execution of 'alarm-multiple' complete.
```

IPS: 423.034M | NUM | CAPS | SCRL | HD:0-M | | | | | | | | | |

参考资料

[Ubuntu安装pintos](#)

[Install Pintos](#)

[Tools Used in 6.828](#)