QEMU

搭建环境

安装交叉编译工具链

```
sudo  apt-get  install gcc-arm-linux-gnueabi
```

查看编译工具链版本号

```
dpkg  -l gcc-arm-linux-gnueabi
```

结果如下

```
Desired=Unknown/Install/Remove/Purge/Hold
| Status=Not/Inst/Conf-files/Unpacked/halF-conf/Half-
inst/trig-aWai>
|/ Err?=(none)/Reinst-required (Status,Err: uppercase=bad)
||/ Name                    Version          Architecture
Description
+++-====================-================-=============-
==========>
ii  gcc-arm-linux-gnueabi 4:9.3.0-1ubuntu2 amd64
GNU C compi>
```

下载qemu模拟器源码

```
wget https://download.qemu.org/qemu-7.0.0-rc2.tar.xz
```

解压

```
tar  xvJf qemu-7.0.0-rc2.tar.xz
```

遇到问题,报

```
Cannot find Ninja    #执行 apt-get install ninja-build
```

```
Dependency "pixman-1" not found, tried pkgconfig  #执行
apt-get install libpixman-1-dev
```

执行命令进行qemu模拟

```
qemu-system-arm -M vexpress-a9 -m 512M -kernel ./zImage -
dtb  vexpress-v2p-ca9.dtb -nographic -append
"root=/dev/mmcblk0 rw console=ttyAMA0" -sd rootfs.ext4
```

```
qemu-system-arm -M vexpress-a9 -kernel u-boot -m 512M -
nographic
```

查看qemu支持的cpu型号

```
qemu-system-arm -cpu help
```

查看qemu支持的设备

```
qemu-system-arm -device help
```

查看qemu支持的板子

```
qemu-system-arm -M help
```

在qemu环境下启动vexpress-a9的rt-thread工程

获取rt-thread源码

```
git clone https://gitee.com/rtthread/rt-thread.git
```

打开bsp文件夹下面的 `vexpress-a9`

安装 `scons`

```
sudo apt install scons
```

编译,在 `vexpress-a9` 文件夹下执行

```
scons
```

编译完成生成 `rtthread.elf`,然后再在 `qemu-vexpress-a9` 文件夹下执行

```
./qemu-nographic.sh
```

驱动起来的设备

```
msh />list_device
device             type              ref count
--------  --------------------  ----------
e0        Network Interface     0
sd0       Block Device          1
rtc       RTC                   0
uart1     Character Device      0
uart0     Character Device      2
```