Atividade 1

Screenshots

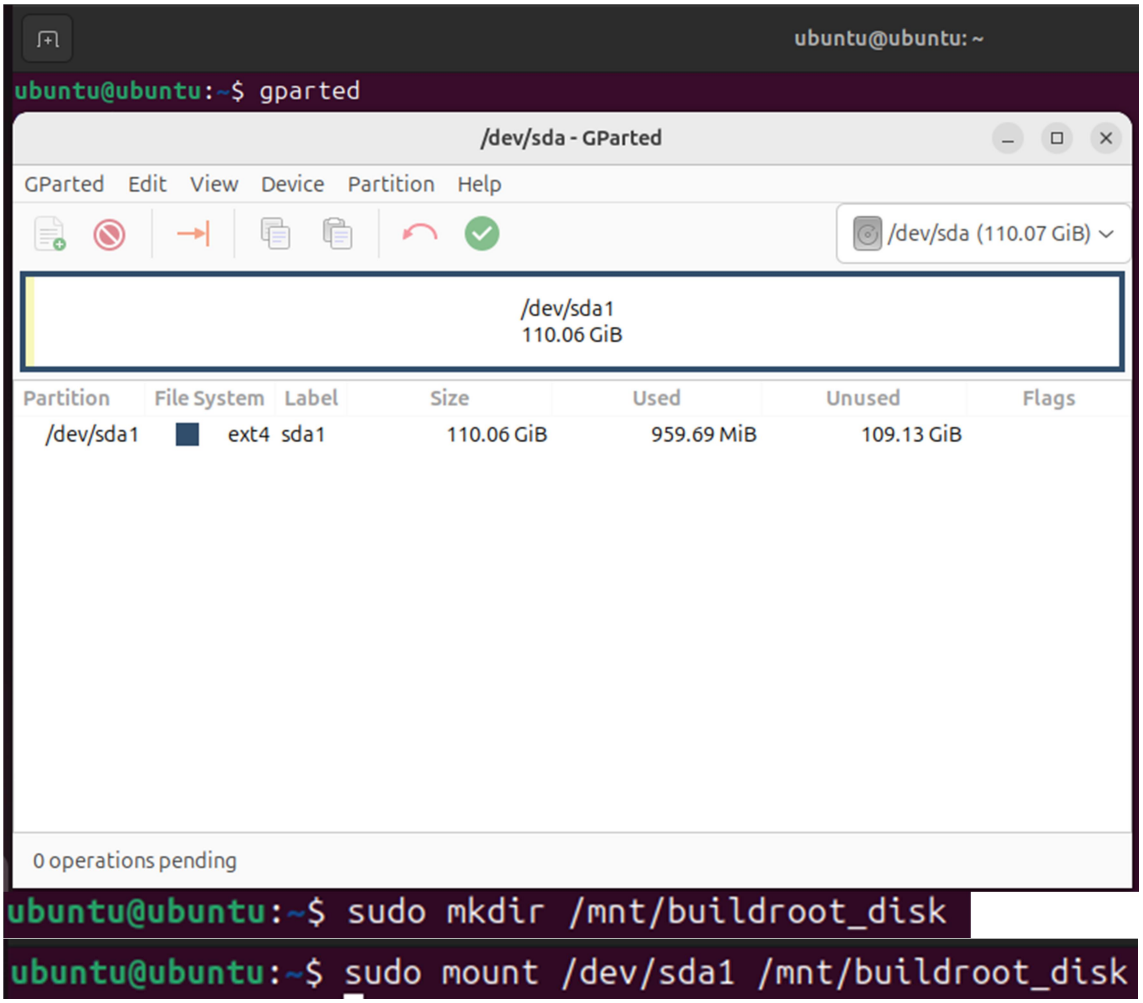
Setup

```
ubuntu@ubuntu: ~
ubuntu@ubuntu:~$ sudo apt-get update
Ign:1 cdrom://Ubuntu 24.04.3 LTS _Noble Numbat_ - Release amd64 (20250805.1) nob
le InRelease
Hit:2 cdrom://Ubuntu 24.04.3 LTS _Noble Numbat_ - Release amd64 (20250805.1) nob
le Release
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Hit:5 http://archive.ubuntu.com/ubuntu noble InRelease
Get:6 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main i386 Packages [339 k
B]
Get:8 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1,22
2 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:10 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [204
 kB]
Get:11 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [2
1.6 kB]
Get:12 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadat
a [8,968 B]
Get:13 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages
[892 kB]
Get:14 http://security.ubuntu.com/ubuntu noble-security/universe i386 Packages [
552 kB]
Get:15 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en
```

```
ubuntu@ubuntu: ~
ubuntu@ubuntu:~$ sudo apt-get install build-essential git curl wget flex bison libssl-dev libncurses5-dev
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'libncurses-dev' instead of 'libncurses5-dev'
wget is already the newest version (1.21.4-1ubuntu4.1).
wget set to manually installed.
The following additional packages will be installed:
  binutils binutils-common binutils-x86-64-linux-gnu dpkg dpkg-dev fakeroot
  g++ g++-13 g++-13-x86-64-linux-gnu g++-x86-64-linux-gnu gcc gcc-13
  gcc-13-x86-64-linux-gnu gcc-x86-64-linux-gnu git-man libalgorithm-diff-perl
  libalgorithm-diff-xs-perl libalgorithm-merge-perl libasan8 libbinutils
  libcc1-0 libctf-nobfd0 libctf0 libdpkg-perl liberror-perl libfakeroot
  libfile-fcntllock-perl libfl-dev libfl2 libgcc-13-dev libgprofng0 libhwasan0
  libitm1 liblsan0 libquadmath0 libsframe1 libssl3t64 libstdc++-13-dev
  libtsan2 libubsan1 lto-disabled-list m4 make openssl
Suggested packages:
  binutils-doc gprofng-gui bison-doc debsig-verify debian-keyring flex-doc
  g++-multilib g++-13-multilib gcc-13-doc gcc-multilib autoconf automake
  libtool gcc-doc gcc-13-multilib gcc-13-locales gdb-x86-64-linux-gnu
  git-daemon-run | git-daemon-sysvinit git-doc git-email git-gui gitk gitweb
  git-cvs git-mediawiki git-svn bzr ncurses-doc libssl-doc libstdc++-13-doc
  m4-doc make-doc
The following NEW packages will be installed:
  binutils binutils-common binutils-x86-64-linux-gnu bison build-essential
  curl dpkg-dev fakeroot flex g++ g++-13 g++-13-x86-64-linux-gnu
  g++-x86-64-linux-gnu gcc gcc-13 gcc-13-x86-64-linux-gnu gcc-x86-64-linux-gnu
  git git-man libalgorithm-diff-perl libalgorithm-diff-xs-perl
  libalgorithm-merge-perl libasan8 libbinutils libcc1-0 libctf-nobfd0 libctf0
  libdpkg-perl liberror-perl libfakeroot libfile-fcntllock-perl libfl-dev
  libfl2 libgcc-13-dev libgprofng0 libhwasan0 libitm1 liblsan0 libncurses-dev
  libquadmath0 libsframe1 libssl-dev libstdc++-13-dev libtsan2 libubsan1
  lto-disabled-list m4 make
```

```
ubuntu@ubuntu: ~
ubuntu@ubuntu:~$ sudo apt-get install qemu-system-arm gparted
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
gparted is already the newest version (1.5.0-1build4).
The following additional packages will be installed:
  ipxe-qemu ipxe-qemu-256k-compat-efi-roms libcacard0 libdaxctl1 libfdt1 libiscsi7 libjack-jackd2-0 libndctl6 libpmem1
  libpmemobj1 librados2 librbd1 librdmacm1t64 libsdl2-2.0-0 libslirp0 libspice-server1 liburing2 libusbredirparser1t64
  libvirglrenderer1 qemu-block-extra qemu-efi-aarch64 qemu-efi-arm qemu-system-common qemu-system-data qemu-system-gui
  qemu-system-modules-opengl qemu-system-modules-spice qemu-utils
Suggested packages:
  jackd2 gstreamer1.0-libav gstreamer1.0-plugins-ugly samba vde2
The following NEW packages will be installed:
  ipxe-qemu ipxe-qemu-256k-compat-efi-roms libcacard0 libdaxctl1 libfdt1 libiscsi7 libjack-jackd2-0 libndctl6 libpmem1
  libpmemobj1 librados2 librbd1 librdmacm1t64 libsdl2-2.0-0 libslirp0 libspice-server1 liburing2 libusbredirparser1t64
  libvirglrenderer1 qemu-block-extra qemu-efi-aarch64 qemu-efi-arm qemu-system-arm qemu-system-common qemu-system-data
  qemu-system-gui qemu-system-modules-opengl qemu-system-modules-spice qemu-utils
0 upgraded, 29 newly installed, 0 to remove and 158 not upgraded.
Need to get 33.6 MB of archives.
```

Alocando espaço no Gparted



Buildroot

```
ubuntu@ubuntu:/mnt/buildroot_disk$ sudo git clone https://github.com/buildroot/buildroot.git
Cloning into 'buildroot'...
remote: Enumerating objects: 601799, done.
remote: Counting objects: 100% (846/846), done.
remote: Compressing objects: 100% (221/221), done.
remote: Total 601799 (delta 651), reused 625 (delta 625), pack-reused 600953 (from 4)
Receiving objects: 100% (601799/601799), 148.12 MiB | 32.96 MiB/s, done.
Resolving deltas: 100% (389756/389756), done.
ubuntu@ubuntu:/mnt/buildroot_disk$
```

```
ubuntu@ubuntu: /mnt/buildroot_disk/buildroot
ubuntu@ubuntu:/mnt/buildroot_disk/buildroot$ sudo make qemu_arm_vexpress_defconfig
#
# configuration written to /mnt/buildroot_disk/buildroot/.config
#
ubuntu@ubuntu:/mnt/buildroot_disk/buildroot$
```

Após rodar o make

```
Allocating group tables: done
Writing inode tables: done
Copying files into the device: done
Writing superblocks and filesystem accounting information: done

ln -snf /mnt/buildroot_disk/buildroot/output/host/arm-buildroot-linux-gnueabihf/sysroot /mnt/buildroot_disk/buildroot/ou
tput/staging
>>>   Executing post-image script board/qemu/post-image.sh
ubuntu@ubuntu:/mnt/buildroot_disk/buildroot$
```

Criando e compilando o codigo ubuntu

```
ubuntu@ubuntu: ~/Desktop
ubuntu@ubuntu:~/Desktop$ nano hello.c
  GNU nano 7.2                                          hello.c
#include <stdio.h>

int main () {

        printf("Hello World!");
        return 0;

}
```

```
ubuntu@ubuntu:~/Desktop$ gcc hello.c -o hello_ubuntu
ubuntu@ubuntu:~/Desktop$ ./hello_ubuntu
Hello World!
ubuntu@ubuntu:~/Desktop$
```

Compilando pra ARM

```
ubuntu@ubuntu:/mnt/buildroot_disk/buildroot$ sudo output/host/bin/arm-buildroot-linux-gnueabihf-gcc /home/ubuntu/Desktop
/hello.c -o hello_arm -static
```

```
ubuntu@ubuntu:/mnt/buildroot_disk/buildroot$ sudo cp hello_arm output/target/
ubuntu@ubuntu:/mnt/buildroot_disk/buildroot$ make
```

```
Allocating group tables: done
Writing inode tables: done
Copying files into the device: done
Writing superblocks and filesystem accounting information: done

>>>   Executing post-image script board/qemu/post-image.sh
ubuntu@ubuntu:/mnt/buildroot_disk/buildroot$
```

Inicializando QEMU

```
ubuntu@ubuntu: /mnt/buildroot_disk/buildroot
ubuntu@ubuntu:/mnt/buildroot_disk/buildroot$ qemu-system-arm -M vexpress-a9 -m 256M \
-kernel output/images/zImage \
-dtb output/images/vexpress-v2p-ca9.dtb \
-drive file=output/images/rootfs.ext2,if=sd,format=raw \
-append "root=/dev/mmcblk0 rw console=ttyAMA0" \
-serial stdio
```

```
Welcome to Buildroot
buildroot login: drm-clcd-pl111 10020000.clcd: DVI muxed to daughterboard 1 (core tile) CLCD
drm-clcd-pl111 10020000.clcd: initializing Versatile Express PL111
i2c 0-0039: deferred probe pending: sii902x: Failed to find remote bridge
amba 1000f000.wdt: deferred probe pending: (reason unknown)
amba 10020000.clcd: deferred probe pending: (reason unknown)
amba 100e0000.memory-controller: deferred probe pending: (reason unknown)
amba 100e1000.memory-controller: deferred probe pending: (reason unknown)
amba 100e5000.watchdog: deferred probe pending: (reason unknown)

Welcome to Buildroot
buildroot login: root
# find / -name hello_arm
/hello_arm
# /hello_arm
Hello World!
#
```

Dados

QEMU

```
ubuntu@ubuntu: /mnt/buildroot_disk/buildroot
# uname -a
Linux buildroot 6.12.47 #1 SMP Sat Oct 18 04:50:44 UTC 2025 armv7l GNU/Linux
# df -h
Filesystem                Size      Used Available Use% Mounted on
/dev/root                58.7M      3.6M     52.0M   6% /
devtmpfs                111.7M         0    111.7M   0% /dev
tmpfs                   120.2M         0    120.2M   0% /dev/shm
tmpfs                   120.2M     24.0K    120.1M   0% /tmp
tmpfs                   120.2M     28.0K    120.1M   0% /run
# free -m
              total        used        free      shared  buff/cache   available
Mem:            240           8         220           0          12         225
Swap:             0           0           0
# ps aux | wc -l
59
#
```

Ubuntu

```
ubuntu@ubuntu: /mnt/buildroot_disk/buildroot
ubuntu@ubuntu:/mnt/buildroot_disk/buildroot$ uname -a
Linux ubuntu 6.14.0-27-generic #27~24.04.1-Ubuntu SMP PREEMPT_DYNAMIC Tue Jul 22 17:38:49 UTC 2 x86_64 x86_64 x86_64 GNU
/Linux
ubuntu@ubuntu:/mnt/buildroot_disk/buildroot$ df -h
Filesystem      Size  Used Avail Use% Mounted on
tmpfs           932M  1.9M  931M   1% /run
/dev/sr0        6.0G  6.0G     0 100% /cdrom
/cow            4.6G  1.5G  3.2G  32% /
tmpfs           4.6G  8.0K  4.6G   1% /dev/shm
tmpfs           5.0M  8.0K  5.0M   1% /run/lock
tmpfs           4.6G  3.8M  4.6G   1% /tmp
tmpfs           932M  164K  932M   1% /run/user/1000
tmpfs           4.6G     0  4.6G   0% /run/qemu
/dev/sda1       108G   15G   88G  15% /mnt/buildroot_disk
ubuntu@ubuntu:/mnt/buildroot_disk/buildroot$ free -m
              total        used        free      shared  buff/cache   available
Mem:           9318        3439         655        1488        6837        5878
Swap:             0           0           0
ubuntu@ubuntu:/mnt/buildroot_disk/buildroot$ ps aux | wc -l
282
ubuntu@ubuntu:/mnt/buildroot_disk/buildroot$
```