**********Draft**********

QEMU Ultibo Bare Metal
DWT Lifting Step
with
Remote Shell
07/29/21

**********Draft**********

Note:
https://ultibo.org/forum/viewtopic.php?f=13&t=1303&p=11632#p11632

By Ultibo Wed Jul 21, 2021 9:01 pm

I suspect the version of QEMU that you have on the RPI3B+ is later than the one on the RPi4, try doing qemu-system-arm -version on each one.

We recently discovered that the Ultibo SD card driver was not compatible with the latest versions of QEMU, a fix for this is included in the release from today (Ultibo core 2.1.079) so if you update your RTL to the latest either using the RTL Builder or by rerunning the ultiboinstaller script then it should work now.
https://en.m.wikipedia.org/wiki/QEMU. On the pi400-1 I ran ./ultiboinstaller.sh on pi400-1.

QEMU is a hosted virtual machine monitor: it emulates the machine's processor through dynamic binary translation and provides a set of different hardware and device models for the machine, enabling it to run a variety of guest operating systems. It also can be used with Kernel-based Virtual Machine (KVM) to run virtual machines at near-native speed (by taking advantage of hardware extensions such as Intel VT-x). QEMU can also do emulation for user-level processes, allowing applications compiled for one architecture to run on another.[3]

Note : Additional software is needed to run QEMU "sudo apt-get install qemu-system-arm". The following programs are added.

/usr/bin/qemu-img /usr/bin/qemu-nbd /usr/bin/qemu-system-aarch64
/usr/bin/qemu-io /usr/bin/qemu-pr-helper /usr/bin/qemu-system-arm

The command line for starting **Lazarus IDE (Ultibo Edition) "~/ultibo/core/lazarus.sh"**

The script compile.sh creates libtest.a

```
#!/bin/bash
date
rm -f test.o
```

```
rm -f libtest.a
rm -f kernel.bin
arm-none-eabi-gcc -O2 -mabi=aapcs -marm -march=armv7-a -mfpu=vfpv3-d16
-mfloat-abi=hard -c test.c
arm-none-eabi-ar rcs libtest.a test.o

#fpc -vi -B -Tultibo -Parm -CpARMV7A -WpRPI2B
@/home/devel/ultibo/core/fpc/bin/RPI2.CFG -O2 LibCTest_RPi2.lpr
ls -la test.o libtest.a kernel.bin

-rw-r--r-- 1 devel devel 7546 Jul 29 04:19 libtest.a

qemu-img create disk.img 25M
Formatting 'disk.img', fmt=raw size=26214400

sudo fdisk disk.img
[sudo] password for devel:

Welcome to fdisk (util-linux 2.33.1).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0xcadc8dbe.

Command (m for help): n
Partition type
   p   primary (0 primary, 0 extended, 4 free)
   e   extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1): 1
First sector (2048-51199, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-51199, default 51199):

Created a new partition 1 of type 'Linux' and of size 24 MiB.

Command (m for help): t
Selected partition 1
Hex code (type L to list all codes): L

 0  Empty           24  NEC DOS         81  Minix / old Lin bf  Solaris
 1  FAT12           27  Hidden NTFS Win 82  Linux swap / So c1  DRDOS/sec (FAT-
 2  XENIX root      39  Plan 9          83  Linux           c4  DRDOS/sec (FAT-
 3  XENIX usr       3c  PartitionMagic  84  OS/2 hidden or  c6  DRDOS/sec (FAT-
 4  FAT16 <32M      40  Venix 80286     85  Linux extended  c7  Syrinx
```

```
 5  Extended        41  PPC PReP Boot   86  NTFS volume set da  Non-FS data
 6  FAT16           42  SFS             87  NTFS volume set db  CP/M / CTOS / .
 7  HPFS/NTFS/exFAT 4d  QNX4.x          88  Linux plaintext de  Dell Utility
 8  AIX             4e  QNX4.x 2nd part 8e  Linux LVM       df  BootIt
 9  AIX bootable    4f  QNX4.x 3rd part 93  Amoeba          e1  DOS access
 a  OS/2 Boot Manag 50  OnTrack DM      94  Amoeba BBT      e3  DOS R/O
 b  W95 FAT32       51  OnTrack DM6 Aux 9f  BSD/OS          e4  SpeedStor
 c  W95 FAT32 (LBA) 52  CP/M            a0  IBM Thinkpad hi ea  Rufus alignment
 e  W95 FAT16 (LBA) 53  OnTrack DM6 Aux a5  FreeBSD         eb  BeOS fs
 f  W95 Ext'd (LBA) 54  OnTrackDM6      a6  OpenBSD         ee  GPT
10  OPUS            55  EZ-Drive        a7  NeXTSTEP        ef  EFI (FAT-12/16/
11  Hidden FAT12    56  Golden Bow      a8  Darwin UFS      f0  Linux/PA-RISC b
12  Compaq diagnost 5c  Priam Edisk     a9  NetBSD          f1  SpeedStor
14  Hidden FAT16 <3 61  SpeedStor       ab  Darwin boot     f4  SpeedStor
16  Hidden FAT16    63  GNU HURD or Sys af  HFS / HFS+      f2  DOS
secondary
17  Hidden HPFS/NTF 64  Novell Netware  b7  BSDI fs         fb  VMware VMFS
18  AST SmartSleep  65  Novell Netware  b8  BSDI swap       fc  VMware
VMKCORE
1b  Hidden W95 FAT3 70  DiskSecure Mult bb  Boot Wizard hid fd  Linux raid
auto
1c  Hidden W95 FAT3 75  PC/IX           bc  Acronis FAT32 L fe  LANstep
1e  Hidden W95 FAT1 80  Old Minix       be  Solaris boot    ff  BBT
Hex code (type L to list all codes): 4
Changed type of partition 'Linux' to 'FAT16 <32M'.

Command (m for help): p
Disk disk.img: 25 MiB, 26214400 bytes, 51200 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xcadc8dbe

Device     Boot Start   End Sectors Size Id Type
disk.img1        2048 51199   49152  24M  4 FAT16 <32M

Command (m for help): w
The partition table has been altered.
Syncing disks.

mkdosfs disk.img
mkfs.fat 4.1 (2017-01-24)

sudo mount disk.img /mnt/img1
```

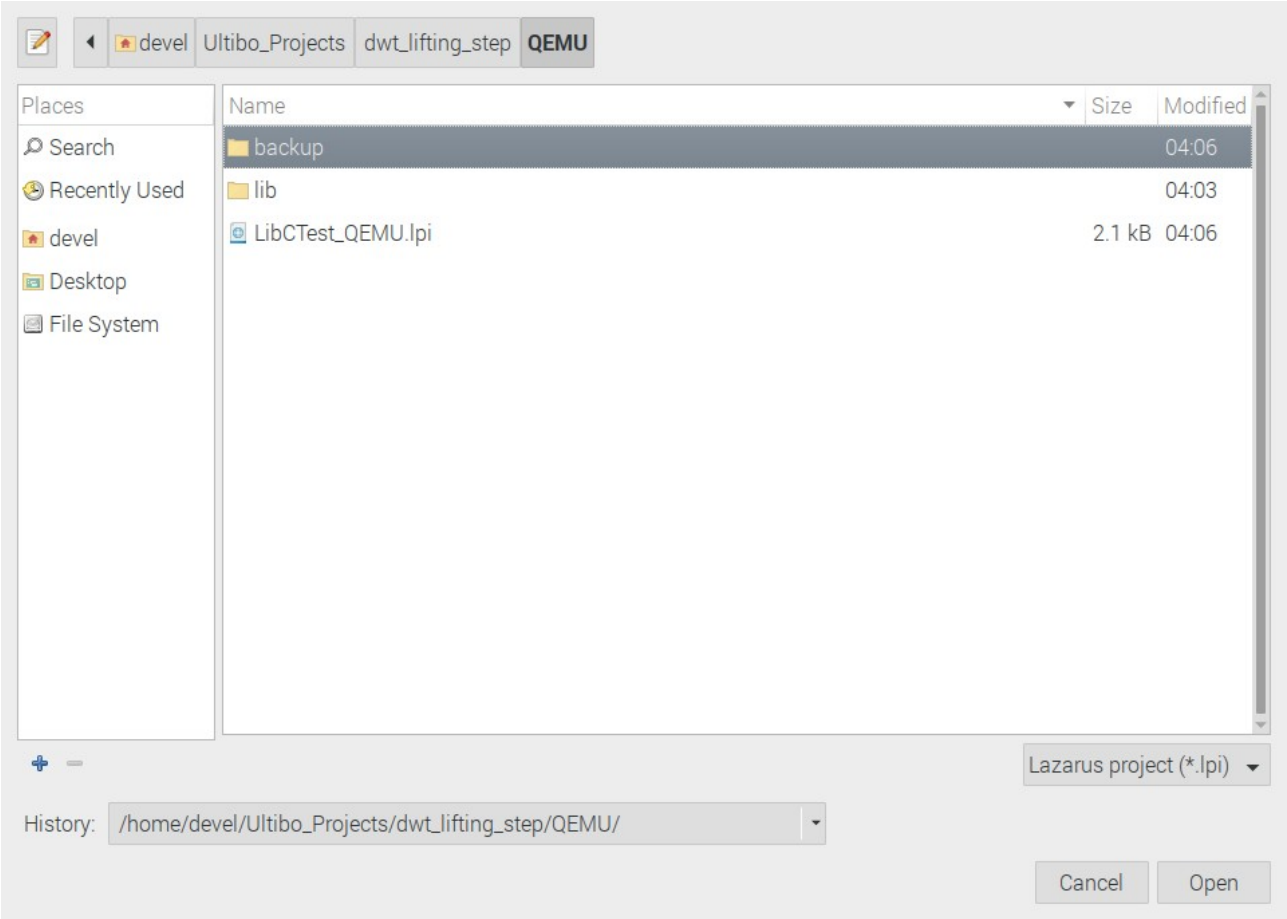
sudo cp -R ~/Ultibo_Projects/Little_Interpreted_Language/img-tests/disk/* /mnt/img1

devel@mypi3-20:~/Ultibo_Projects/jpeg2000/QEMU $ sudo cp testfile 256com 256decom lena_rgb_256.bmp MyBitmap.bmp /mnt/img1

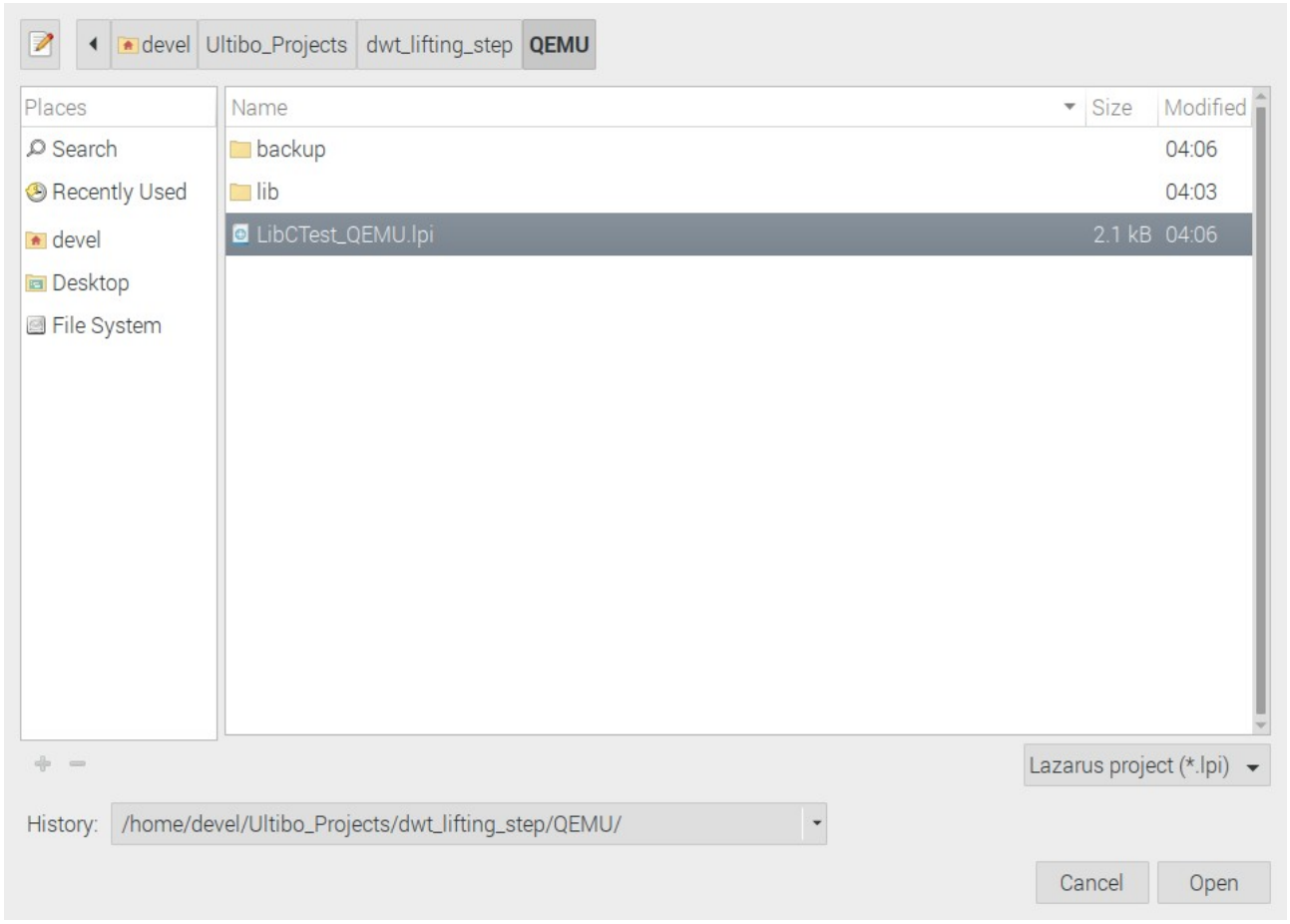
ls -la /mnt/img1
total 420
drwxr-xr-x 3 root root 16384 Dec 31 1969 .
drwxr-xr-x 5 root root   4096 Jul 18 10:10 ..
-rwxr-xr-x 1 root root   24 Jul 28 12:44 256com
-rwxr-xr-x 1 root root   24 Jul 28 12:44 256decom
-rwxr-xr-x 1 root root   53 Jul 28 12:41 'Another File.txt'
-rwxr-xr-x 1 root root 196730 Jul 28 12:44 lena_rgb_256.bmp
-rwxr-xr-x 1 root root 196730 Jul 28 12:44 MyBitmap.bmp
-rwxr-xr-x 1 root root   24 Jul 28 12:44 testfile
-rwxr-xr-x 1 root root   31 Jul 28 12:41 'Test File.txt'
drwxr-xr-x 2 root root   2048 Jul 28 12:41 www

sudo umount /mnt/img1

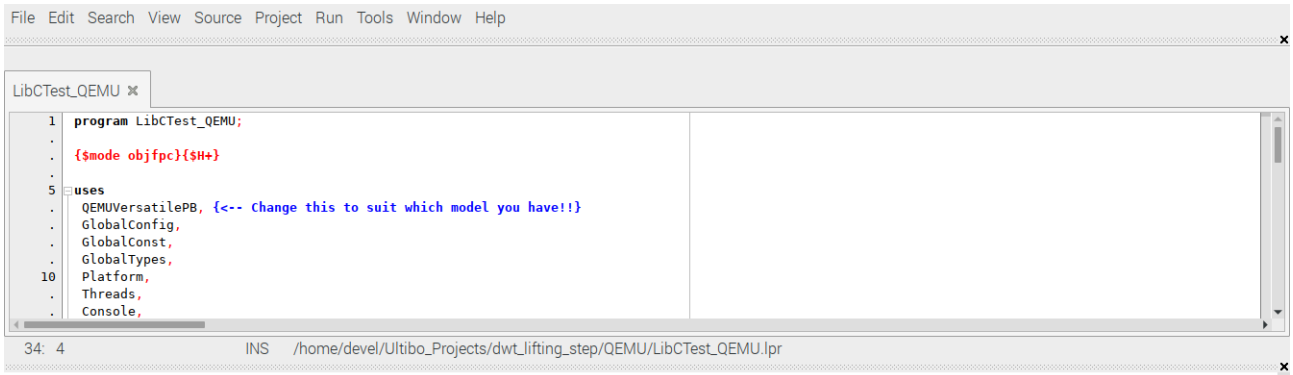
Project/Open



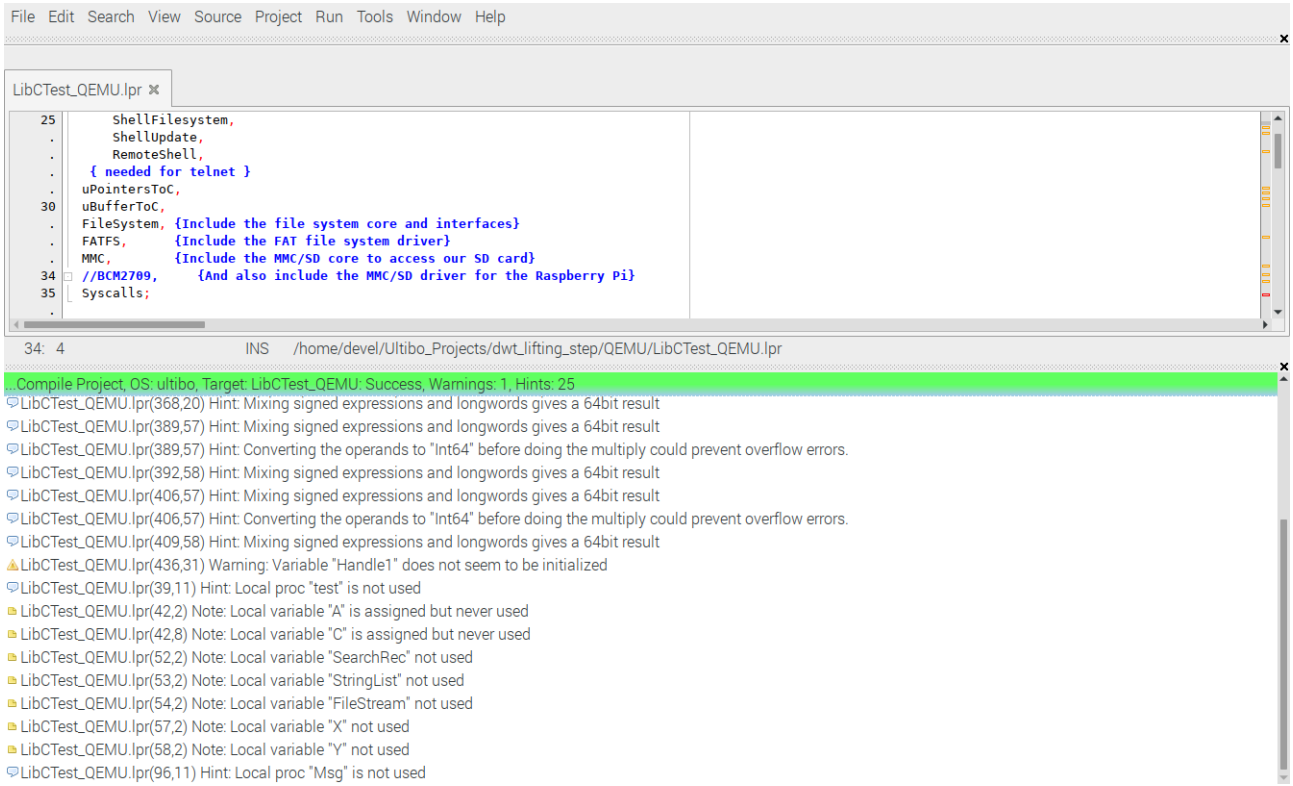
Select LibCTest_QEMU.lpi



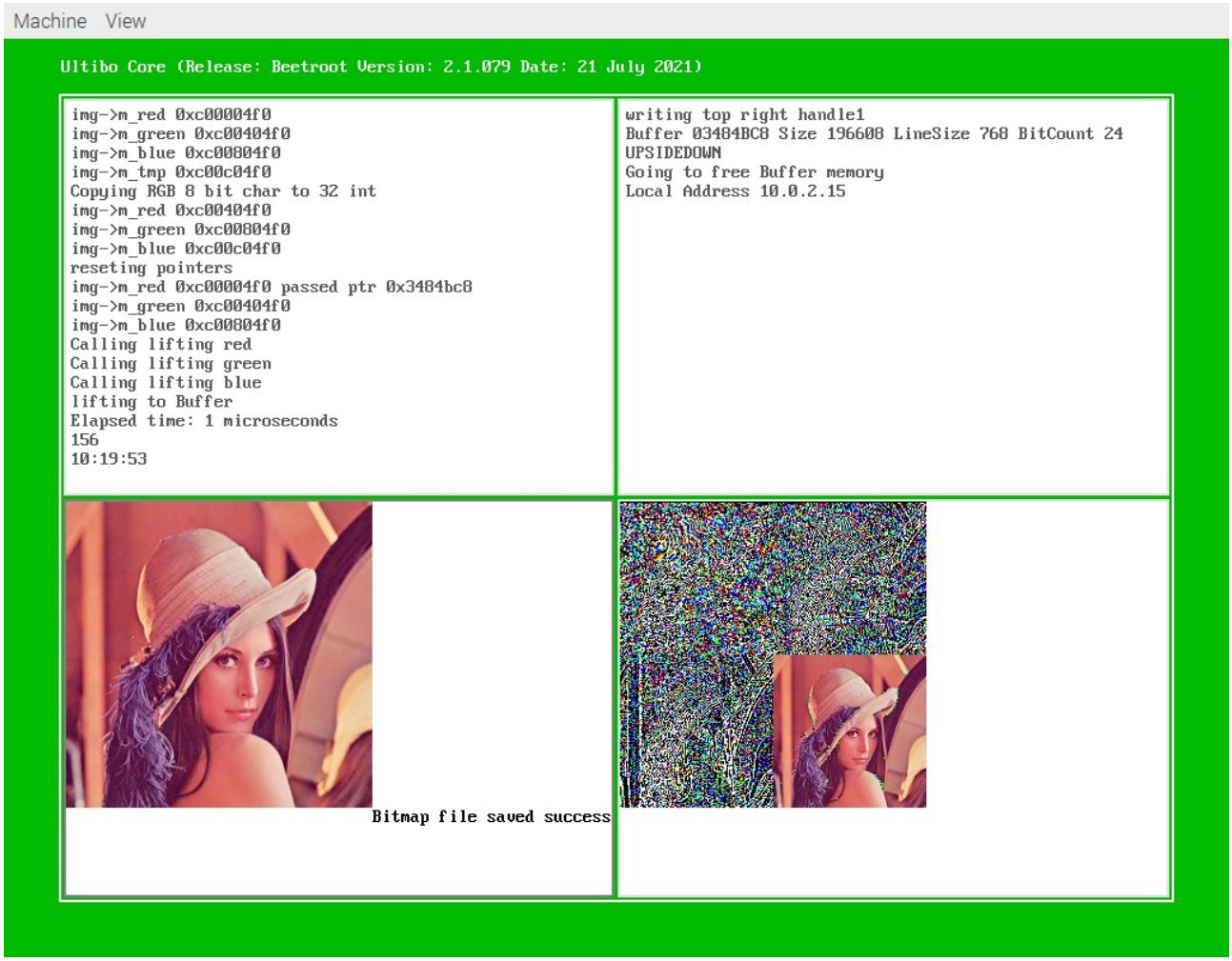
Depress Open



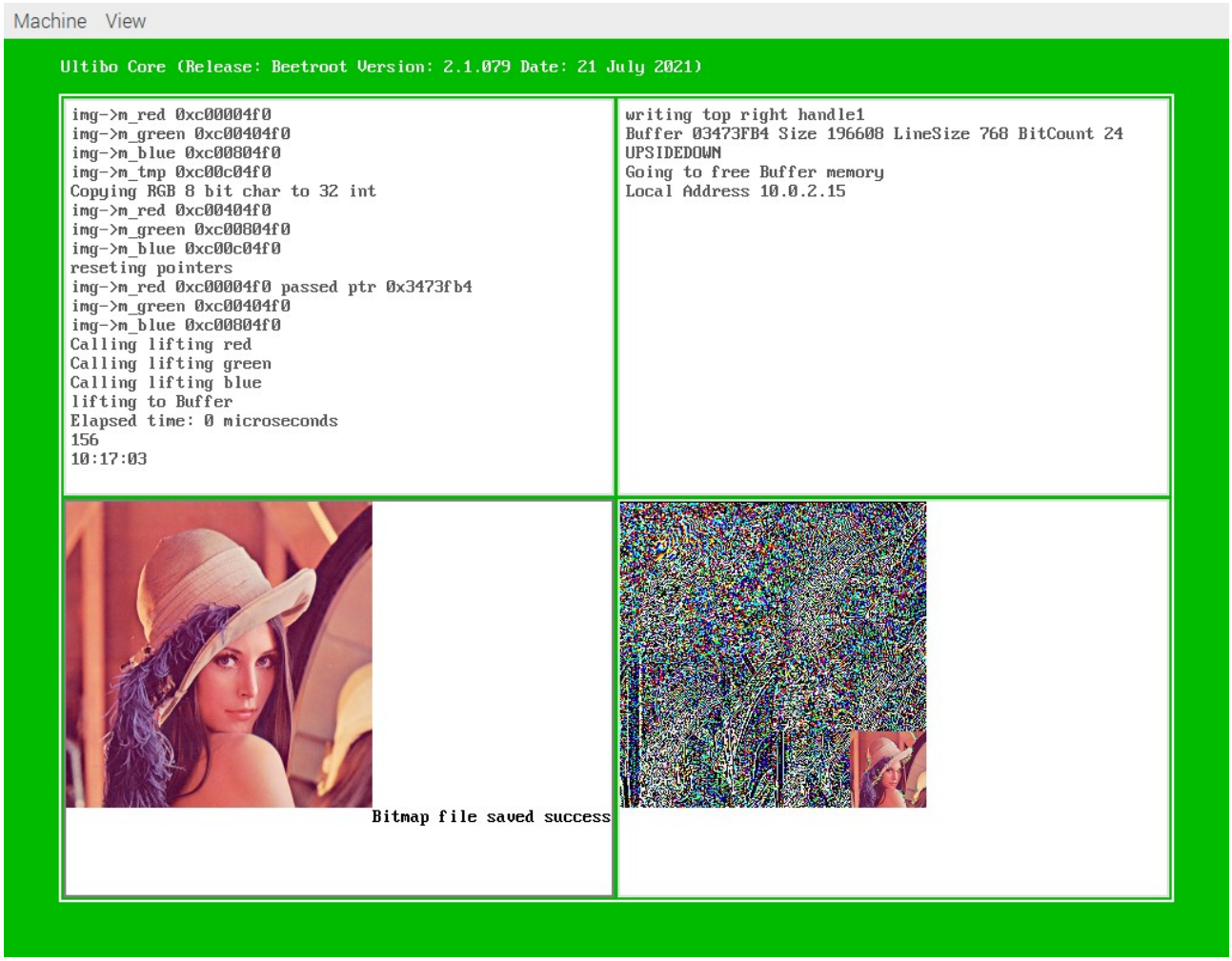
Run/Compile The kernel.bin is created when the Grean bar appears.



./startqemu.sh



By changing line 193 in test.c const int LVLS = 1; to const int LVLS = 2; recompiling libtest.a with the
command ./compile.sh. Then recompiling LibCTest_QEMU.lpr to create kernel.bin Lazarus IDE (Ultibo Edition).
Rerunning the command
./startqemu.sh



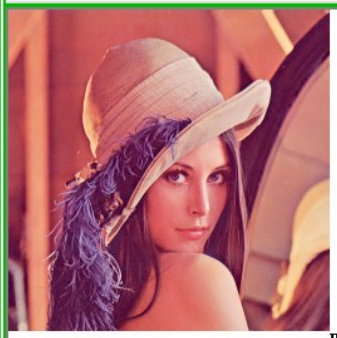
By changing line 193 in test.c const int LVLS = 1; to const int LVLS = 3; recompiling libtest.a with the
command ./compile.sh. Then recompiling LibCTest_QEMU.lpr to create kernel.bin Lazarus IDE (Ultibo Edition).
Rerunning the command
./startqemu.sh

Machine View

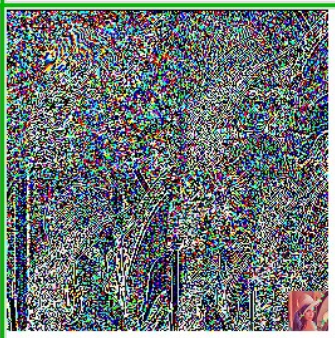
Ultibo Core (Release: Beetroot Version: 2.1.079 Date: 21 July 2021)

```
img->m_red 0xc00004f0
img->m_green 0xc00404f0
img->m_blue 0xc00804f0
img->m_tmp 0xc00c04f0
Copying RGB 8 bit char to 32 int
img->m_red 0xc00404f0
img->m_green 0xc00804f0
img->m_blue 0xc00c04f0
reseting pointers
img->m_red 0xc00004f0 passed ptr 0x3481bf0
img->m_green 0xc00404f0
img->m_blue 0xc00804f0
Calling lifting red
Calling lifting green
Calling lifting blue
lifting to Buffer
Elapsed time: 1 microseconds
156
10:14:22
```

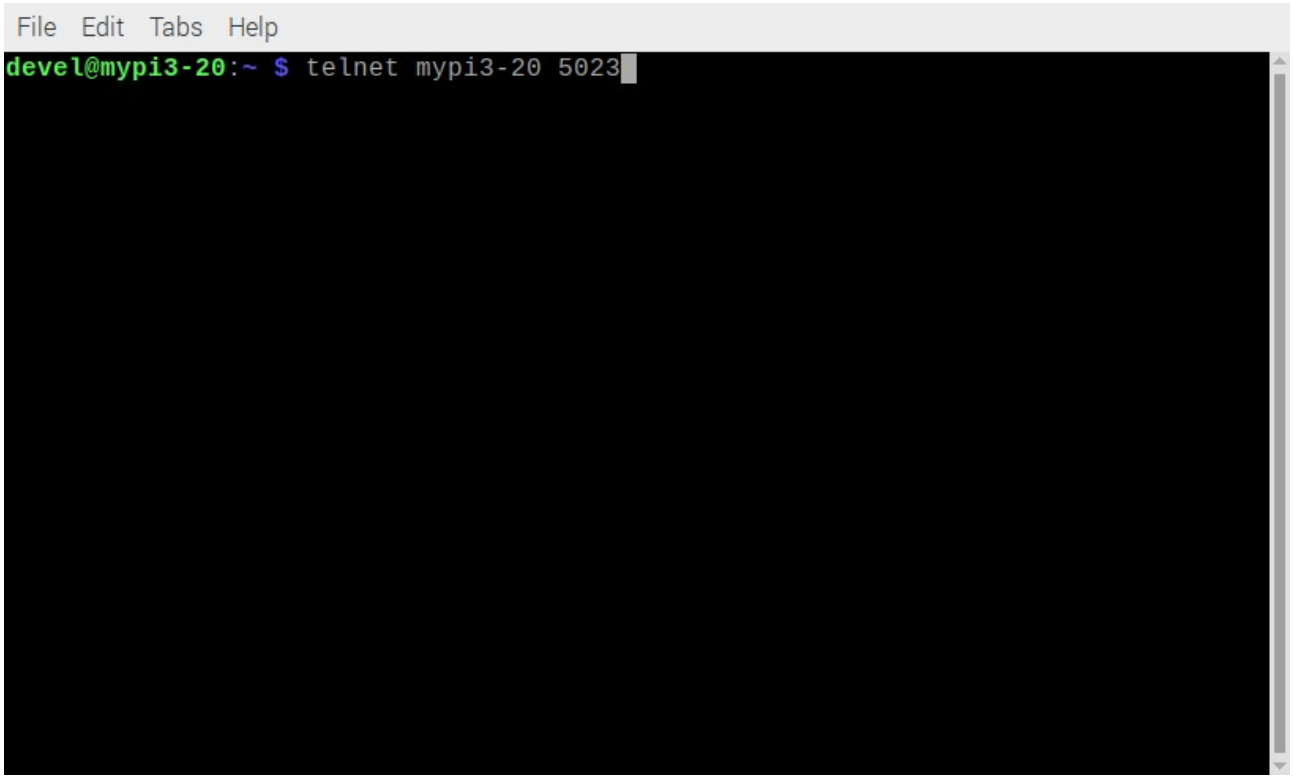
```
writing top right handle1
Buffer 03481BF0 Size 196608 LineSize 768 BitCount 24
UPSIDEDOWN
Going to free Buffer memory
Local Address 10.0.2.15
```

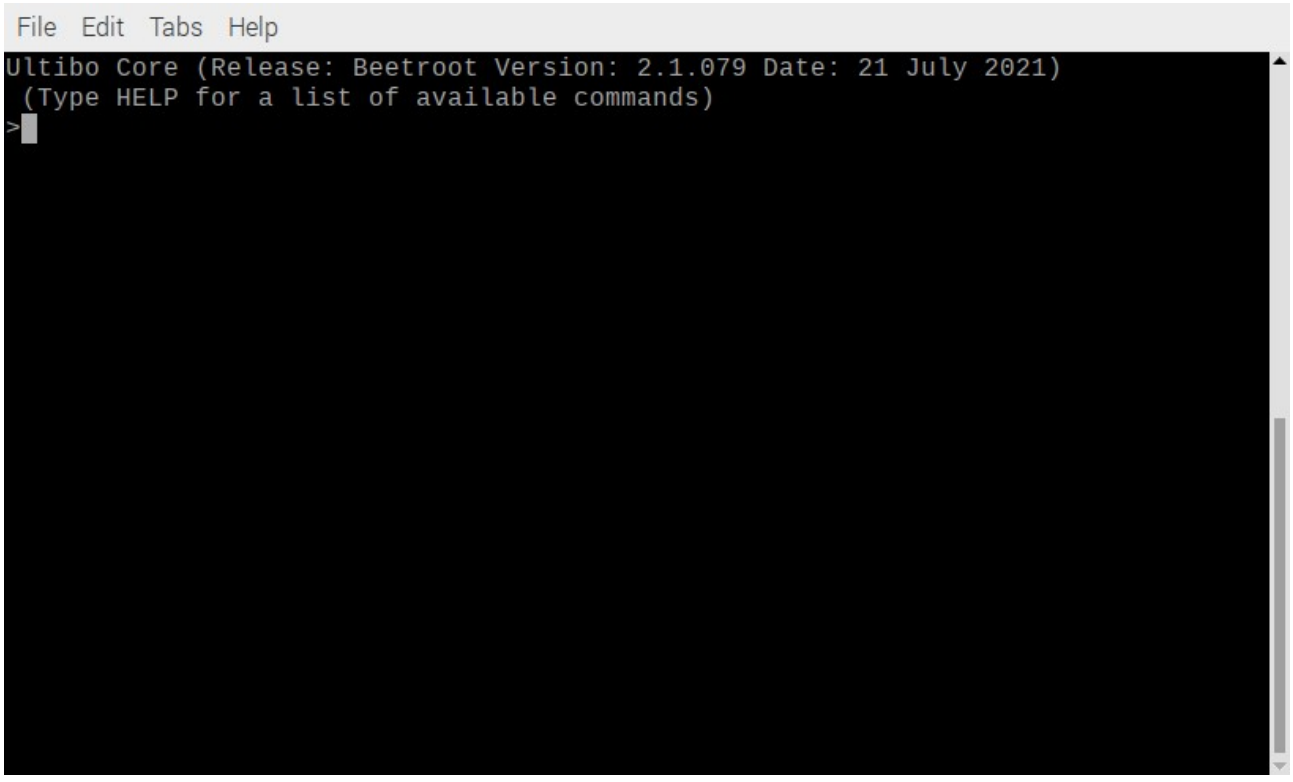


Bitmap file saved success

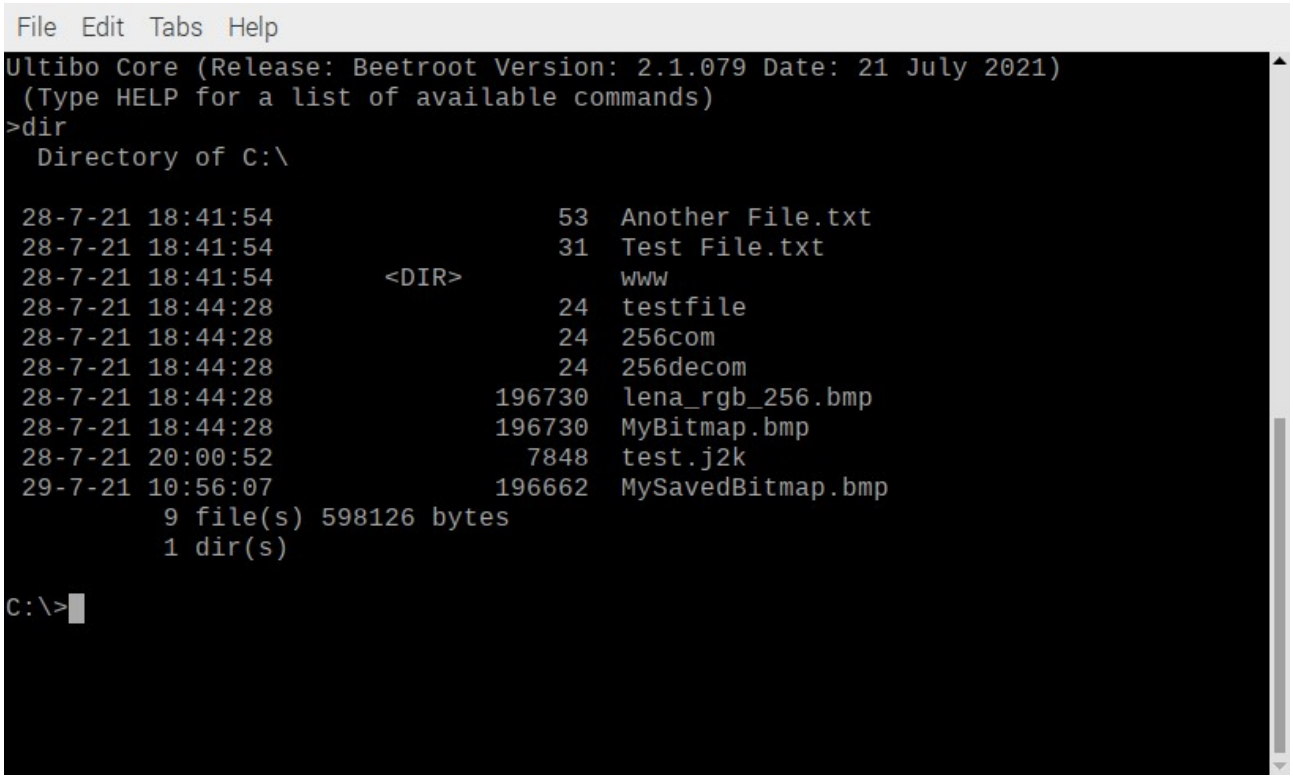


telnet mypi3-20 5023


File Edit Tabs Help
devel@mypi3-20:~ $ telnet mypi3-20 5023


File Edit Tabs Help
Ultibo Core (Release: Beetroot Version: 2.1.079 Date: 21 July 2021)
(Type HELP for a list of available commands)
>

dir


File Edit Tabs Help
Ultibo Core (Release: Beetroot Version: 2.1.079 Date: 21 July 2021)
(Type HELP for a list of available commands)
>dir
Directory of C:\
28-7-21 18:41:54 53 Another File.txt
28-7-21 18:41:54 31 Test File.txt
28-7-21 18:41:54 <DIR> www
28-7-21 18:44:28 24 testfile
28-7-21 18:44:28 24 256com
28-7-21 18:44:28 24 256decom
28-7-21 18:44:28 196730 lena_rgb_256.bmp
28-7-21 18:44:28 196730 MyBitmap.bmp
28-7-21 20:00:52 7848 test.j2k
29-7-21 10:56:07 196662 MySavedBitmap.bmp
9 file(s) 598126 bytes
1 dir(s)
C:\>