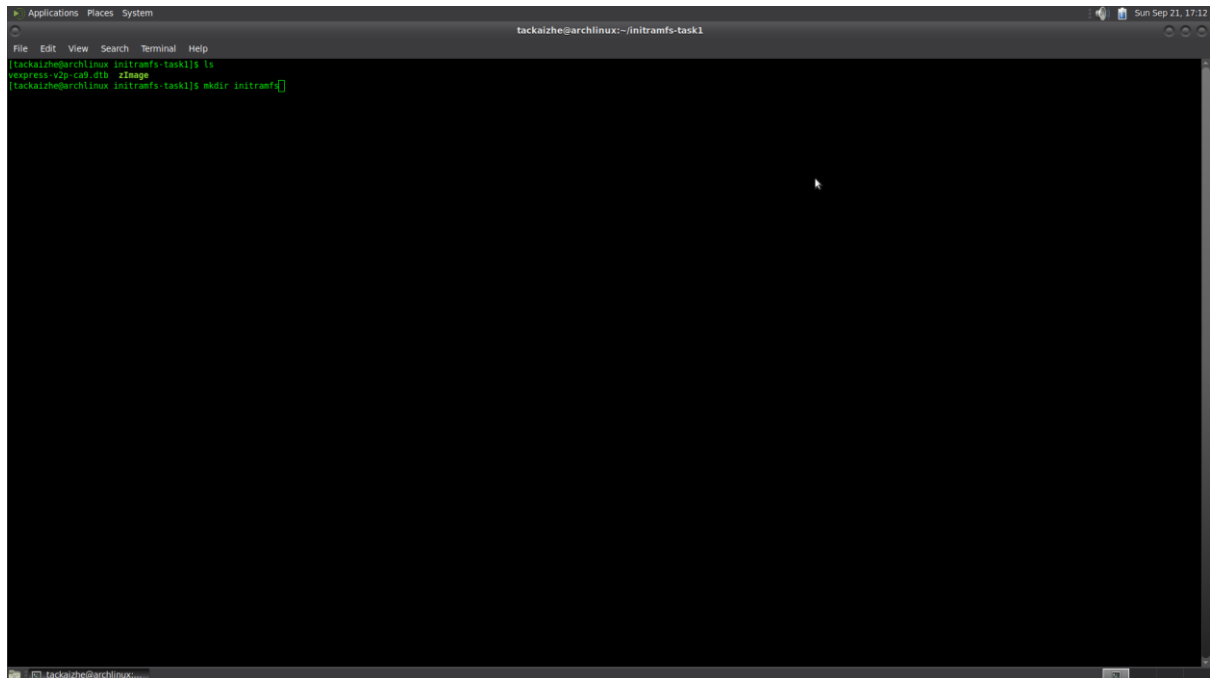


#18 Задание по корневой файловой системе

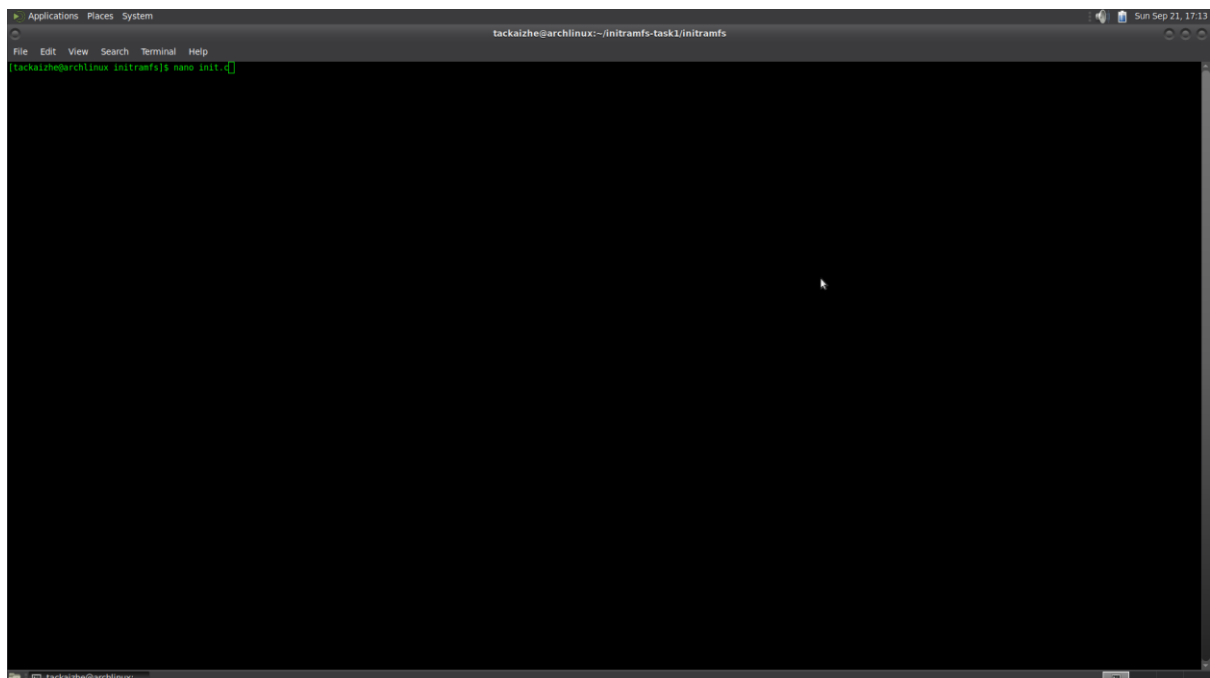
Часть 1

1. Создание папки для файла init

A terminal window titled 'tackaizhe@archlinux:~/initramfs-task1' with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal shows the following commands and output:

```
tackaizhe@archlinux:~/initramfs-task1$ ls
express v2p-ca9.dtb zImage
[tackaizhe@archlinux:~/initramfs-task1$ mkdir initramfs]
```

2. Создание файла init.c

A terminal window titled 'tackaizhe@archlinux:~/initramfs-task1/initramfs' with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal shows the following command and output:

```
[tackaizhe@archlinux:~/initramfs$ nano init.c]
```

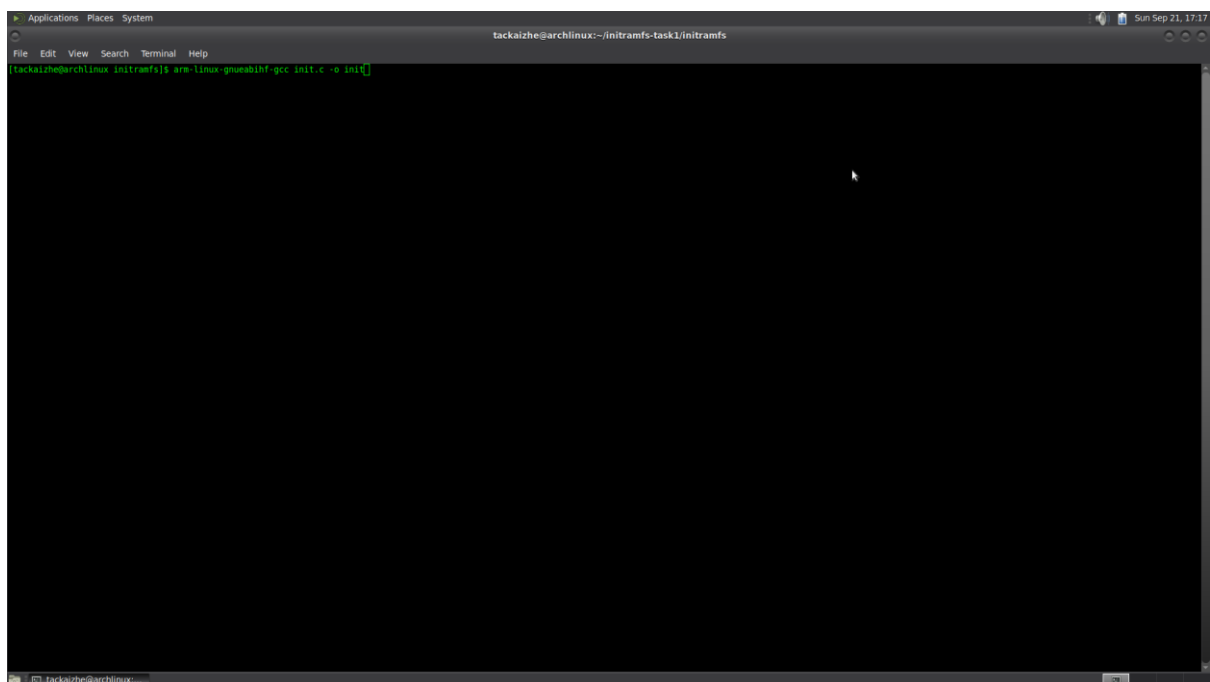
3. Програма init.c



```
GNU nano 2.8 init.c
#include <stdio.h>
#include <unistd.h>

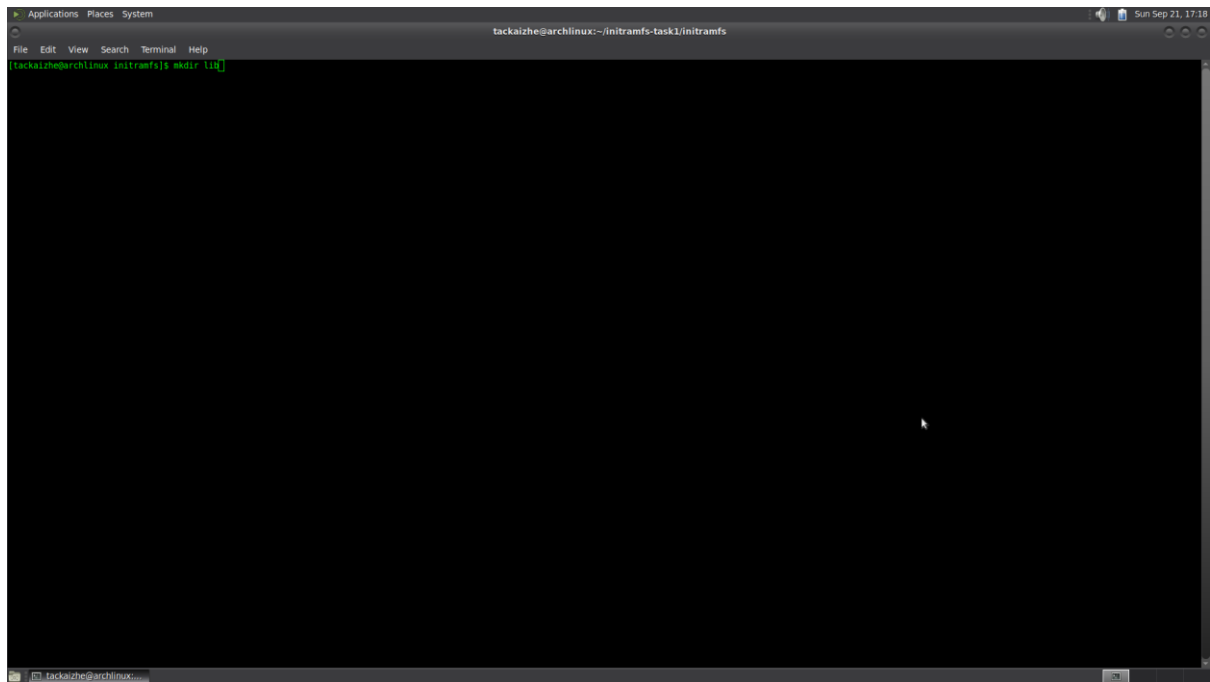
int main(){
    printf("Hello!!!! \n\n");
    sleep(15);
    return 0;
}
```

4. Компиляция

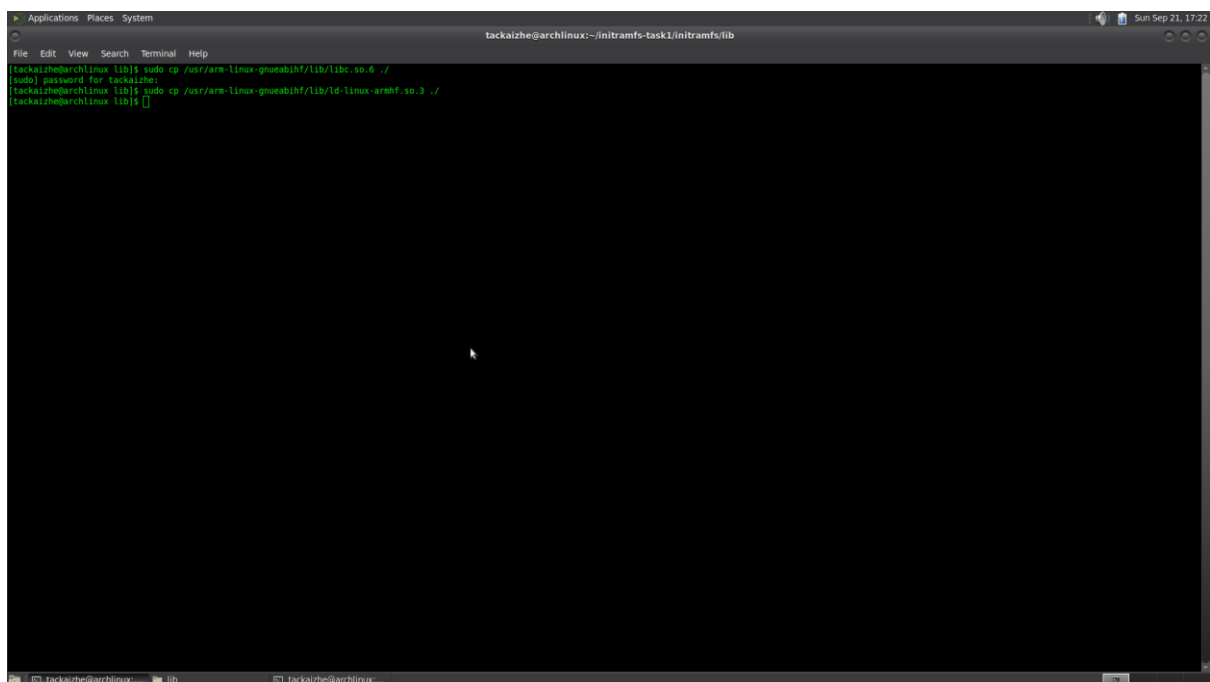


```
tackaizhe@archlinux:~/initramfs-task1/initramfs$ arm-linux-gnueabi-gcc init.c -o init
```

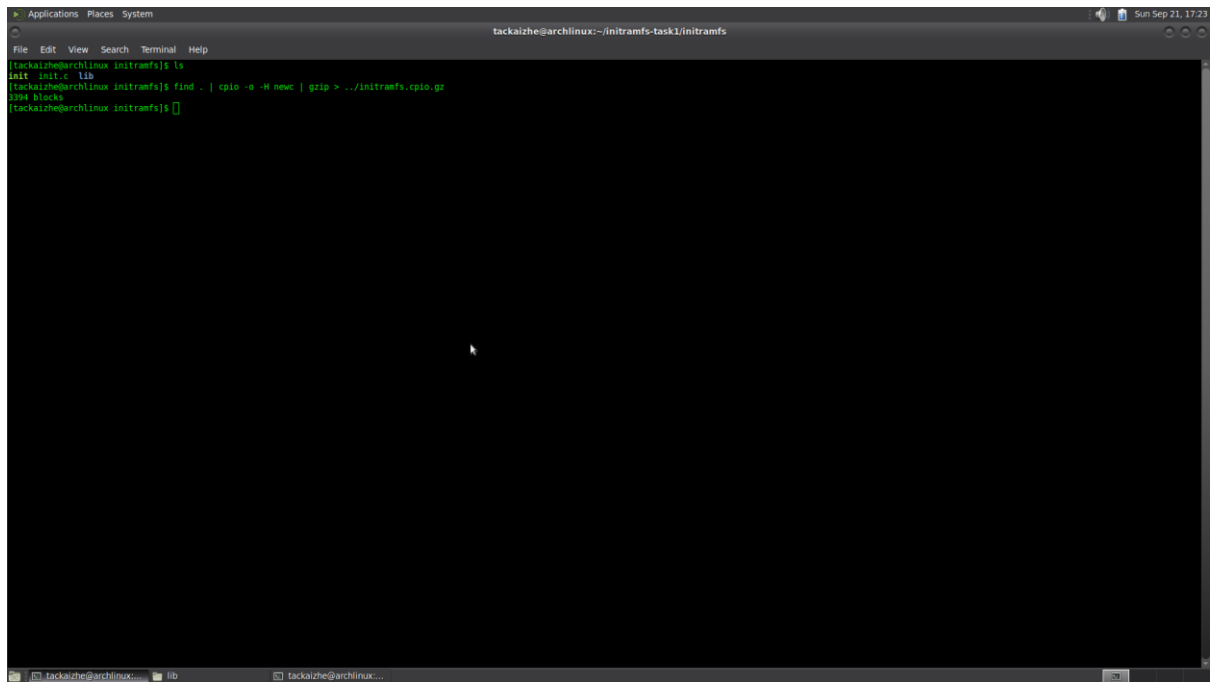
5. Создание папки для библиотек



6. Получение библиотек из компилятора

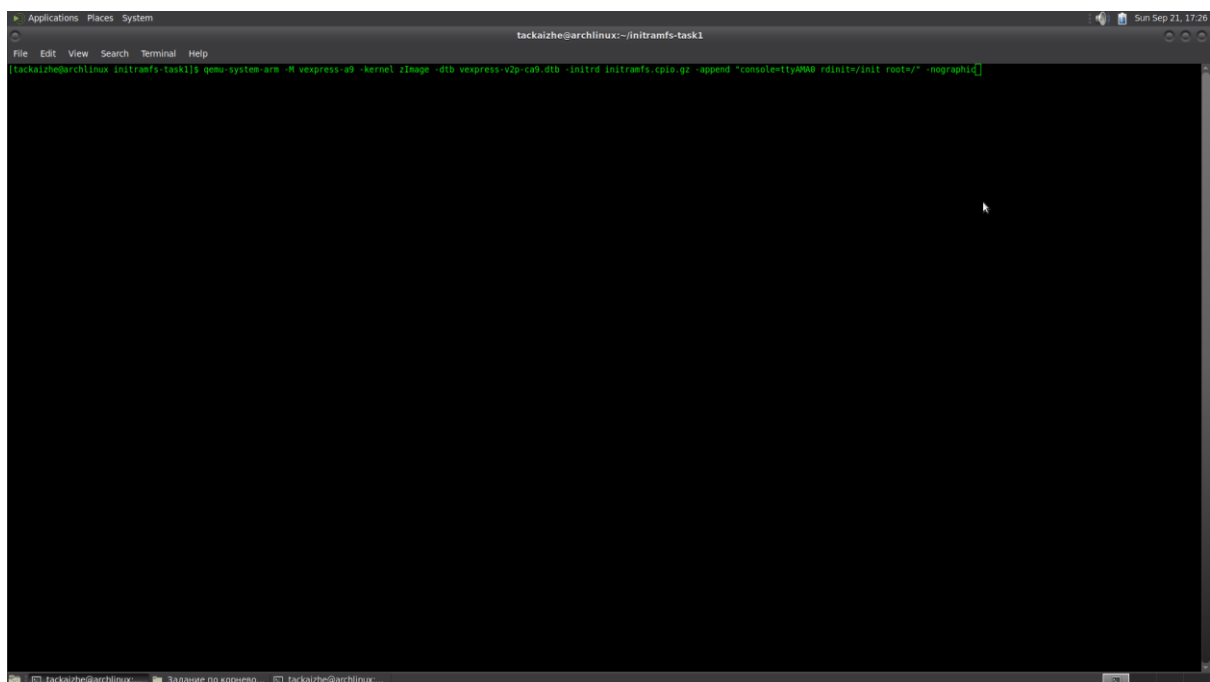


7. Создание initrd



```
tackaizhe@archlinux:~/initramfs-task1/initramfs
File Edit View Search Terminal Help
[tackaizhe@archlinux initramfs]$ ls
init init.c lib
[tackaizhe@archlinux initramfs]$ find . | cpio -o -H newc | gzip > ../initramfs.cpio.gz
3994 blocks
[tackaizhe@archlinux initramfs]$
```

8. Запуск QEMU



```
tackaizhe@archlinux:~/initramfs-task1
File Edit View Search Terminal Help
[tackaizhe@archlinux initramfs-task1]$ qemu-system-arm -M vespress-a9 -kernel zImage -dtb vespress-v2p-ca9.dtb -initrd initramfs.cpio.gz -append "console=ttyAMA0 rdinit=/init root=/" -nographic
```

9. Работа

```
Applications Places System
tackaizhe@archlinux: ~/initramfs-task1
File Edit View Search Terminal Help

1.184041| usbcore: registered new interface driver usb8179.178a
1.184097| usbcore: registered new interface driver cdc_ether
1.184160| usbcore: registered new interface driver smc27xx
1.184223| usbcore: registered new interface driver smc95xx
1.184279| usbcore: registered new interface driver net1080
1.184332| usbcore: registered new interface driver cdc_subset
1.184391| usbcore: registered new interface driver zaurs
1.184455| usbcore: registered new interface driver cdc_ncm
1.254515| lsi1760 4f000000.usb: lsi1760 bus width: 32, dc: digital
1.254528| lsi1760 4f000000.usb: NOP ISP1760 USB Host Controller
1.254547| lsi1760 4f000000.usb: new USB bus registered, assigned bus number 1
1.254547| lsi1760 4f000000.usb: scratch test failed: 80000000
1.254553| lsi1760 4f000000.usb: can't setup: -19
1.254553| lsi1760 4f000000.usb: USB bus 1 deregistered
1.300300| usbcore: registered new interface driver usb-storage
1.317888| rtc-pl831 10017000.rtc: registered as rtc9
1.318522| rtc-pl831 10017000.rtc: setting system clock to 2025-09-21T17:27:21 UTC (1758475641)
1.320620| rtc-dev: rtc-dev entries driver
1.373163| mmc-pl18x 10005000.mmc: Got CD GPIO
1.373269| mmc-pl18x 10005000.mmc: Got WP GPIO
1.375033| sdhci: Secure Digital Host Controller Interface driver
1.375046| sdhci: Copyright(c) Pierre Ossman
1.376957| Synopsys Designware Multimedia Card Interface Driver
1.376958| sdhci-pltfm: SDHCI platform and OF driver helper
1.384275| usbhid: registered new interface driver usbhid
1.384297| usbhid: USB HID core driver
1.385284| mmc-pl18x 10005000.mmc: mmc0: PL181 nanb 41 rev0 at 0x10005000 irq 31,32 (pio)
1.411897| hw perfevents: enabled with armv7 cortex-a9 PMU driver, 7 (0000003f) counters available
1.414528| NET: Registered PF_INET6 protocol family
1.436311| Segment Routing with IPv6
1.436471| In-situ OAM (IOAM) with IPv6
1.436776| sit: IPv6, IPv4 and MPLS over IPv4 tunneling driver
1.438842| NET: Registered PF_PACKET protocol family
1.438872| can: controller area network core
1.439124| NET: Registered PF_CAN protocol family
1.439166| can: raw protocol
1.439272| can: broadcast manager protocol
1.439378| can: netlink gateway - max_hops=1
1.440285| Key type dns_resolver registered
1.440712| ThumbEE CPU extension supported.
1.440763| Registering SMP/DBG emulation handler
1.470219| Loading compiled-in X.509 certificates
1.483741| 10000000.serial: ttyAMA0 at MMIO 0x10000000 (irq = 37, base_baud = 0) is a PL011 rev1
1.486469| printk: console [ttyAMA0] enabled
1.543361| 10000000.serial: ttyAMA1 at MMIO 0x10000000 (irq = 38, base_baud = 0) is a PL011 rev1
1.543865| 10000000.serial: ttyAMA2 at MMIO 0x10000000 (irq = 39, base_baud = 0) is a PL011 rev1
1.544444| 10000000.serial: ttyAMA3 at MMIO 0x10000000 (irq = 40, base_baud = 0) is a PL011 rev1
1.742450| input: ItePS/2 Generic Explorer Mouse as /devices/platform/bus4000000/busb4000000/motherboard-bus4000000:lofga07,00000000/10007000.knl/serial/input/input1
1.887923| input: AT Raw Set 2 keyboard as /devices/platform/bus4000000/busb4000000/motherboard-bus4000000:lofga07,00000000/10005000.knl/serial/input/input2
1.876573| clk: Disabling unused clocks
2.915491| Freeing unused kernel image (initmem) memory: 2048K
2.916841| Run /init as init process

Hello!!!!
```

10. Смерть процесса init

```
Applications Places System
tackaizhe@archlinux: ~/initramfs-task1
File Edit View Search Terminal Help

1.250593| lsi1760 4f000000.usb: USB bus 1 deregistered
1.300300| usbcore: registered new interface driver usb-storage
1.317888| rtc-pl831 10017000.rtc: registered as rtc9
1.318522| rtc-pl831 10017000.rtc: setting system clock to 2025-09-21T17:27:21 UTC (1758475641)
1.320620| rtc-dev: rtc-dev entries driver
1.373163| mmc-pl18x 10005000.mmc: Got CD GPIO
1.373269| mmc-pl18x 10005000.mmc: Got WP GPIO
1.375033| sdhci: Secure Digital Host Controller Interface driver
1.375046| sdhci: Copyright(c) Pierre Ossman
1.376957| Synopsys Designware Multimedia Card Interface Driver
1.376958| sdhci-pltfm: SDHCI platform and OF driver helper
1.384275| usbhid: registered new interface driver usbhid
1.384297| usbhid: USB HID core driver
1.385284| mmc-pl18x 10005000.mmc: mmc0: PL181 nanb 41 rev0 at 0x10005000 irq 31,32 (pio)
1.411897| hw perfevents: enabled with armv7 cortex-a9 PMU driver, 7 (0000003f) counters available
1.414528| NET: Registered PF_INET6 protocol family
1.436311| Segment Routing with IPv6
1.436471| In-situ OAM (IOAM) with IPv6
1.436776| sit: IPv6, IPv4 and MPLS over IPv4 tunneling driver
1.438842| NET: Registered PF_PACKET protocol family
1.438872| can: controller area network core
1.439124| NET: Registered PF_CAN protocol family
1.439166| can: raw protocol
1.439272| can: broadcast manager protocol
1.439378| can: netlink gateway - max_hops=1
1.440285| Key type dns_resolver registered
1.440712| ThumbEE CPU extension supported.
1.440763| Registering SMP/DBG emulation handler
1.470219| Loading compiled-in X.509 certificates
1.483741| 10000000.serial: ttyAMA0 at MMIO 0x10000000 (irq = 37, base_baud = 0) is a PL011 rev1
1.486469| printk: console [ttyAMA0] enabled
1.543361| 10000000.serial: ttyAMA1 at MMIO 0x10000000 (irq = 38, base_baud = 0) is a PL011 rev1
1.543865| 10000000.serial: ttyAMA2 at MMIO 0x10000000 (irq = 39, base_baud = 0) is a PL011 rev1
1.544444| 10000000.serial: ttyAMA3 at MMIO 0x10000000 (irq = 40, base_baud = 0) is a PL011 rev1
1.742450| input: ItePS/2 Generic Explorer Mouse as /devices/platform/bus4000000/busb4000000/motherboard-bus4000000:lofga07,00000000/10007000.knl/serial/input/input1
1.887923| input: AT Raw Set 2 keyboard as /devices/platform/bus4000000/busb4000000/motherboard-bus4000000:lofga07,00000000/10005000.knl/serial/input/input2
1.876573| clk: Disabling unused clocks
2.915491| Freeing unused kernel image (initmem) memory: 2048K
2.916841| Run /init as init process

Hello!!!!

13.273659| amba 1000f000.wdt: deferred probe pending: (reason unknown)
13.273762| amba 1000e000.memory-controller: deferred probe pending: (reason unknown)
13.273777| amba 1000e000.memory-controller: deferred probe pending: (reason unknown)
13.273798| amba 1000e000.watchdog: deferred probe pending: (reason unknown)
17.991994| kernel panic - not syncing: Attempted to kill init! exitcode=0x00000000
17.996488| CPU: 0 UID: 0 PID: 1 Comm: init Not tainted 6.12.0-rc4-WQ25-gb29650731d6 #1 NONE
17.997248| Hardware name: ARM Versatile Express
17.997625| Call trace:
17.998381| 00000000:00000000:00000000:00000000:00000000:00000000:00000000:00000000
17.999625| show_stack from show_stack+0x18/0x14
17.999625| show_stack from dump_stack+0x54/0x68
17.999625| dump_stack from vpanic+0x19/0x2f
18.000285| vpanic from __do_trace_suspend_resume+0x0/0x40
18.001321| ---[ end Kernel panic - not syncing: Attempted to kill init! exitcode=0x00000000 ]---
```

P. S.: Компилятор, который поставляется моим linux (Arch linux) не может собирать статические файлы, он поддерживает только динамическую линковку.

При статической линковке происходит segmentation fault с кодом ошибки 11.