MINIX System Boot Process

🎯 Objective

To understand and modify the MINIX boot process by editing the kernel's source code to display a custom message during the boot phase.
This workshop demonstrates how kernel-level source changes affect the operating system startup behavior.

🧰 Tools Required

- **VirtualBox**
- **MINIX 3** (installed and configured)
- **Access to terminal and kernel source** (`/usr/src/kernel`)
- **Text editor** (`vi` , `nano` , or equivalent)

⚙️ Procedure / Implementation Steps

1. **Boot into MINIX** inside VirtualBox.
   Ensure that the environment is properly configured with root privileges.
2. **Navigate to the kernel source directory:**

   ```
   cd /usr/src/kernel
   ```

3. **Open the `main.c` file:**

   ```
   vi main.c
   ```

4. **Locate the line** that displays the standard MINIX message:

   ```
   printf("MINIX is open source software.\n");
   ```

5. **Insert your custom message** immediately after that line:

```
printf("Modified by : Kabelan G K\n");
```

6. **Save your changes** and exit the editor.
7. **Rebuild the kernel** and prepare a bootable image:

```
cd /usr/src/releasetools
make build
make hdboot
```

8. **Reboot the system** to apply and test the modifications.
9. **Observe the boot sequence** — the new custom line should appear during startup.

🧩 Source Code Modifications

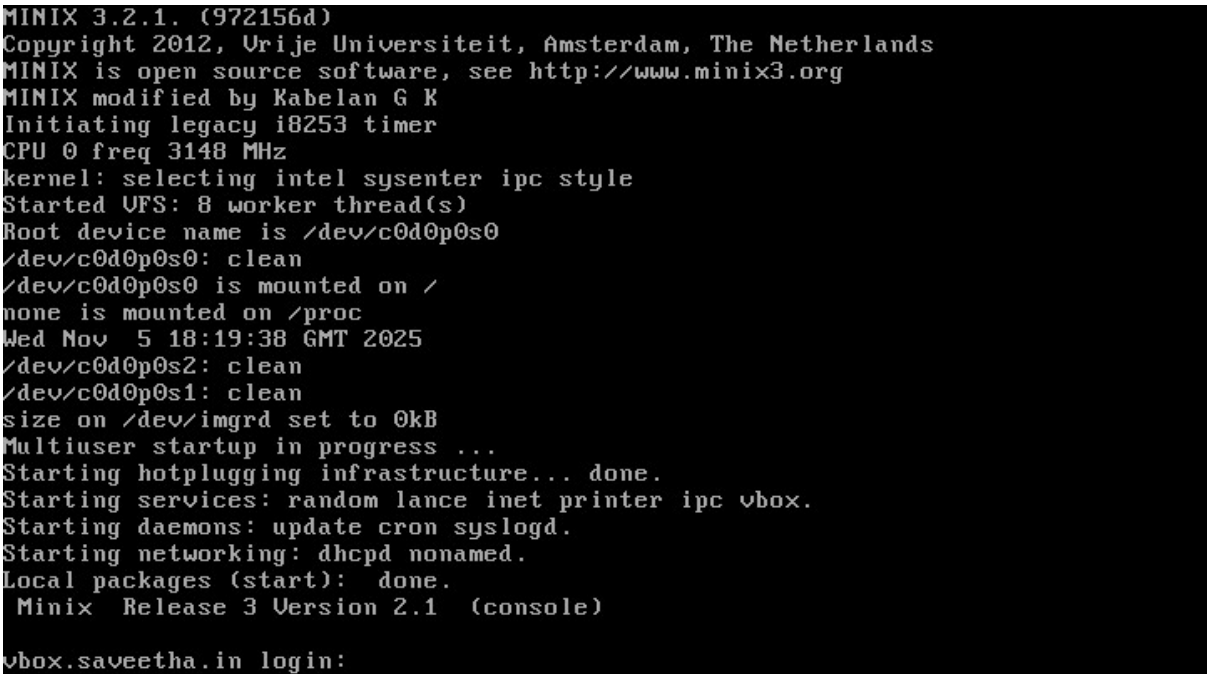
```
/* File: /usr/src/kernel/main.c */

printf("MINIX is open source software.\n");
printf("Modified by : Kabelan G K\n");
```

```
/*===========================================================================*
 *                                announce                                   *
 *===========================================================================*/
static void announce(void)
{
  /* Display the MINIX startup banner. */
  printf("\nMINIX %s.%s. "
#ifdef _VCS_REVISION
        "(" _VCS_REVISION ")\n"
#endif
      "Copyright 2012, Vrije Universiteit, Amsterdam, The Netherlands\n",
      OS_RELEASE, OS_VERSION);

  printf("MINIX is open source software, see http://www.minix3.org\n");
  printf("MINIX modified by Kabelan G K \n");
}

/*===========================================================================*
 *                                prepare_shutdown                           *
 *===========================================================================*/
void prepare_shutdown(const int how)
{
/* This function prepares to shutdown MINIX. */
  static timer_t shutdown_timer;
```

🖥️ Observation / Output

During the MINIX boot process, the following lines are displayed:

```
MINIX is open source software....
Modified by : Kabelan G K
```



📃 Conclusion

The MINIX system boot process was successfully modified to include a custom user-defined message. This demonstrates a practical understanding of:

- The MINIX kernel source structure
- System build and boot image generation (`make build` , `make hdboot`)
- How source-level modifications reflect in system-level behavior

Such exercises strengthen the foundational knowledge of **Operating System internals** and **kernel customization**.