

# The Code of Valkyrie OS

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# 1 Introduction

The Valkyrie Operating System

## 2 Design goals

List your goals here. Examples:

1. Minimal, understandable code.
2. Boot from FAT12/16 image.
3. Small, well-documented boot stages.
4. Incremental testing with tools in ‘tools/’.

## 3 Repository layout

Explain the important folders and files so you don’t have to remember them later.

**src/** Source code for the bootloader and kernel.

**src/bootloader/stage1/** Minimal real-mode assembler stage 1.

**src/bootloader/stage2/** C + assembly for the second stage; FAT, disk access and helpers.

**src/kernel1/** Kernel entrypoint and kernel-related assembly.

**tools/** Utilities (e.g. FAT tools) useful during development.

**docs/** This documentation.

## 4 Boot process

Describe how the system boots and which files are responsible for each step. Keep it chronological.

### 4.1 Stage 1

Explain the stage1 responsibilities (MBR/boot sector constraints) and point to the source file. Example file: ‘src/bootloader/stage1/boot.asm’.

### 4.2 Stage 2

What stage2 does (switch to protected mode or load kernel), where the FAT driver is, and how you link it. Key files: ‘src/bootloader/stage2/main.asm’, ‘src/bootloader/stage2/main.c’, ‘src/bootloader/stage2/fat.c’.

## 5 Important code snippets

You can include code directly or load files from the repo. When you build the PDF locally, listings will include the exact source.

Inline C example:

Listing 1: Minimal example from `stdio.c`

```
1 // src/bootloader/stage2/stdio.c
2 #include "stdio.h"
3 int puts(const char *s) {
4     while (*s) putchar(*s++);
5     return 0;
6 }
```

Inline assembly example:

Listing 2: Boot sector entry (example)

```
1 ; src/bootloader/stage1/boot.asm
2 org 0x7c00
3 cli
4 xor ax, ax
5 mov ds, ax
6 ; ...
```

To include an entire file from the tree (recommended for accuracy):

```
\codefile{C}{../src/bootloader/stage2/main.c}
```

Replace the path above with the relative path from ‘docs/’ to a source file.

## 6 Build and run

Keep simple reproducible commands here. From the project root (one level above ‘docs/’):

- Build OS image: `make`
- Run (QEMU or emulator): `make run`

How to build this PDF (from ‘docs/’):

```
1 # Recommended: use latexmk if available
2 latexmk -pdf -interaction=nonstopmode The_Basics_of_Valkyrie_OS.tex
3
4 # Or the simple sequence
5 pdflatex The_Basics_of_Valkyrie_OS.tex
6 bibtex The_Basics_of_Valkyrie_OS || true
7 pdflatex The_Basics_of_Valkyrie_OS.tex
8 pdflatex The_Basics_of_Valkyrie_OS.tex
```

Notes:

- Using ‘minted’ gives better highlighting but requires ‘shell-escape’ and Pygments; ‘listings’ works everywhere.
- If you include large files from ‘src/’ the PDF will reflect the current source at compile time.

## 7 Development notes

Keep short actionable items here: known bugs, TODOs, testing checklist, and where to find test images.

## 8 Writing tips

Short recommendations to keep docs usable:

- Write short focused sections with a single purpose.
- Add relative paths when referencing source (so you can jump to the file from the PDF viewer in many editors).
- Use `\label{}` and `\ref{}` to cross-reference figures, sections, and listings.
- Prefer including source with `\lstinputlisting` so examples stay correct.

## 9 Appendix: Useful file list

Add short one-line descriptions for the most important files so you don't have to hunt later.

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