

# 45% of AI-generated code has vulnerabilities

! DEVELOPER SECURITY

# AI Security for Developers

Protecting Code in the Age of Agents

```
def secure_agent(agent_config):  
    """Sandbox agent with least privilege."""  
    agent_permissions = {  
        "read": True,  
        "write": False,  
        "exec": False,  
        "network": False,  
        "system": False,  
    }
```

Prompt injection · Data leakage · OWASP LLM

Attack patterns, defenses, and compliance

prompt injection

data leakage

OWASP

MCP security

sandboxing

compliance

```
# OWASP LLM Top 10  
# Prompt injection defense  
# Data leakage prevention  
# Supply chain security  
# MCP server hardening  
# Compliance frameworks
```

# AI Security for Developers

Protecting Code in the Age of Agents

CAIO INCAU

This book is available at <https://leanpub.com/ai-security-for-developers>

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This is a [Leanpub](#) book. Leanpub empowers authors and publishers with the Lean Publishing process. [Lean Publishing](#) is the act of publishing an in-progress ebook using lightweight tools and many iterations to get reader feedback, pivot until you have the right book and build traction once you do.

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# Getting Started

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## Unsure How to Get Started? Try our Book Workshop!

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## How to Write on Leanpub

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## Previewing and publishing

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## Basic formatting

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## Markdown and Markua

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## **Generate a preview version of your book**

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## **Either read a tutorial, or just go for it!**

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## **Read the tutorial...**

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## **...or just go for it!**

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## **Thanks for being a Leanpub author!**

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# Writing in Markua

Writing in Markua is easy! You can learn most of what you need to know with just a few examples.

To make *italic text* you surround it with single asterisks. To make **bold text** you surround it with double asterisks.

## Section One

You can start new sections by starting a line with two # signs and a space, and then typing your section title.

### Sub-Section One

You can start new sub-sections by starting a line with three # signs and a space, and then typing your sub-section title.

## Including a Chapter in the Sample Book

At the top of this file, you will also see a line at the top:

```
1 {sample: true}
```

Leanpub has the ability to make a sample book, which interested readers can download or read online. If you add this line above a chapter heading, then when you publish your book, this chapter will be included in a separate sample book for these interested readers.

## Links

You can add web links easily.

Here's a link to the [Leanpub homepage](#).

## Images

You can add an image to your book in a similar way.

First, add the image to the “Resources” folder for your book. You will find the “Resources” folder under the “Manuscript” menu to the left.

If you look in your book’s “Resources” folder right now, you will see that there is an example image there with the file name “palm-trees.jpg”. Here’s how you can add this image to your book:



If you want to add a figure title, you put it in quotes:



**Figure 1. Palm Trees**

If you want to add descriptive alt text, which is good for accessibility, you put it between the square brackets:



**Figure 2. Palm Trees**

You can also set the alt text and/or the figure title in an attribute list:



**Figure 3. Palm Trees**

Finally, if no title is provided, and the `alt-title` document setting is the default of `all`, the alt text will be used as the figure title instead of as alt text.



**Figure 4. Palm Trees**

You can set the important document settings at Settings > Generation Settings.

## **Lists**

### **Numbered Lists**

You make a numbered list like this:

1. kale
2. carrot
3. ginger

### **Bulleted Lists**

You make a bulleted list like this:

- kale

- carrot
- ginger

## Definition Lists

You can even have definition lists!

### **term 1**

definition 1a

definition 1b

### **term 2**

definition 2

## Page Breaks

We don't recommend that you manually break pages, since that is brittle and can lead to unexpected formatting if you edit text earlier in your chapter and forget about the manual page breaks. But if you really want to add a page break, you use the `{pagebreak}` directive on a line by itself, with blank lines above it and below it.

## Code Samples

You can add code samples really easily. Code can be in separate files (a “local” resource) or in the manuscript itself (an “inline” resource).

### Local Code Samples

Here’s a local code resource:

**Figure 5. Hello World in Ruby**

---

```
1 require 'time'
2
3 # This is just some pointless code so you can see the syntax highlighting...
4 def display_info
5   pi = Math::PI.round(10)
6   time_last_year = (Time.now - 365 * 24 * 60 * 60).getlocal("-08:00")
7   formatted_time = time_last_year.strftime("%Y-%m-%d %H:%M:%S")
8   puts "Pi to 10 decimal places: #{pi}"
9   puts "The time 1 year ago in Pacific Time: #{formatted_time}"
10 end
```

---

### Inline Code Samples

Inline code samples can either be spans or figures.

A span looks like `puts "hello world"` this.

A figure looks like this:

```
1 require 'time'
2
3 # This is just some pointless code so you can see the syntax highlighting...
4 def display_info
5   pi = Math::PI.round(10)
6   time_last_year = (Time.now - 365 * 24 * 60 * 60).getlocal("-08:00")
7   formatted_time = time_last_year.strftime("%Y-%m-%d %H:%M:%S")
8   puts "Pi to 10 decimal places: #{pi}"
9   puts "The time 1 year ago in Pacific Time: #{formatted_time}"
10 end
```

You can also add a figure title using the title attribute:

**Figure 6. Hello World in Ruby**


---

```

1 require 'time'
2
3 # This is just some pointless code so you can see the syntax highlighting...
4 def display_info
5   pi = Math::PI.round(10)
6   time_last_year = (Time.now - 365 * 24 * 60 * 60).getlocal("-08:00")
7   formatted_time = time_last_year.strftime("%Y-%m-%d %H:%M:%S")
8   puts "Pi to 10 decimal places: #{pi}"
9   puts "The time 1 year ago in Pacific Time: #{formatted_time}"
10 end

```

---

## Tables

You can insert tables easily inline, using the GitHub Flavored Markdown (GFM) table syntax:

Header 1	Header 2
Content 1	Content 2
Content 3	Content 4 Can be Different Length

Tables work best for numeric tabular data involving a small number of columns containing small numbers:

Central Bank	Rate
JPY	-0.10%
EUR	0.00%
USD	0.00%
CAD	0.25%

Definition lists are preferred to tables for most use cases, since reading a large table with many columns is terrible on phones and since typing text in a table quickly gets annoying.

## Math

You can easily insert math equations inline using either spans or figures.

Here's one of the kinematic equations  $d = v_i t + \frac{1}{2} a t^2$  inserted as a span inside a sentence.

Here's some math inserted as a figure.

$$\left| \sum_{i=1}^n a_i b_i \right| \leq \left( \sum_{i=1}^n a_i^2 \right)^{1/2} \left( \sum_{i=1}^n b_i^2 \right)^{1/2}$$

**Figure 7. Something Involving Sums**

## Headings

Markua supports both of Markdown's heading styles.

The preferred style, called atx headers, has the following meaning in Markua:

```

1 {class: part}
2 # Part
3
4 This is a paragraph.
5
6 # Chapter
7
8 This is a paragraph.
9
10 ## Section
11
12 This is a paragraph.
13
14 ### Sub-section
15
16 This is a paragraph.
17
18 #### Sub-sub-section
19
20 This is a paragraph.
21
22 ##### Sub-sub-sub-section
23
```

```

24 This is a paragraph.
25
26 ##### Sub-sub-sub-sub-section
27
28 This is a paragraph.

```

Note the use of three backticks in the above example, to treat the Markua like inline code (instead of actually like headers).

The other style of headers, called Setext headers, has the following headings:

```

1 {class: part}
2 Part
3 ====
4
5 This is a paragraph.
6
7 Chapter
8 =====
9
10 This is a paragraph.
11
12 Section
13 -----
14
15 This is a paragraph.

```

Setext headers look nice, but only if you're only using chapters and sections. If you want to add sub-sections (or lower), you'll be using atx headers for at least some of your headers. My advice is to just use atx headers all the time. (The `{class: part}` attribute list on a chapter header to make a part header does actually work with Setext headers, but it's really ugly.)

Note that while it is confusing and ugly to mix and match using atx and Setext headers for chapters and sections in the same document, you can do it. However, please don't.

## Block quotes, Asides and Blurbs

Block quotes are really easy too.

—Peter Armstrong, *Markua Spec*

Asides are useful for longer text.  
But typing them like this isn't fun.

Asides can be written this way, since adding a bunch of A> stuff at the beginning of each line can get annoying with longer asides.

Blurbs are useful

Blurbs are useful

There are many types of blurbs, which will be familiar to you if you've ever read a computer programming book.



This is a discussion.

You can also specify them this way:



This is a discussion



This is an error.



This is information.



This is a question. (Not a question in a Markua course; those are done differently!)



This is a tip.



This is a warning.



This is an exercise. (Not an exercise in a Markua course; those are done differently!)

## Good luck, have fun!

If you've read this far, you're definitely the right type of person to be here!

Our last piece of advice is simple: once you have a couple chapters completed, publish your book in-progress!

This approach is called Lean Publishing. It's why Leanpub is called Leanpub.

If you want to learn more about Lean Publishing, read [this](#) or watch [this](#).

\* \* \*

**author: Caio Incau date: "2026-05-25T13:41:16Z"**

**identifier:**

**"urn:uuid:9224380c-44fa-4fba-a29b-526741c89a23"**

**language: en title: AI Security for Developers**

`[]{#title_page.xhtml}`

`[]{#ch001.xhtml}`

# Preface

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## Who this book is for

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## How this book is organized

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## What you need

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# Chapter 1 -- The New Attack Surface

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## The pre-AI security model

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## What AI changes

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## The new threat categories

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## Why traditional AppSec is not enough

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## A defense-in-depth model for AI

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## Common mistakes

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# Chapter 2 -- How AI-Generated Code Introduces Vulnerabilities

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## Why AI writes insecure code

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## The vulnerability taxonomy

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### SQL injection

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### Cross-site scripting (XSS)

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### Hardcoded credentials and secrets

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## Insecure cryptographic practices

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## Measuring your exposure

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## **Next chapter**

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# Chapter 3 -- Prompt Injection: The SQL Injection of AI

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## How prompt injection works

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## The attack taxonomy

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### Direct prompt injection

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### Indirect prompt injection

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## Why there is no parameterized query equivalent

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## Building layered defenses

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### Layer 2: Prompt hardening

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### Layer 3: Output validation

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### Layer 4: Structural separation

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# Chapter 4 -- Data Leakage and Model Extraction

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## Training data memorization

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## How memorization works

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## What gets memorized

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## Context window exposure

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## System prompt extraction

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## Conversation history leakage

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## Model extraction attacks

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## The economics of model theft

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## How extraction works

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## Defending against model extraction

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## Practical data loss prevention for AI

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# Chapter 5 -- Securing AI-Generated Code

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## Static analysis for AI-generated code

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### Bandit: Python security linter

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### Semgrep: pattern-based analysis

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## Building the CI/CD security gate

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## GitHub Actions integration

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## Automated fix suggestions

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# Chapter 6 -- Secure Coding with AI Assistants

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## Security-aware prompting

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## The security prompt template

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## The security review checklist for AI code

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## Configuring AI assistants for security

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## Project-level security instructions

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## Pre-commit hooks for AI code

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## The review workflow

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# Chapter 7 -- Input Validation for AI Systems

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## Input validation architecture

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## Pre-model input filters

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## Length and format validation

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## Injection pattern detection

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## Content policy enforcement

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## Runtime guardrails

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## Output sanitization

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## Putting it all together

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# Chapter 8 -- Authentication and Authorization with AI

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## The agent authentication problem

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## OAuth 2.0 for AI agents

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## API key management for AI services

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## The principle of least privilege for AI agents

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## Middleware for AI endpoint protection

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# Chapter 9 -- Securing MCP Servers

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## The MCP security model

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## Server hardening

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## Parameter sanitization for dangerous tools

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## Transport security

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## Production deployment patterns

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## The gateway pattern

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# Chapter 10 — Securing AI Agents in Production

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## The agent threat model

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## Sandboxing agent execution

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## Network isolation

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## Resource limits and quotas

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## Comprehensive audit trails

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## Putting it all together: the secure agent runtime

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## Third-party model evaluation

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## AI Software Bill of Materials (AI-SBOM)

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# Chapter 12 -- Monitoring and Incident Response

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## What to monitor

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## Building the monitoring pipeline

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## Detection rules

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## Incident response playbooks

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## Forensic analysis

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# Chapter 13 -- Compliance and Regulatory Requirements

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## OWASP Top 10 for LLM Applications

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## EU AI Act security requirements

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## SOC 2 implications for AI

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## Automated compliance evidence collection

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# Chapter 14 -- Building a Security-First AI Practice

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## The DevSecAI workflow

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## Threat modeling for AI systems

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## Security training program

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## The security champion model

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