

3: Setting Up Your Environment

This module focuses on setting up all the tools you'll need to build and interact with blockchain systems, covering everything from writing a basic blockchain in Python to building decentralized applications (dApps) using JavaScript and Solidity.

3.1 Tools and Languages Overview

We'll use the following:

- **Python:** For understanding blockchain fundamentals by building a simple blockchain.
 - **JavaScript with Node.js:** For interacting with smart contracts and creating dApps.
 - **Solidity:** To write smart contracts for Ethereum.
 - **Ganache:** A local Ethereum blockchain for testing.
 - **MetaMask:** A browser extension for interacting with blockchains.
 - **Truffle:** A framework for developing, testing, and deploying smart contracts.
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3.2 Setting Up Python

We'll start by building a simple blockchain from scratch using Python. Follow these steps:

1. **Install Python:**

- **macOS:**

brew install python3

- **Windows:** Download the installer from the [official Python website](#) and follow the installation instructions.
- **Linux:**

sudo apt-get install python3

2. **Verify Python Installation:** Open a terminal or command prompt and type:

python3 --version

3. **Install Flask:** Flask is a lightweight Python framework for building web applications. Install it using:

pip install Flask

4. **Verify Flask Installation:**

flask --version

3.3 Setting Up Node.js

Node.js is essential for creating dApps and interacting with smart contracts.

1. **Install Node.js:** Download and install Node.js from the [official website](#). Choose the **LTS (Long-Term Support)** version for stability.
2. **Verify Node.js and npm Installation:** Run the following commands to check if Node.js and npm (Node Package Manager) are installed correctly:

node --version

npm --version

3.4 Setting Up Truffle and Ganache

Truffle and Ganache are core tools for Ethereum development.

1. **Install Truffle:** Truffle is a development framework for Ethereum. Install it globally using npm:

npm install -g truffle

Verify the installation:

truffle version

2. **Install Ganache:** Ganache is a personal blockchain for Ethereum development. Download the application from the official Ganache website and install it.

3.5 Setting Up MetaMask

MetaMask is a browser extension that acts as a cryptocurrency wallet and allows dApps to interact with blockchains.

1. Install the MetaMask extension for your browser from the [official MetaMask website](#).
2. Follow the setup wizard to create a wallet or import an existing one.