Complete Guide to Installing Python

This guide provides detailed instructions for installing Python on different operating systems (Windows, macOS, and Linux). Python is the prerequisite for creating virtual environments and running the Mankind Matrix project.

Windows Installation

Method 1: Using the Official Installer (Recommended)

1. **Download the installer**:
    - Go to python.org/downloads
    - Click on the "Download Python" button (latest version recommended, 3.8 or newer)
2. **Run the installer**:
    - Check the box that says "Add Python to PATH" (**very important**)
    - Click "Install Now" for a standard installation
    - Alternatively, choose "Customize installation" if you need specific options
3. **Verify the installation**:
    - Open Command Prompt (type "cmd" in the Windows search bar)
    - Type: `python --version`
    - You should see the Python version displayed

Method 2: Using Microsoft Store

1. **Open Microsoft Store**
2. **Search for Python**
3. **Select** the latest version (e.g., "Python 3.10")
4. **Click "Get"** to install

Method 3: Using Chocolatey (For Advanced Users)

If you have Chocolatey package manager installed:

1. **Open Command Prompt as Administrator**
2. **Run**: `choco install python`

macOS Installation

Method 1: Using the Official Installer

1. **Download the installer**:
    - Go to python.org/downloads
    - Click on "Download Python" for the latest version
2. **Run the installer**:
    - Double-click the downloaded .pkg file
    - Follow the installation wizard instructions
3. **Verify the installation**:
    - Open Terminal
    - Type: `python3 --version`
    - You should see the Python version displayed

Method 2: Using Homebrew (Recommended for macOS)

1. **Install Homebrew** (if not already installed):
    - Open Terminal
    - Run: `/bin/bash -c "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/HEAD/install.sh)"`
2. **Install Python**:
    - Run: `brew install python`
3. **Verify the installation**:
    - Run: `python3 --version`

Linux Installation

Ubuntu/Debian:

Python is usually pre-installed, but to ensure you have the latest version:

Update package lists:

```
sudo apt update
```

1.

Install Python:

```
sudo apt install python3 python3-pip python3-venv
```

2.

Verify the installation:

```
python3 --version
```

3.

Fedora:

Install Python:

```
sudo dnf install python3 python3-pip
```

1.

Verify the installation:

```
python3 --version
```

2.

CentOS/RHEL:

Install Python:

```
sudo yum install python3 python3-pip
```

1.

Verify the installation:

```
python3 --version
```

2.

Troubleshooting Common Installation Issues

"Python is not recognized as an internal or external command" (Windows)

This error occurs when Python is not in your PATH environment variable.

Solution:

1. Reinstall Python and make sure to check "Add Python to PATH"
2. Or manually add Python to PATH:
    - Search for "Environment Variables" in Windows search
    - Edit the PATH variable and add the Python installation directory

Permission Errors on Linux/macOS

Solution:

- Use `sudo` before the installation commands
- Check that you have proper permissions for the directories

Multiple Python Versions

If you have multiple Python versions installed:

On Windows:

- Use `py -3.x` to specify the version (e.g., `py -3.9`)

On macOS/Linux:

- Use `python3.x` to specify the version (e.g., `python3.9`)

Setting Up Basic Configuration

Installing pip (Python Package Manager)

Pip usually comes with Python installations, but if not:

Windows:

curl https://bootstrap.pypa.io/get-pip.py -o get-pip.py
python get-pip.py

macOS/Linux:

curl https://bootstrap.pypa.io/get-pip.py -o get-pip.py
python3 get-pip.py

Upgrading pip

Windows:

python -m pip install --upgrade pip

macOS/Linux:

python3 -m pip install --upgrade pip

Verifying Your Python Environment

Run the following commands to check your Python environment:

```
# Check Python version
python --version  # Windows
python3 --version  # macOS/Linux

# Check pip version
pip --version  # Windows
pip3 --version  # macOS/Linux

# List installed packages
pip list  # Windows
pip3 list  # macOS/Linux
```

Next Steps

After successfully installing Python, you can proceed to set up a virtual environment for your Mankind Matrix project as described in the virtual environment setup guide.