Missing Class Before College

Package Manger, Shell, Vscode and Markdown

Zhaojiacheng Zhou

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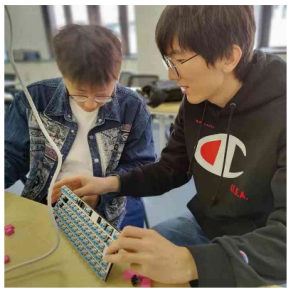
TechJI

Outline

TechJI Introduction

Who are we?

- Fans of Computer Science (but not focs)
- Host tech related workshop like linux install party, git, bash, reflow ...



机械键盘

DIY

Reflow

Create your own electrical cat

Git

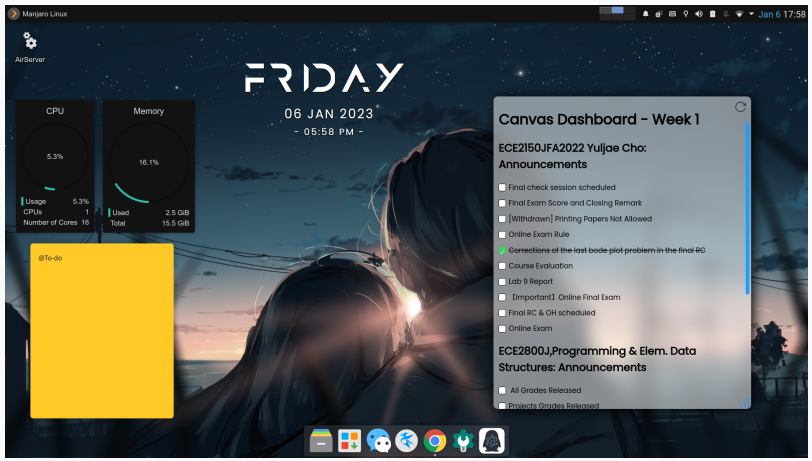
"Handle everything with speed and efficiency"

Bash

An SH-Compatible Shell

Who are we?

- Conduct a bunch of open source project development like course selection community, dancing party software, canvas helper...
- Post online tutorial like terminal beautify...



Package Manager

Introduction to package manager

- A package manager or package management system (PMS) is a collection of software tools that automates the process of installing, upgrading, configuring, and removing computer programs for a computer in a consistent manner.

Problem solved

- **Dependency Hell**: Different software packages require different, and sometimes conflicting, versions of the same shared libraries. Package managers solve this by managing and allowing for the coexistence of multiple library versions.
- **Manual Installation**: Package managers eliminate the need for users to manually download, compile, and install software, which can be a complex and time-consuming process.
- **Synchronization Issues**: They ensure that the list of installed software is always consistent and up-to-date with a central database, preventing conflicts and missing prerequisites that could arise from manual interventions.

How It Works

A package manager operates by interacting with three key components:

- **Packages**: Packages are the fundamental units of a PMS. A package is a file that contains the application, its necessary files, and metadata like the name, version, and dependencies.
- **Repositories**: These are centralized locations or servers where packages are stored. A package manager downloads packages from these repositories.
- **Local Database**: The package manager maintains a local database on the user's system. This database keeps a record of all installed packages, their versions, and their dependencies.

Examples

- Windows: winget, scoop, chocolatey
- Macos: homebrew, macport
- Linux: pacman, apt, dnf ...

Mirror

- The mirror/source config of package defines where your package manager fetch remote packages
- It can be customized to improve download speed and availability
- There are many good quality source like tsinghua, ustc...

Exercise: vscode installation

- Windows users: use winget to install vscode
- Macos users: download homebrew and install vscode
- Linux users: you should now how to do so

You can install vscodium if you value your privacy since it is open source and no one will steal your data and code :)

Exercise: vscode installation (Windows)

1. Check USTC Mirror and change your source
2. Proof read winget –help
3. Run the following command to install vscode

```
winget install --location
↪  <path-you-want-to-install>
↪  Microsoft.VisualStudioCode
```

Exercise: vscode installation (Macos)

1. Download homebrew from tsinghua mirror
2. Run the following script to install homebrew

```
xcode-select --install
export HOMEBREW_BREW_GIT_REMOTE="https://mirrors.t
 ↪  una.tsinghua.edu.cn/git/homebrew/brew.git"
export HOMEBREW_CORE_GIT_REMOTE="https://mirrors.t
 ↪  una.tsinghua.edu.cn/git/homebrew/homebrew-core
 ↪  .git"
export HOMEBREW_INSTALL_FROM_API=1
export HOMEBREW_API_DOMAIN="https://mirrors.tuna.t
 ↪  singhua.edu.cn/homebrew-bottles/api"
export HOMEBREW_BOTTLE_DOMAIN="https://mirrors.tun
 ↪  a.tsinghua.edu.cn/homebrew-bottles"
git clone --depth=1 https://mirrors.tuna.tsinghua.
 ↪  edu.cn/git/homebrew/install.git brew-install
/bin/bash brew-install/install.sh
rm -rf brew-install
```

Exercise: vscode installation (Macos)

For apple scilicon CPU user run following command

```
test -r ~/.bash_profile && echo 'eval
 ↪  "$(/opt/homebrew/bin/brew shellenv)"' >>
 ↪  ~/.bash_profile
test -r ~/.zprofile && echo 'eval
 ↪  "$(/opt/homebrew/bin/brew shellenv)"' >>
 ↪  ~/.zprofile
```

Exercise: vscode installation (Macos)

For long term substitution of mirror, run following command, also see this website

```
export HOMEBREW_CORE_GIT_REMOTE="https://mirrors.t
 ↪  una.tsinghua.edu.cn/git/homebrew/homebrew-core
 ↪  .git"
for tap in core cask command-not-found; do
brew tap --custom-remote "homebrew/${tap}"
 ↪  "https://mirrors.tuna.tsinghua.edu.cn/git/home
 ↪  brew/homebrew-${tap}.git"
done
brew update
```

Exercise: vscode installation (Macos)

- Proof read brew –help
- Run the following command to install vscode

```
brew install --cask visual-studio-code
```

Exercise: vscode installation (Linux)

1. Check vscode official website and download
2. For Ubuntu users, I don't recommend you to use snap

Shell

Introduction to shell

- A shell is a command-line interpreter that provides a user interface for accessing an operating system's services.
- It allows users to execute commands, manage files, and run programs through text-based inputs.
- Consider it as a direct communication channel between you and your computer's operating system.

Types of shells

- **PowerShell (Windows)**: A task automation and configuration management framework from Microsoft.
- **Bash (Linux/Mac)**: The Bourne Again Shell, the default shell on most Linux distributions and older macOS versions.
- **Zsh (Mac/Linux)**: An extended version of Bash with additional features like better auto-completion and theme support.

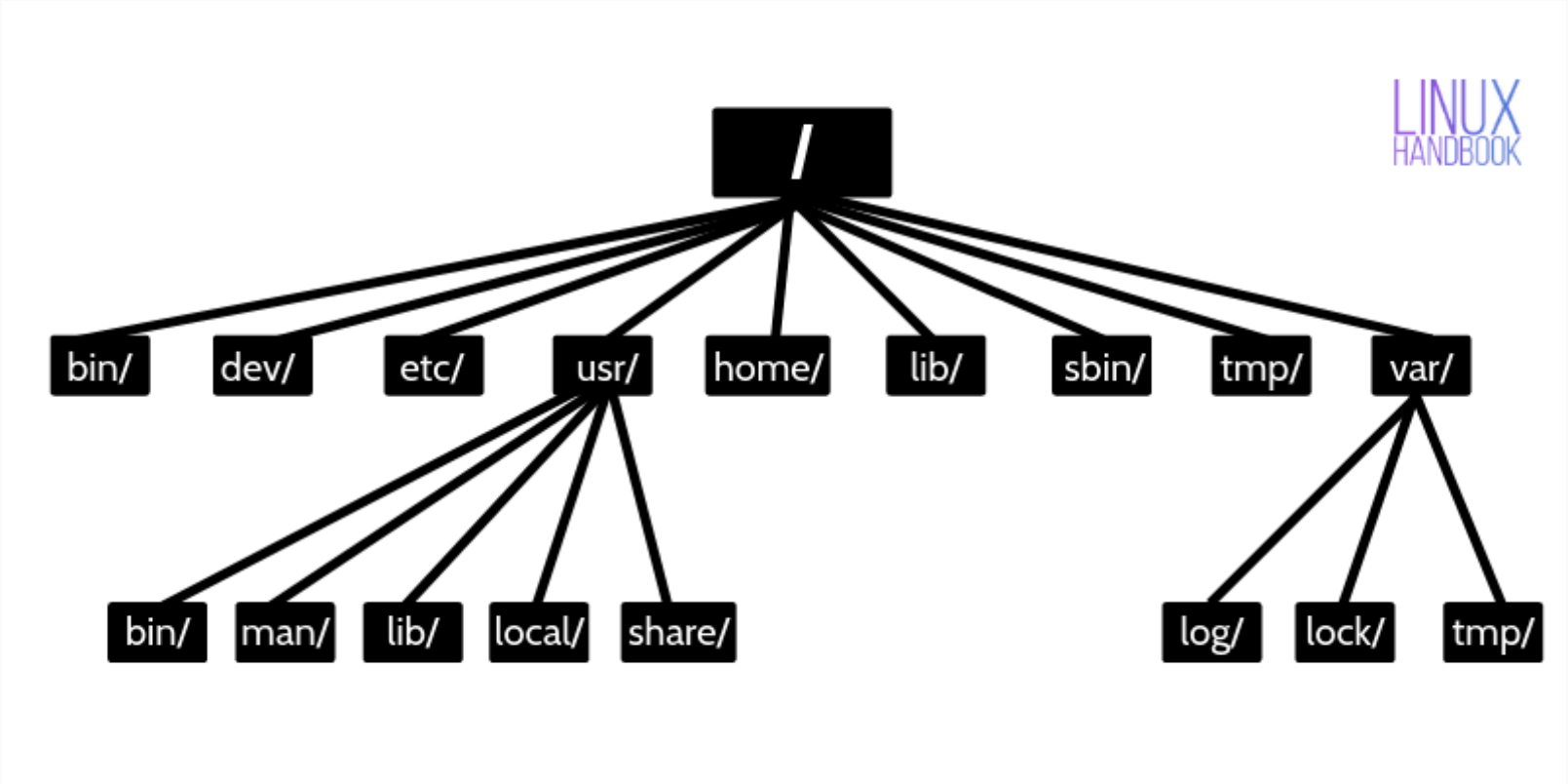
Why zsh?

- Enhanced auto-completion for commands, file paths, and options
- Better customization options with themes and plugins
- Improved file globbing and array handling
- Spelling correction and approximate completion
- Built-in support for Git and other version control systems
- macOS has made zsh the default shell since Catalina (10.15)

WSL installation

- For Macos and Linux users, you can take a rest
- For windows users, check the wsl installation manual wsl.pdf

File organization in Linux



File organization in Linux

- /: Root directory - the base of the entire file system
- **/home**: User home directories (your personal files)
- **/etc**: System configuration files
- **/usr**: User programs and support files
- **/var**: Variable data like logs, databases, websites
- **/tmp**: Temporary files
- **/bin**: Essential command binaries
- **/lib**: Essential shared libraries and kernel modules
- **/dev**: Device files
- **/proc**: Process information and system information

For more detailed information, check this wiki

Basic bash commands

- **pwd**: Print working directory - shows your current location in the file system
- **ls**: List directory contents (files and folders)
- **cd**: Change directory - navigate between folders
- **mkdir**: Create a new directory
- **touch**: Create an empty file or update file timestamps
- **cp**: Copy files or directories
- **mv**: Move or rename files or directories
- **rm**: Remove files or directories
- **cat**: Display file contents
- **echo**: Print text or variables to the terminal
- **>**: Redirect stdout to overwrite file
- **»**: Redirect stdout to append file

Practical examples

```
# Navigate to your home directory
cd ~

# List files in long format
ls -l

# Create a new directory
mkdir my_project

# Navigate into the directory
cd my_project

# Create a new file
touch README.md

# Copy a file
cp README.md README_copy.md
```

Practical examples

```
cd ~/my_project
# redirect stdout into files
echo "fooo" >foo
echo "barrr" >bar

# concatenate two files
cat foo bar

# Go to parent path
cd ..

# Dangerous!!! You'd better use project like
 ↪  trash-cli
rm -rf my_project
```

Environment Variable

- We know that, ls is at /bin/ls, but we can directly use ls command.
- This is the benefit of PATH environment variable.
- The PATH define where OS finds the executable files.
- You can use **echo $PATH** to check your current PATH

Environment Variables

- What are environment variables?
- Environment variables, often called **ENVs**, are dynamic values that play a crucial role in controlling the behavior of programs and processes in Linux and other operating systems.

Environment Variables (Examples)

```
FOO="fooo"
echo $FOO
set # display all the ENVs(global as well as local)
env # display all the global ENVs

# local variable won't show, don't use " here
bash -c 'echo $FOO'

export FOO="fooo" # define a global variable

# global variable will show
bash -c 'echo $FOO'

unset FOO
```

Environment Variables (Examples)

How to set up proxy in shell

```
export
 ↪  http_proxy="(http)|(socks5)://127.0.0.1:<port>"
export https_proxy="(http)|(socks5)://127.0.0.1:<p
 ↪  ort>"
export
 ↪  all_proxy="(http)|(socks5)://127.0.0.1:<port>"

curl -i www.google.com # test with google
```

VS Code

Introduction to VS Code

- Visual Studio Code is a “free”, “open-source” code editor developed by Microsoft
- Supports debugging, syntax highlighting, intelligent code completion, snippets, and embedded Git
- Highly extensible through a vast marketplace of plugins and extensions
- Available for Windows, macOS, and Linux
- Built with Electron framework and written in TypeScript

Key features

- **Extensions**: Thousands of extensions to add new languages, themes, and tools
- **LSP**: Support many lsp for syntax highlighting and intellisense
- **Customizable**: Highly customizable interface and keybindings
- **Integrated terminal**: Built-in terminal for running commands
- **Git integration**: Built-in Git support for version control
- **Copilot integration**: Smart code completion that understands your code context

Extension marketplace

- Access thousands of extensions through the Extensions view (Ctrl+Shift+X)
- Categories include:
  - Programming languages (Python, JavaScript, Java, C++, etc.)
  - Linters and formatters
  - Themes and icon packs
  - Productivity tools
  - Fun extensions

Productivity shortcuts

- **Quick Open**: Ctrl+P (Cmd+P on Mac) to quickly open files
- **Command Palette**: Ctrl+Shift+P (Cmd+Shift+P on Mac) for all commands
- **Multi-cursor**: Alt+Click (Option+Click on Mac) for multiple cursors
- **Column selection**: Shift+Arrow keys (Shift+Arrow on Mac)
- **Integrated terminal**: Ctrl+‘ (Ctrl+ on some keyboards) to open terminal
- **Split editor**: Ctrl+ (Cmd+ on Mac) to split your view

You can search in command palette with key “Preferences: Open Keyboard Shortcuts” to customize your keybindings

Recommended extensions

- **Theme**: Personally I use github theme
- **Remote-ssh**: Useful for windows users to connect their wsl
- **Remote - SSH: Editing Configuration Files**: Edit SSH configuration files conveniently
- **Gitlens**: Beautify git visualizer
- **Vim**: Vim keybindings and cmd mode for vscode

Exercises

- Install a theme for your vscode
- Install Markdown all in one, markdownlint, Markdown Preview Github Styling and Markdown PDF

Tips for beginners

- Start with default settings and gradually customize as you learn
- Install extensions only when you need them to avoid clutter
- Learn keyboard shortcuts to improve your coding speed
- Use the Explorer view to navigate your project files
- Use the integrated Git features for version control

Explore more features by attending vscode workshop!

Markdown

markdown

Check markdown dir

Recommendation

Recommended websites

- Sub websites from stack exchange like Stackoverflow and Math Stackexchange
- Github
- Arch wiki

The Correct Way to Use Search Engines

- Use reliable search engines for technical queries, e.g., **Google**, **DuckDuckGo**, **Bing**.
- Avoid region-limited engines for technical searches (e.g., **Baidu**) due to irrelevant advertisements or outdated documentation.
- Use advanced search operators for more precise results:
  - `site:stackoverflow.com <query>` → search only on StackOverflow
  - `filetype:pdf <query>` → search for PDF files
  - `"exact phrase"` → search exact matches
- Use programming-specific search tools:
  - GitHub search: find code examples and projects
  - StackOverflow: find solutions to common errors
  - Official documentation: most reliable, do always verify with source

The Correct Way to Use AI

- **Define the problem clearly:**
  - Be specific about your goal, the role of AI in this process and expected output.
  - Break complex tasks into smaller, manageable sub-tasks.
- **Validate AI output:**
  - Cross-check AI suggestions with official documentation, scientific sources, or authoritative references.
  - Treat AI output as a recommendation, not absolute truth.
- **Leverage AI effectively:**
  - Avoid blindly copying output; understand and adapt it, else, you learn nothing from this chat but waste your time.
  - Make sure you understand what AI is doing. AI may create dangerous cmd and ruin up your env.
  - Don’t abuse AI in hard homework. Most homework is deliberately designed to help you understand the course content.
- **Maintain privacy and security:**
  - Do not share sensitive data unless you trust the platform.
  - Prefer anonymized or synthetic examples when possible.

The Correct Way to Use AI

- Google Gemini can read pdf and images without limitation and you can use Pro for free for 12 months after college verification.
- Chatgpt deepresearch is especially helpful when you want to learn a field you don't know. It is a very good tools when you are doing survey in research.
- Qwen-code, gemini-cli is free agent coding tools you can use.

Comments on GC life

- Maintain your passion
- Explore more possibilities
- Don’t push yourself too hard

Thank You

Questions?