Secure Password Generator (CLI)

A Cryptographically-Secure Python Command-Line Tool

Project Overview

- This is a Python-based CLI tool for generating strong, random passwords.
- It uses the secrets module for cryptographic security.
- Works on Linux, macOS, Windows terminals.
- Requires no external dependencies.

Why It's Needed

- Weak passwords lead to security risks.
- Users often reuse or manually create predictable passwords.
- A CLI tool allows fast generation directly from terminal.
- Useful for developers, sysadmins, security-conscious users.

Key Features

- Fully customizable password generation.
- Supports lowercase, uppercase, digits, symbols.
- Custom symbol sets.
- Exclude characters.
- Remove ambiguous characters (O/0, I/l/1).
- Enforce at least one of each chosen character class.
- No-repeat mode (no duplicate characters).
- URL-safe mode.
- Prefix and suffix support.
- Generate one or many passwords.

Security Features

- Uses secrets.choice() and secrets.randbelow() for secure randomness.
- Avoids Python's insecure random module.
- Supports entropy calculation.
- Can copy results to clipboard using system tools (wl-copy, xclip, pbcopy).

Output Formats

- Plain text
- JSON
- CSV

Example Commands

```
./spg.py
./spg.py -l 24
./spg.py -n 5 -l 20
./spg.py --upper --digits
./spg.py --url-safe -l 32
./spg.py --format json > output.json
./spg.py --format csv > output.csv
```

How It Works Internally

- Builds a character pool based on selected options.
- Ensures required classes and constraints.
- Uses secure shuffle algorithm.
- Generates the requested number of passwords.

Project Structure

```
spg.py          # main CLI script
README.md       # documentation
```

Installation

- Simple steps:

```
chmod +x spg.py
sudo mv spg.py /usr/local/bin/spg
```

Use Cases

- Developers creating secrets or API keys.
- Sysadmins configuring servers.
- Automating password creation in scripts.
- Generating URL-safe tokens.

Conclusion

- Lightweight but powerful CLI tool.
- Helps generate secure passwords quickly.
- Customizable, scriptable, and safe.
- Suitable for both personal and professional use.