Task 3: FOSSEE LPMS (Linux Package Management System)

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Link to project: https://github.com/suchinton/FOSSEE_LPMS

Overview: This submission is in context to the specifications of Task 3: Linux Package Management System, i.e.

- The entire setup (Verilator and the GUI) is packaged to run on any Linux-based OS.
- Offers the option to install Verilator on a system with a single click.
- Instructions to package and execute have been specified.

To satisfy these requirements, this project utilises these tools,

- **Verilator:** A free and open-source software tool which converts Verilog (a hardware description language) to a cycle-accurate behavioural model in C++ or SystemC.
- **PyQt5 (pip):** Used to create the GUI component (Python bindings for Qt5 framework)
- **Pyinstaller (pip):** Used to create one file binary (Executable) from a python program
- **Appimagetool (Appimage):** Used to create a platform-independent package, with no additional dependencies

Explaining Approach/ Functionalities:

➢ **GUI (Using PyQt5):** The GUI consists of two main tabs, namely “Generate” and “Installation”, where the “Generate” tab allows the end user to select either just a Verilog (.v) file or both a Verilog (.v) and a Cpp (.cpp) file; it then provides the option to pick the output directory after pressing the “Accept” button.

The “Installation” tab provides instructions to resolve dependencies required by Verilator on Ubuntu and provides a one-click install option for verilator if not installed already.

The commands for installation of Verilator and building of Vour output/ executable run on separate threads, to keep the GUI responsive and display operations taking place on the output field of the two tabs respectively.

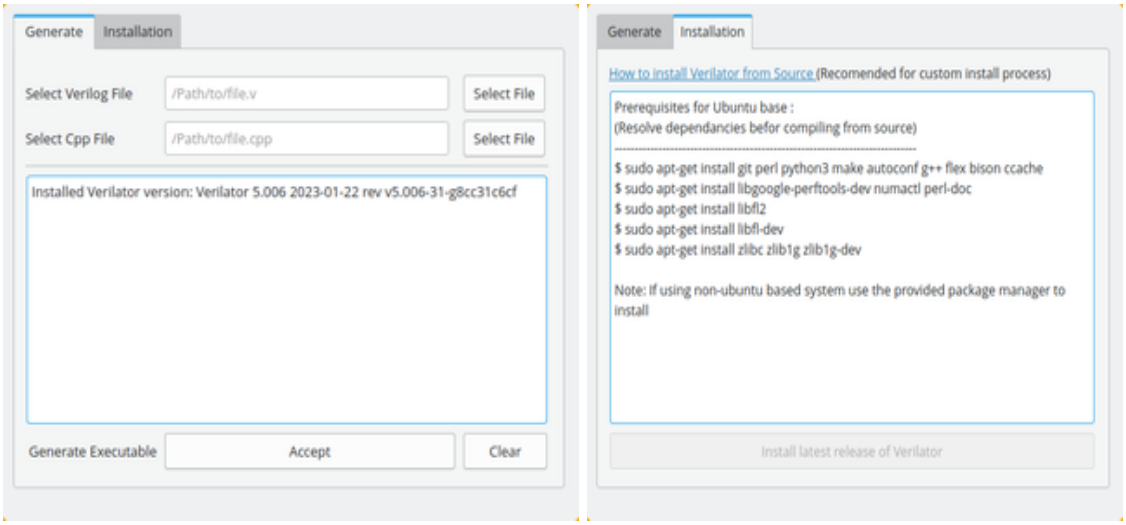

Fig. Screenshots of FOSSEE_GUI

- **Backend Logic:** The tool verifies if Verilator is already installed on the system, if not it prompts the user to install the latest version provided by their OS's package manager or install the latest Stable release from Verilator (build from source).

  If Verilator is installed, the tool then checks for the version on the system and compares it to the supported version. If using an outdated version, the end user is prompted to install the latest version.

- **Packaging:** This project adopts the AppImage format of packaging due to the listed reasons,
  - No additional dependencies and version independence
  - OS Independence (Linux based)
  - Easy to distribute and test
  - Simplified build process

- **Installation/ Usage:**
    - Building from Source:
        - git clone https://github.com/suchinton/FOSSEE_LPMS.git
        - cd ./FOSSEE_LPMS/
        - bash ./Ubuntu_install_script.sh
        - cd ./FOSSEE_LPMS/
        - bash ./Ubuntu_install_script.sh
        - bash ./make_appimage.sh
    - Usage of AppImage:
        - To run from the terminal run
            - cd /Path/To/Downloaded/Appimage/
            - chmod +x ./FOSSEE_GUI-x86_64.AppImage
            - ./FOSSEE_GUI-x86_64.AppImage
        - To run from file manager
            - Open prefferd file manager
            - Navigate to file (FOSSEE_GUI-x86_64.AppImage)
            - Right-click -> Select Properties -> Make Executable
            - Double Click to Launch

Dependencies: FOSSEE_GUI has zero dependencies after compilation. Thanks to the following projects/tools for making this possible:

- Verilator
- Pyinstaller (pip)
- PyQt5 (pip)
- Appimagetool (Appimage)

Conclusion: FOSSEE_LPMS provides a simple and easy-to-use GUI/ Application using the Appimage packing format for distribution and easy testing.