

# **PyGGI Tool Demonstration Presentation**

BY

Shuvanidhi Suresh- 40293590

# Introduction

- PyGGI (Python General Framework for Genetic Improvement) is an automated program repair (APR) tool.
- Provides a flexible framework for applying genetic improvement techniques to software code.

# Motivation

- Lightweight and flexible Python-based APR tool.
- Supports multiple programming languages.
- Useful for research and real-world applications in program repair.

# Key Features

- Modular framework for genetic improvement
- Supports multi-language modifications
- By default, it has built-in support for: Python, Java, C, JavaScript
- Easy-to-use API for program transformation
- Enables automatic bug fixing and software optimization

# Installation & Setup

**Clone the Repository:** *git clone* <https://github.com/coinse/pyggi.git>

**Install prerequisites:**

*Pip install pytest*

*python setup.py install*

## Program setup convention

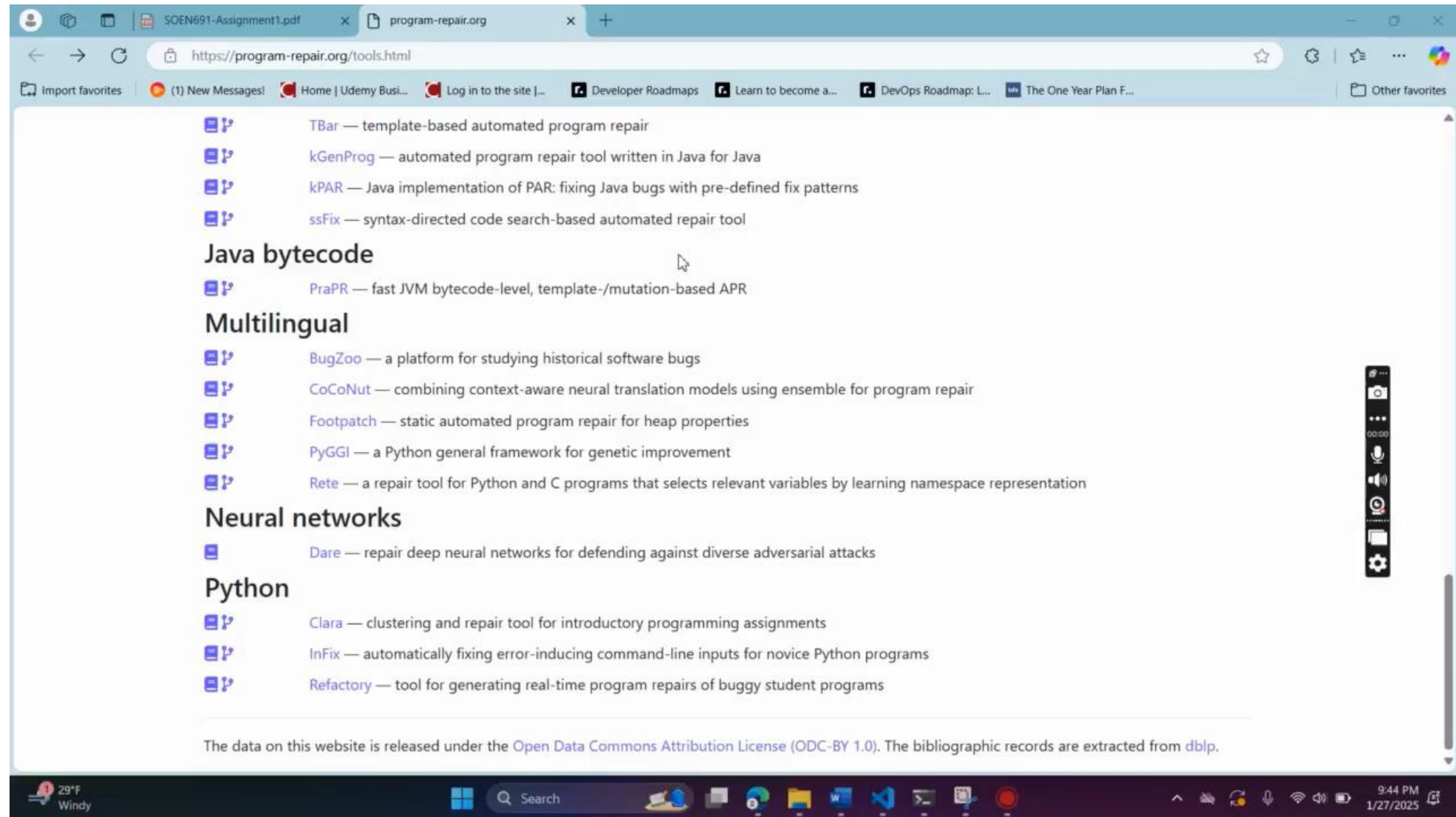
To run PyGGI, these files should be provided in the target directory:

1. Configuration File (.pyggi.config)
2. Test Script

# PyGGI Workflow

- Input – Test script, config file
- Patch Generation - By applying mutation operators
- Patch Evaluation - Patch is evaluated using a fitness function
- Iterative Refinement - search-based algorithm

# Demonstration



The screenshot shows a web browser window with the URL <https://program-repair.org/tools.html>. The page lists several automated program repair tools, categorized into groups:

- General Tools:**
  - [TBar](#) — template-based automated program repair
  - [kGenProg](#) — automated program repair tool written in Java for Java
  - [kPAR](#) — Java implementation of PAR: fixing Java bugs with pre-defined fix patterns
  - [ssFix](#) — syntax-directed code search-based automated repair tool
- Java bytecode:**
  - [PraPR](#) — fast JVM bytecode-level, template-/mutation-based APR
- Multilingual:**
  - [BugZoo](#) — a platform for studying historical software bugs
  - [CoCoNut](#) — combining context-aware neural translation models using ensemble for program repair
  - [Footpatch](#) — static automated program repair for heap properties
  - [PyGGI](#) — a Python general framework for genetic improvement
  - [Rete](#) — a repair tool for Python and C programs that selects relevant variables by learning namespace representation
- Neural networks:**
  - [Dare](#) — repair deep neural networks for defending against diverse adversarial attacks
- Python:**
  - [Clara](#) — clustering and repair tool for introductory programming assignments
  - [InFix](#) — automatically fixing error-inducing command-line inputs for novice Python programs
  - [Refactory](#) — tool for generating real-time program repairs of buggy student programs

The data on this website is released under the [Open Data Commons Attribution License \(ODC-BY 1.0\)](#). The bibliographic records are extracted from [dblp](#).

# Conclusion

- PyGGI is a flexible and powerful tool for automated program repair.
- Enables mutation-based code improvement with ease.
- Useful for research and practical software maintenance.