IT314 - Software Engineering
Static-Analysis

Date of submission: 01-03-2023

Static Analysis:

Static analysis is a method of examining the source code of a software program without executing it. Static analysis can help detect errors, bugs, vulnerabilities, and other quality issues in the code. Static analysis tools can perform various tasks, such as checking syntax, style, logic, data flow, control flow, and security. Static analysis can improve the reliability, performance, and maintainability of software by identifying and correcting defects early in the development process.

Static Analysis Tools:

Static analysis tools are software tools that analyze the source code of a program without executing it. They can help developers find and fix errors, bugs, vulnerabilities, code smells, and other quality issues in their code. Static analysis tools can also measure various metrics of the code, such as complexity, readability, maintainability, test coverage, and documentation. Static analysis tools can be integrated into the development process as part of the code editor, the version control system, or the continuous integration pipeline. Some examples of static analysis tools are SonarQube, PMD, ESLint, and Pylint.

- **How we installed the pylint tool:**

- Open the command prompt or Windows Terminal. You can do this by pressing the Windows key + R, then typing "cmd" and hitting Enter.

- Type "pip install pylint" and hit Enter. This will download and install Pylint.

- Once the installation is complete, you can verify that Pylint is installed by typing "pylint --version" and hitting Enter. This should display the version of Pylint you just installed.

- We now use Pylint to check the quality of your Python code. To use it, navigate to the directory where your Python script is located, then type "pylint filename.py" and hit Enter. This will run Pylint on your file and provide feedback on any issues.

1. Password manager

```
Microsoft Windows [Version 10.0.22621.1413]
(c) Microsoft Corporation. All rights reserved.

C:\Users\HP\OneDrive\Desktop>pylint password.py
************* Module password
password.py:2:35: C0303: Trailing whitespace (trailing-whitespace)
password.py:3:31: C0303: Trailing whitespace (trailing-whitespace)
password.py:4:13: C0303: Trailing whitespace (trailing-whitespace)
password.py:5:16: C0303: Trailing whitespace (trailing-whitespace)
password.py:9:38: C0303: Trailing whitespace (trailing-whitespace)
password.py:10:10: C0303: Trailing whitespace (trailing-whitespace)
password.py:11:21: C0303: Trailing whitespace (trailing-whitespace)
password.py:11:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
password.py:13:29: C0303: Trailing whitespace (trailing-whitespace)
password.py:14:20: C0303: Trailing whitespace (trailing-whitespace)
password.py:14:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
password.py:16:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
password.py:17:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
password.py:18:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
password.py:19:14: C0303: Trailing whitespace (trailing-whitespace)
password.py:19:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
password.py:21:30: C0303: Trailing whitespace (trailing-whitespace)
password.py:22:19: C0303: Trailing whitespace (trailing-whitespace)
password.py:22:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
password.py:23:28: C0303: Trailing whitespace (trailing-whitespace)
password.py:23:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
password.py:24:45: C0303: Trailing whitespace (trailing-whitespace)
password.py:24:0: W0311: Bad indentation. Found 3 spaces, expected 12 (bad-indentation)
password.py:25:17: C0303: Trailing whitespace (trailing-whitespace)
password.py:25:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
password.py:27:33: C0303: Trailing whitespace (trailing-whitespace)
password.py:28:21: C0303: Trailing whitespace (trailing-whitespace)
password.py:28:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
password.py:29:28: C0303: Trailing whitespace (trailing-whitespace)
password.py:29:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
password.py:30:45: C0303: Trailing whitespace (trailing-whitespace)
password.py:30:0: W0311: Bad indentation. Found 3 spaces, expected 12 (bad-indentation)
password.py:31:17: C0303: Trailing whitespace (trailing-whitespace)
password.py:31:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
password.py:33:33: C0303: Trailing whitespace (trailing-whitespace)
```

As given in the screenshot, multiple suggestions for code optimization.


```
password.py:66:1: C0103: Variable name "Random_password" doesn't conform to snake_case naming style (invalid-name)
password.py:76:1: W0104: Statement seems to have no effect (pointless-statement)
password.py:63:8: R1732: Consider using 'with' for resource-allocating operations (consider-using-with)
password.py:78:8: W1514: Using open without explicitly specifying an encoding (unspecified-encoding)
password.py:78:8: R1732: Consider using 'with' for resource-allocating operations (consider-using-with)
password.py:81:0: C0116: Missing function or method docstring (missing-function-docstring)
password.py:81:0: C0103: Function name "readPasswords" doesn't conform to snake_case naming style (invalid-name)
password.py:82:11: W1514: Using open without explicitly specifying an encoding (unspecified-encoding)
password.py:82:11: R1732: Consider using 'with' for resource-allocating operations (consider-using-with)
password.py:6:0: C0411: standard import "from tkinter import *" should be placed before "import pyperclip" (wrong-import-order)
password.py:7:0: C0411: standard import "from tkinter.ttk import *" should be placed before "import pyperclip" (wrong-import-order)
password.py:6:0: W0614: Unused import(s) collections, enum, sys, types, TclError, re, wantobjects, TkVersion, TclVersion, READABLE, WRITABLE, EXCEPTION, Eve
ntType, Event, NoDefaultRoot, Variable, StringVar, DoubleVar, BooleanVar, mainloop, getint, getdouble, getboolean, Misc, CallWrapper, XView, YView, Wm, Tcl,
 Pack, Place, Grid, BaseWidget, Widget, Toplevel, Canvas, Checkbutton, Frame, Listbox, Menu, Menubutton, Message, Scale, Scrollbar, Text, OptionMenu, Image,
 PhotoImage, BitmapImage, image_names, image_types, Spinbox, LabelFrame, PanedWindow, NO, FALSE, OFF, YES, TRUE, ON, N, S, W, E, NW, SW, NE, SE, NS, EW, NSE
W, CENTER, NONE, X, Y, BOTH, LEFT, TOP, RIGHT, BOTTOM, RAISED, SUNKEN, FLAT, RIDGE, GROOVE, SOLID, HORIZONTAL, VERTICAL, NUMERIC, CHAR, WORD, BASELINE, INSI
DE, OUTSIDE, SEL, SEL_FIRST, SEL_LAST, INSERT, CURRENT, ANCHOR, ALL, NORMAL, DISABLED, ACTIVE, HIDDEN, CASCADE, CHECKBUTTON, COMMAND, RADIOBUTTON, SEPARATOR
, SINGLE, BROWSE, MULTIPLE, EXTENDED, DOTBOX, UNDERLINE, PIESLICE, CHORD, ARC, FIRST, LAST, BUTT, PROJECTING, ROUND, BEVEL, MITER, MOVETO, SCROLL, UNITS and
 PAGES from wildcard import of tkinter (unused-wildcard-import)
password.py:7:0: W0614: Unused import(s) tkinter, tclobjs_to_py, setup_master, Style, Labelframe, Notebook, Panedwindow, Progressbar, Separator, Sizegrip, T
reeview and LabeledScale from wildcard import of tkinter.ttk (unused-wildcard-import)


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Your code has been rated at 0.00/10
```

2. Rolling Dice

```
C:\Users\HP\OneDrive\Desktop>pylint Rolling.py
************* Module Rolling
Rolling.py:36:0: C0305: Trailing newlines (trailing-newlines)
Rolling.py:1:0: C0114: Missing module docstring (missing-module-docstring)
Rolling.py:1:0: C0103: Module name "Rolling" doesn't conform to snake_case naming style (invalid-name)
Rolling.py:5:0: C0116: Missing function or method docstring (missing-function-docstring)
Rolling.py:8:4: W0621: Redefining name 'choice' from outer scope (line 20) (redefined-outer-name)
Rolling.py:24:8: R1723: Unnecessary "elif" after "break", remove the leading "el" from "elif" (no-else-break)
Rolling.py:24:11: R1714: Consider merging these comparisons with 'in' by using 'choice in ('No', 'no')'. Use a set instead if elements are hashable. (consid
er-using-in)
Rolling.py:26:13: R1714: Consider merging these comparisons with 'in' by using 'choice in ('Yes', 'yes')'. Use a set instead if elements are hashable. (cons
ider-using-in)


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Your code has been rated at 6.52/10
```

3. Weather_App

```
C:\Users\HP\OneDrive\Desktop>pylint weatherapp.py
************* Module weatherapp
weatherapp.py:2:39: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:3:21: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:4:30: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:5:20: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:6:22: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:6:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
weatherapp.py:7:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
weatherapp.py:8:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
weatherapp.py:9:29: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:9:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
weatherapp.py:10:67: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:10:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
weatherapp.py:11:38: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:11:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
weatherapp.py:12:20: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:12:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
weatherapp.py:13:23: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:13:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
weatherapp.py:14:15: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:14:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
weatherapp.py:15:33: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:15:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
weatherapp.py:16:34: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:16:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
weatherapp.py:17:33: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:17:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
weatherapp.py:18:18: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:18:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
weatherapp.py:19:43: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:19:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
weatherapp.py:20:61: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:20:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
weatherapp.py:21:54: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:21:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
weatherapp.py:22:53: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:22:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
weatherapp.py:23:50: C0303: Trailing whitespace (trailing-whitespace)
weatherapp.py:23:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
```

weatherapp.py:1:0: C0114: Missing module docstring (missing-module-docstring)
weatherapp.py:3:0: W0401: Wildcard import tkinter (wildcard-import)
weatherapp.py:5:0: C0116: Missing function or method docstring (missing-function-docstring)
weatherapp.py:6:1: C0415: Import outside toplevel (requests, json) (import-outside-toplevel)
weatherapp.py:6:1: C0410: Multiple imports on one line (requests, json) (multiple-imports)
weatherapp.py:6:1: E0401: Unable to import 'requests' (import-error)
weatherapp.py:12:1: C0103: Variable name "x" doesn't conform to snake_case naming style (invalid-name)
weatherapp.py:14:2: C0103: Variable name "y" doesn't conform to snake_case naming style (invalid-name)
weatherapp.py:18:2: C0103: Variable name "z" doesn't conform to snake_case naming style (invalid-name)
weatherapp.py:6:1: W0611: Unused import json (unused-import)
weatherapp.py:32:0: C0116: Missing function or method docstring (missing-function-docstring)
weatherapp.py:3:0: W0614: Unused import(s) collections, enum, sys, types, TclError, re, wantobjects, TkVersion, TclVersion, READABLE, WRITABLE, EXCEPTION, E
ventType, Event, NoDefaultRoot, Variable, StringVar, IntVar, DoubleVar, BooleanVar, mainloop, getint, getdouble, getboolean, Misc, CallWrapper, XView, YView
, Wm, Tcl, Pack, Place, Grid, BaseWidget, Widget, Toplevel, Canvas, Checkbutton, Frame, Listbox, Menu, Menubutton, Message, Radiobutton, Scale, Scrollbar, T
ext, OptionMenu, Image, PhotoImage, BitmapImage, image_names, image_types, Spinbox, LabelFrame, PanedWindow, NO, FALSE, OFF, YES, TRUE, ON, N, S, W, E, NW,
SW, NE, SE, NS, EW, NSEW, CENTER, NONE, X, Y, BOTH, LEFT, TOP, RIGHT, BOTTOM, RAISED, SUNKEN, FLAT, RIDGE, GROOVE, SOLID, HORIZONTAL, VERTICAL, NUMERIC, CHA
R, WORD, BASELINE, INSIDE, OUTSIDE, SEL, SEL_FIRST, SEL_LAST, INSERT, CURRENT, ANCHOR, ALL, NORMAL, DISABLED, ACTIVE, HIDDEN, CASCADE, CHECKBUTTON, COMMAND,
 RADIOBUTTON, SEPARATOR, SINGLE, BROWSE, MULTIPLE, EXTENDED, DOTBOX, UNDERLINE, PIESLICE, CHORD, ARC, FIRST, LAST, BUTT, PROJECTING, ROUND, BEVEL, MITER, MO
VETO, SCROLL, UNITS and PAGES from wildcard import of tkinter (unused-wildcard-import)

Your code has been rated at 0.00/10

4. WordGames

C:\Users\HP\OneDrive\Desktop>pylint letter_partner.py
************* Module letter_partner
letter_partner.py:8:0: C0325: Unnecessary parens after 'if' keyword (superfluous-parens)
letter_partner.py:10:0: C0325: Unnecessary parens after 'if' keyword (superfluous-parens)
letter_partner.py:14:0: C0325: Unnecessary parens after 'if' keyword (superfluous-parens)
letter_partner.py:24:0: C0325: Unnecessary parens after 'if' keyword (superfluous-parens)
letter_partner.py:25:0: C0325: Unnecessary parens after 'if' keyword (superfluous-parens)
letter_partner.py:34:0: C0325: Unnecessary parens after 'if' keyword (superfluous-parens)
letter_partner.py:36:0: C0325: Unnecessary parens after 'if' keyword (superfluous-parens)
letter_partner.py:40:0: C0305: Trailing newlines (trailing-newlines)
letter_partner.py:1:0: C0114: Missing module docstring (missing-module-docstring)
letter_partner.py:32:0: C0103: Constant name "count" doesn't conform to UPPER_CASE naming style (invalid-name)

Your code has been rated at 7.22/10

5. Calculator

```
C:\Users\HP\OneDrive\Desktop>pylint CALC.py
************* Module CALC
CALC.py:5:1: C0303: Trailing whitespace (trailing-whitespace)
CALC.py:13:1: C0303: Trailing whitespace (trailing-whitespace)
CALC.py:33:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:34:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:35:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:36:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:39:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:40:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:41:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:42:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:43:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:44:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
CALC.py:45:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:46:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
CALC.py:47:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:48:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
CALC.py:49:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:50:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
CALC.py:51:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:52:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
CALC.py:53:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:54:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
CALC.py:55:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:56:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
CALC.py:57:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:58:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
CALC.py:59:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:60:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
CALC.py:61:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
CALC.py:62:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
CALC.py:63:0: W0311: Bad indentation. Found 3 spaces, expected 12 (bad-indentation)
CALC.py:64:0: W0311: Bad indentation. Found 2 spaces, expected 8 (bad-indentation)
CALC.py:65:0: W0311: Bad indentation. Found 3 spaces, expected 12 (bad-indentation)
CALC.py:66:0: W0311: Bad indentation. Found 1 spaces, expected 4 (bad-indentation)
```

```
CALC.py:32:0: C0116: Missing function or method docstring (missing-function-docstring)
CALC.py:32:0: R1711: Useless return at end of function or method (useless-return)
CALC.py:38:0: C0116: Missing function or method docstring (missing-function-docstring)
CALC.py:38:0: C0103: Function name "sc" doesn't conform to snake_case naming style (invalid-name)
CALC.py:41:1: C0103: Variable name "no" doesn't conform to snake_case naming style (invalid-name)
CALC.py:38:0: R0912: Too many branches (15/12) (too-many-branches)
CALC.py:76:0: C0116: Missing function or method docstring (missing-function-docstring)
CALC.py:76:0: R1711: Useless return at end of function or method (useless-return)
CALC.py:81:0: C0116: Missing function or method docstring (missing-function-docstring)
CALC.py:87:0: C0116: Missing function or method docstring (missing-function-docstring)
CALC.py:89:5: W0123: Use of eval (eval-used)
CALC.py:116:95: W0108: Lambda may not be necessary (unnecessary-lambda)
CALC.py:117:99: W0108: Lambda may not be necessary (unnecessary-lambda)
CALC.py:145:101: W0108: Lambda may not be necessary (unnecessary-lambda)
CALC.py:23:0: W0614: Unused import(s) collections, enum, sys, types, TclError, re, wantobjects, TkVersion, TclVersion, READABLE, WRITABLE, EXCEPTION, EventT
ype, Event, NoDefaultRoot, Variable, StringVar, IntVar, DoubleVar, BooleanVar, mainloop, getint, getdouble, getboolean, Misc, CallWrapper, XView, YView, Wm,
 Tcl, Pack, Place, Grid, BaseWidget, Widget, Toplevel, Canvas, Checkbutton, Frame, Label, Listbox, Menu, Menubutton, Message, Radiobutton, Scale, Scrollbar,
 Text, OptionMenu, Image, PhotoImage, BitmapImage, image_names, image_types, Spinbox, LabelFrame, PanedWindow, NO, FALSE, OFF, YES, TRUE, ON, N, S, W, E, NW
, SW, NE, SE, NS, EW, NSEW, CENTER, NONE, X, Y, BOTH, LEFT, TOP, RIGHT, BOTTOM, SUNKEN, FLAT, GROOVE, SOLID, HORIZONTAL, VERTICAL, NUMERIC, CHAR, WORD, BASE
LINE, INSIDE, OUTSIDE, SEL, SEL_FIRST, SEL_LAST, INSERT, CURRENT, ANCHOR, ALL, NORMAL, DISABLED, ACTIVE, HIDDEN, CASCADE, CHECKBUTTON, COMMAND, RADIOBUTTON,
 SEPARATOR, SINGLE, BROWSE, MULTIPLE, EXTENDED, DOTBOX, UNDERLINE, PIESLICE, CHORD, ARC, FIRST, LAST, BUTT, PROJECTING, ROUND, BEVEL, MITER, MOVETO, SCROLL,
 UNITS and PAGES from wildcard import of tkinter (unused-wildcard-import)

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Your code has been rated at 3.13/10
```