

## **IT314 - Software Engineering**

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### **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.

# Using Mypy

At online platform [mypy-playground](https://mypy-playground.org/)

1)

<https://github.com/Kalebu/Website-blocker-python/blob/master/app.py>

mypy PlaygroundRunGistmypy latest (1.0.0)Python 3.11Options

```
16 Window_host = r"C:\Windows\System32\drivers\etc\hosts"
17 default_host = linux_host # if you are on windows then change it to Window_host
18 redirect = "127.0.0.1"
19
20
21 def block_websites(start_hour, end_hour):
22     while True:
23         if (
24             dt(dt.now().year, dt.now().month, dt.now().day, start_hour)
25             < dt.now()
26             < dt(dt.now().year, dt.now().month, dt.now().day, end_hour)
27         ):
28             print("Do the work ....")
29             with open(default_host, "r+") as hostfile:
30                 hosts = hostfile.read()
31                 for site in sites_to_block:
32                     if site not in hosts:
33                         hostfile.write(redirect + " " + site + "\n")
34             else:
35                 with open(default_host, "r+") as hostfile:
36                     hosts = hostfile.readlines()
37                     hostfile.seek(0)
38                     for host in hosts:
39                         if not any(site in host for site in sites_to_block):
40                             hostfile.write(host)
41                     hostfile.truncate()
42             print("Good Time")
43             time.sleep(3)
44
45
46 if __name__ == "__main__":
47     block_websites(9, 21)
```

Failed (exit code: 2) (993 ms)

main.py:29: error: invalid syntax; you likely need to run mypy using Python 3.11 or newer [syntax]  
Found 1 error in 1 file (errors prevented further checking)

Error : Invalid syntax

2)

[https://github.com/ayushreal/Signature-recognition/blob/master/signature\\_recognition.py](https://github.com/ayushreal/Signature-recognition/blob/master/signature_recognition.py)

```
myPy Playground  Run  Gist  mypy latest (1.0.0)  Python 3.11  Options

1 import keras
2 from sklearn.model_selection import train_test_split
3
4 TEST_DIR='E:/Python/signature_recognition/data/test/'
5
6 SIGNATURE_CLASSES = ['A', 'B', 'C', 'D', 'E', 'F', 'K', 'L', 'M', 'N', 'O', 'P']
7
8 import os, random
9 import numpy as np
10 import pandas as pd
11 from sklearn.model_selection import train_test_split
12 from sklearn.metrics import log_loss
13 from sklearn.preprocessing import LabelEncoder
14
15 import matplotlib.pyplot as plt
16 from matplotlib import ticker
17 #import seaborn as sns
18 #matplotlib inline
19
20 from keras.models import Sequential
21 from keras.layers import Dropout, Flatten, Convolution2D, MaxPooling2D, ZeroPadding2D, Dense, Activation
22 from keras.optimizers import SGD, Adagrad
23 from keras.callbacks import EarlyStopping
24 from keras.utils import np_utils
25 from keras.optimizers import RMSprop, Adam
26 from keras import backend as K
27 ROWS = 100
28 COLS = 160
29 CHANNELS = 3
30 TRAIN_DIR="E:/Python/signature_recognition/data/train/"
31
32 def root_mean_squared_error(y_true, y_pred):
    ...

Failed (exit code: 1) (3232 ms)

main.py:1: error: Cannot find implementation or library stub for module named "keras" [import]
main.py:2: error: Cannot find implementation or library stub for module named "sklearn.model_selection" [import]
main.py:2: note: See https://mypy.readthedocs.io/en/stable/running_mypy.html#missing-imports
main.py:9: error: Cannot find implementation or library stub for module named "numpy" [import]
main.py:10: error: Cannot find implementation or library stub for module named "pandas" [import]
main.py:12: error: Cannot find implementation or library stub for module named "sklearn.metrics" [import]
main.py:13: error: Cannot find implementation or library stub for module named "sklearn.preprocessing" [import]
main.py:15: error: Cannot find implementation or library stub for module named "matplotlib.pyplot" [import]
main.py:15: error: Cannot find implementation or library stub for module named "matplotlib" [import]
main.py:20: error: Cannot find implementation or library stub for module named "keras.models" [import]
main.py:21: error: Cannot find implementation or library stub for module named "keras.layers" [import]
main.py:22: error: Cannot find implementation or library stub for module named "keras.optimizers" [import]
main.py:23: error: Cannot find implementation or library stub for module named "keras.callbacks" [import]
main.py:24: error: Cannot find implementation or library stub for module named "keras.utils" [import]
```

Error : import errors , which can be resolved by importing files

3)

<https://github.com/tensorflow/tensorflow/blob/master/configure.py>

mypy Playground

Run

Gist

mypy latest (1.0.0) ▾

Python 3.11 ▾

Options

```
8 #
9 # Unless required by applicable law or agreed to in writing, software
10 # distributed under the license is distributed on an "AS IS" BASIS,
11 # WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
12 # See the license for the specific language governing permissions and
13 # limitations under the license.
14 # =====
15 """configure script to get build parameters from user."""
16
17 import argparse
18 import errno
19 import glob
20 import os
21 import platform
22 import re
23 import subprocess
24 import sys
25
26 # pylint: disable=g-import-not-at-top
27 try:
28     from shutil import which
29 except ImportError:
30     from distutils.spawn import find_executable as which
31 # pylint: enable=g-import-not-at-top
32
33 _DEFAULT_CUDA_VERSION = '11'
34 _DEFAULT_CUDNN_VERSION = '2'
35 _DEFAULT_TENSORRT_VERSION = '6'
36 _DEFAULT_CUDA_COMPUTE_CAPABILITIES = '3.5,7.0'
37
38 _SUPPORTED_ANDROID_NDK_VERSIONS = [
39     19, 20, 21
40 ]
```

Failed (exit code: 1) (3370 ms)

main.py:30: error: Name "which" already defined (possibly by an import) [no-redef]  
Found 1 error in 1 file (checked 1 source file)

Error : already defined name used

4)

<https://github.com/CT83/SmoothStream/blob/master/StreamViewer.py>

```
mypy Playground Run Gist mypy latest (1.0.0) Python 3.11 Options
29 :param display: boolean, If False no stream output will be displayed.
30 :return: None
31 """
32 self.keep_running = True
33 while self.footage_socket and self.keep_running:
34     try:
35         frame = self.footage_socket.recv_string()
36         self.current_frame = string_to_image(frame)
37
38         if display:
39             cv2.imshow("Stream", self.current_frame)
40             cv2.waitKey(1)
41
42     except KeyboardInterrupt:
43         cv2.destroyAllWindows()
44         break
45     print("Streaming Stopped!")
46
47 def stop(self):
48     """
49     Sets 'keep_running' to False to stop the running loop if running.
50     :return: None
51     """
52     self.keep_running = False
53
54 def main():
55     port = PORT
56
57     parser = argparse.ArgumentParser()
58     parser.add_argument('-p', '--port',
59                         help='The port which you want the Streaming Viewer to use, default'
60                         ' is ' + PORT, required=False)
61
62 Failed (exit code: 2) (927 ms)
63
64 main.py:47: error: expected ':' [syntax]
65 Found 1 error in 1 file (errors prevented further checking)
```

Error : syntax error , **expected :** instead of ;

5)

<https://github.com/CT83/SmoothStream/blob/master/Streamer.py>

myPy Playground Run Gist mypy latest (1.0.0) Python 3.11 Options

```
1 import argparse
2
3 import cv2
4 import zmq
5
6 from camera.Camera import Camera
7 from constants import PORT, SERVER_ADDRESS
8 from utils import image_to_string
9
10
11 class Streamer:
12
13     def __init__(self, server_address=SERVER_ADDRESS, port=PORT);
14         """
15         Tries to connect to the StreamViewer with supplied server_address and creates a socket for future use.
16
17         :param server_address: Address of the computer on which the StreamViewer is running, default is `localhost`
18         :param port: Port which will be used for sending the stream
19         """
20
21         print("Connecting to ", server_address, "at", port)
22         context = zmq.Context()
23         self.footage_socket = context.socket(zmq.PUB)
24         self.footage_socket.connect('tcp://' + server_address + ':' + port)
25         self.keep_running = True
26
27     def start(self):
28         """
29         Starts sending the stream to the Viewer.
30         Creates a camera, takes a image frame converts the frame to string and sends the string across the network
31         :return: None
32         """
```

Failed (exit code: 2) (1201 ms)

main.py:13: error: expected ':' [syntax]  
Found 1 error in 1 file (errors prevented further checking)

Error : Syntax error near 13th line

6)

<https://github.com/CT83/SmoothStream/blob/master/constants.py>

The screenshot shows the mypy Playground interface. At the top, there is a header bar with the text "mypy Playground" and several buttons: "Run" (highlighted in yellow), "Gist", "mypy latest (1.0.0)" with a dropdown arrow, "Python 3.11" with a dropdown arrow, and "Options". Below the header, a code editor displays the following Python code:

```
1 from utils import is_raspberry_pi
2
3 PORT = '5555';
4 SERVER_ADDRESS = 'localhost'
5
6 CAMERA_PORT = 0
7 IS_RASPBERRY_PI = is_raspberry_pi()
8 RESOLUTION_H = 320
9 RESOLUTION_W = 320
10
11 GPIO_SWITCH = 24
```

Below the code editor, a status bar indicates "Failed (exit code: 1) (3068 ms)". At the bottom, a message box contains the following text:

```
main.py:1: error: Cannot find implementation or library stub for module named "utils" [import]
main.py:1: note: See https://mypy.readthedocs.io/en/stable/running_mypy.html#missing-imports
Found 1 error in 1 file (checked 1 source file)
```

Error : at begging import file was not provided

7)

[https://github.com/CT83/SmoothStream/blob/master/test\\_local\\_streaming.py](https://github.com/CT83/SmoothStream/blob/master/test_local_streaming.py)

myPy Playground Run Gist myPy latest (1.0.0) Python 3.11 Options

```
1 import time
2 import unittest
3 from threading import Thread
4
5 import numpy
6
7 from StreamViewer import StreamViewer
8 from Streamer import Streamer
9
10
11 class TestLocalStreaming(unittest.TestCase):
12
13     @classmethod
14     def setUpClass(cls):
15         super(TestLocalStreaming, cls).setUpClass()
16
17         cls.stream_viewer = StreamViewer()
18         Thread(target=lambda: cls.stream_viewer.receive_stream(display=False)).start()
19
20         cls.streamer = Streamer()
21         Thread(target=lambda: cls.streamer.start()).start()
22
23         time.sleep(5)
24
25     def test_camera_image(self):
26         self.assertIsInstance(self.stream_viewer.current_frame, numpy.ndarray)
27
28     def test_camera_image_not_null(self):
29         self.assertIsNotNone(self.stream_viewer.current_frame)
30
31     @classmethod
32     def tearDownClass(cls):
```

Failed (exit code: 2) (969 ms)

main.py:11: error: invalid syntax; you likely need to run mypy using Python 3.11 or newer [syntax]  
Found 1 error in 1 file (errors prevented further checking)

Error : Near 11th line **used** ; instead of :



8)

<https://github.com/CT83/SmoothStream/blob/master/utils.py>



The screenshot shows the mypy Playground interface. At the top, there are buttons for 'Run' (highlighted in orange), 'Gist', and a dropdown menu showing 'mypy latest (1.0.0)'. To the right of these are 'Python 3.11' and an 'Options' button. The main area displays a Python script with line numbers 1 through 32. Line 11 is highlighted with a red background and a red 'x' icon in the left margin, indicating a syntax error. The script defines a function `is_raspberry_pi` that checks if the system is a Raspberry Pi by reading `/proc/cpuinfo`. The error message at the bottom states: 'Failed (exit code: 2) (985 ms)' and 'main.py:11: error: invalid syntax; you likely need to run mypy using Python 3.11 or newer [syntax]'. It also notes 'Found 1 error in 1 file (errors prevented further checking)'.

```
1 import io
2
3
4
5 def is_raspberry_pi(raise_on_errors=False):
6     """Checks if Raspberry PI.
7
8     :return:
9         """
10    try:
11        with io.open('/proc/cpuinfo', 'r') as cpuinfo:
12            found = False
13            for line in cpuinfo:
14                if line.startswith('Hardware'):
15                    found = True
16                    label, value = line.strip().split(':', 1)
17                    value = value.strip()
18                    if value not in (
19                        'BCM2708',
20                        'BCM2709',
21                        'BCM2835',
22                        'BCM2836'
23                    ):
24                        if raise_on_errors:
25                            raise ValueError(
26                                'This system does not appear to be a '
27                                'Raspberry Pi.'
28                            )
29                        else:
30                            return False
31            if not found:
32                if raise_on_errors:
```

Failed (exit code: 2) (985 ms)

main.py:11: error: invalid syntax; you likely need to run mypy using Python 3.11 or newer [syntax]  
Found 1 error in 1 file (errors prevented further checking)

Error : Invalid syntax at 11th line

9)

<https://github.com/hackstarsj/django-e-commerce-project-amazon-clone/blob/master/manage.py>

mypy Playground

Run

Gist

mypy latest (1.0.0)

Python 3.11

Options

```
1 #!/usr/bin/env python
2 """Django's command-line utility for administrative tasks."""
3 import os
4 import sys
5
6
7 def main():
8     """Run administrative tasks."""
9     os.environ.setdefault('DJANGO_SETTINGS_MODULE', 'DjangoEcommerce.settings')
10     try:
11         from django.core.management import execute_from_command_line
12     except ImportError as exc:
13         raise ImportError(
14             "Couldn't import Django. Are you sure it's installed and "
15             "available on your PYTHONPATH environment variable? Did you "
16             "forget to activate a virtual environment?"
17         ) from exc
18     execute_from_command_line(sys.argv)
19
20
21 if __name__ == '__main__':
22     main()
```

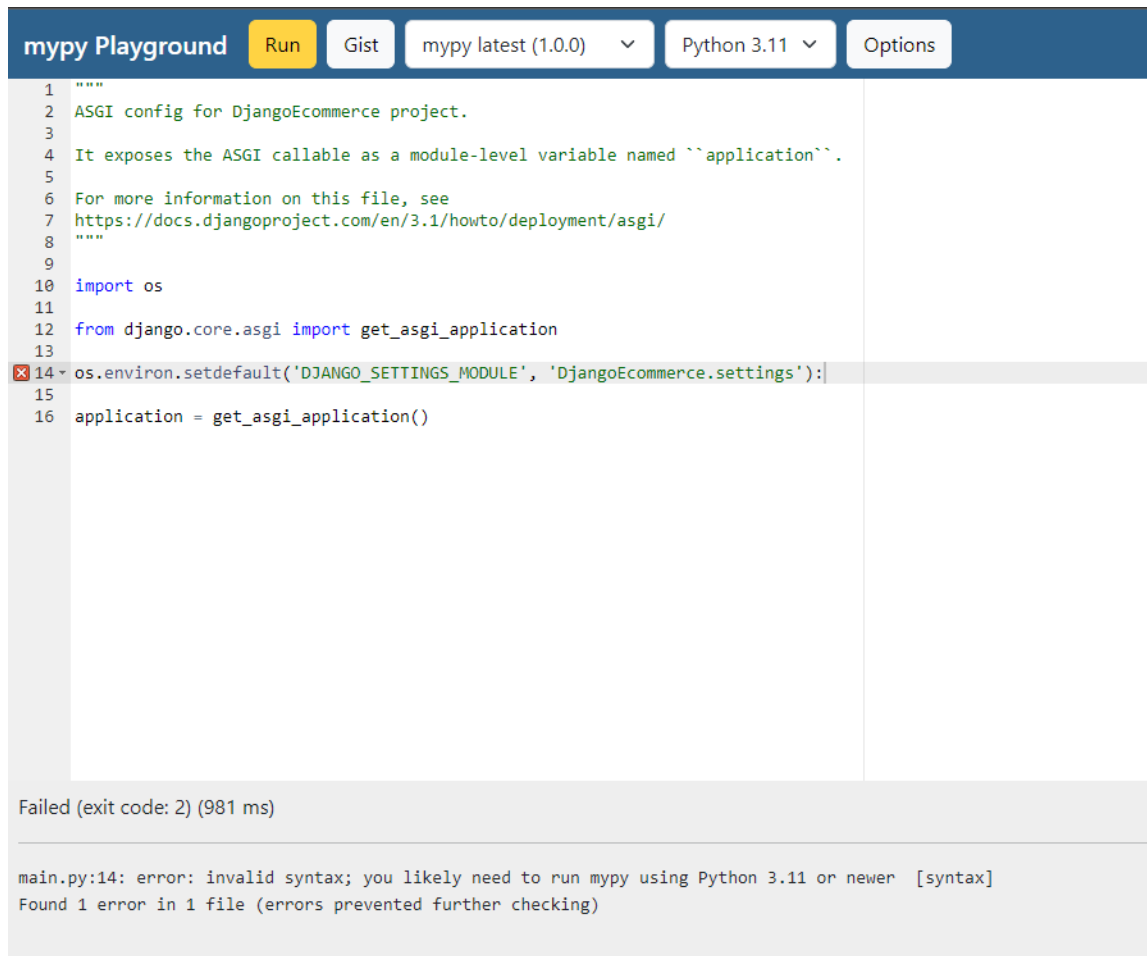
Failed (exit code: 2) (959 ms)

main.py:7: error: expected ':' [syntax]  
Found 1 error in 1 file (errors prevented further checking)

Error : Syntax error near main() , used ; instead of :

10)

<https://github.com/hackstarsj/django-ecommerce-project-amazon-clone/blob/master/DjangoEcommerce/asgi.py>



The screenshot shows the mypy Playground interface. At the top, there's a header with the text "mypy Playground", a yellow "Run" button, a "Gist" button, a dropdown menu showing "mypy latest (1.0.0)", another dropdown menu showing "Python 3.11", and an "Options" button. Below the header is a code editor with the following Python code:

```
1 """
2 ASGI config for DjangoEcommerce project.
3
4 It exposes the ASGI callable as a module-level variable named ``application``.
5
6 For more information on this file, see
7 https://docs.djangoproject.com/en/3.1/howto/deployment/asgi/
8 """
9
10 import os
11
12 from django.core.asgi import get_asgi_application
13
14 os.environ.setdefault('DJANGO_SETTINGS_MODULE', 'DjangoEcommerce.settings');
15
16 application = get_asgi_application()
```

Line 14 is highlighted with a red error icon on the left. Below the code editor, a status bar indicates "Failed (exit code: 2) (981 ms)". At the bottom, a message box displays the error: "main.py:14: error: invalid syntax; you likely need to run mypy using Python 3.11 or newer [syntax]" and "Found 1 error in 1 file (errors prevented further checking)".

Error : Unexpected symbol ; at line 14

**Using vs code also we can analyze the code**

**Link :** <https://github.com/Kalebu/Website-blocker-python/blob/master/app.py>

app.py

app.py > ...

```
14 # different hosts for different os
15 Linux_host = "/etc/hosts"
16 Window_host = r"C:\Windows\System32\drivers\etc\hosts"
17 default_host = Linux_host # if you are on windows then change it to Window_host
18 redirect = "127.0.0.1"
19
20
21 def block_websites(start_hour, end_hour):
22     while True:
23         if (
24             dt(dt.now().year, dt.now().month, dt.now().day, start_hour)
25             < dt.now()
26             < dt(dt.now().year, dt.now().month, dt.now().day, end_hour)
27         ):
28             print("Do the work ....")
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL JUPYTER

```
***** Module app
app.py:47:0: C0304: Final newline missing (missing-final-newline)
app.py:1:0: C0114: Missing module docstring (missing-module-docstring)
app.py:15:0: C0103: Constant name "Linux_host" doesn't conform to UPPER_CASE naming style (invalid-name)
app.py:16:0: C0103: Constant name "Window_host" doesn't conform to UPPER_CASE naming style (invalid-name)
app.py:17:0: C0103: Constant name "default_host" doesn't conform to UPPER_CASE naming style (invalid-name)
app.py:18:0: C0103: Constant name "redirect" doesn't conform to UPPER_CASE naming style (invalid-name)
app.py:21:0: C0116: Missing function or method docstring (missing-function-docstring)
app.py:29:17: W1514: Using open without explicitly specifying an encoding (unspecified-encoding)
app.py:35:17: W1514: Using open without explicitly specifying an encoding (unspecified-encoding)
```

-----  
Your code has been rated at 6.67/10 (previous run: 6.67/10, +0.00)

C:\Users\student\Downloads\Website-blocker-python-master\Website-blocker-python-master>