IT314- Software Engineering

Lab Session 5

Static Analysis

Prepared by :

Jaimin Baurasi 202001403

Github repository link :https://github.com/ndleah/python-mini-project

Static analysis:

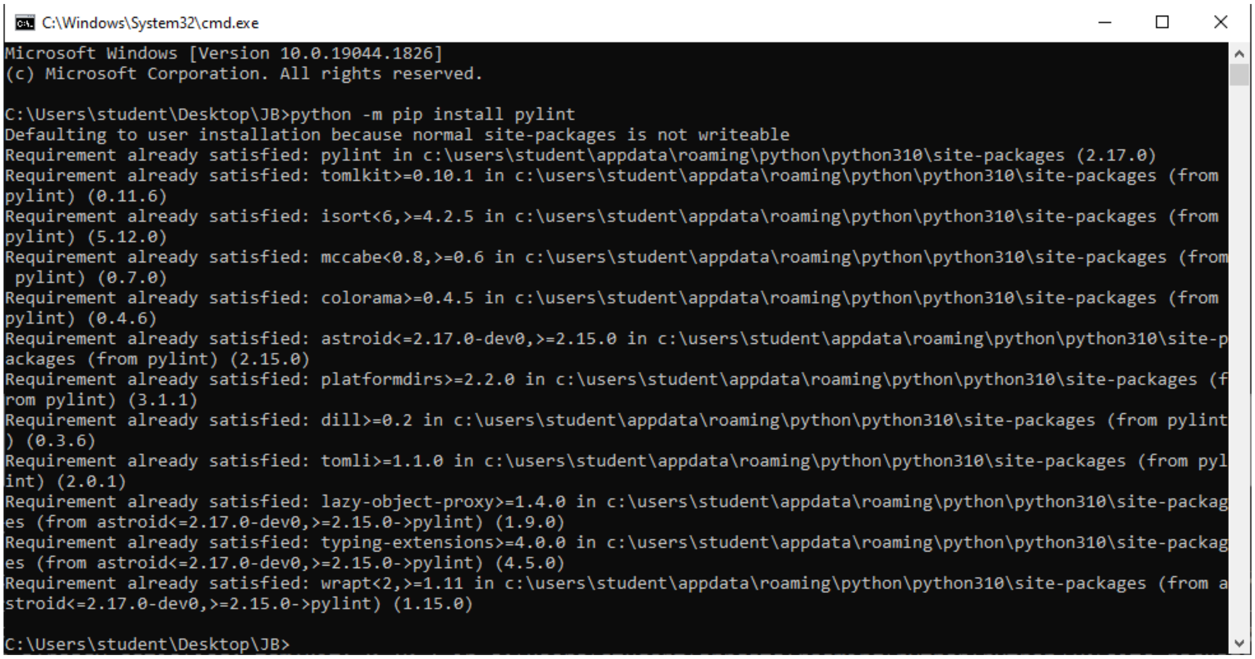
- Static analysis is a technique for looking at a software program's source code without actually running it.
- Static analysis can be used to find bugs, errors, vulnerabilities, and other issues with the code's quality.
- Tools for static analysis can check grammar, style, logic, data flow, control flow, and security, among other things.
- Static analysis can increase the software's dependability, performance, and maintainability by spotting and fixing errors early in the development cycle.
- SonarQube, PMD, ESLint, and Pylint are a few tools used for static analysis.

Chosen tool: pylint

- For Python 2 or 3, Pylint is a static code analyzer.
- Without actually running the code, Pylint examines it. It verifies the code for errors, upholds a coding standard, searches for code smells, and can offer suggestions for code refactoring.
- Pylint uses its own code representation to deduce the real value of nodes because it does not trust your typing (astroid). Pylint can verify that argparse.error(...) is actually a logging call and not an argparse call if your code imports logging as argparse.

Additionally, Pylint includes an ecosystem of already-built plugins for well-known frameworks and outside libraries.

Installation of pylint:

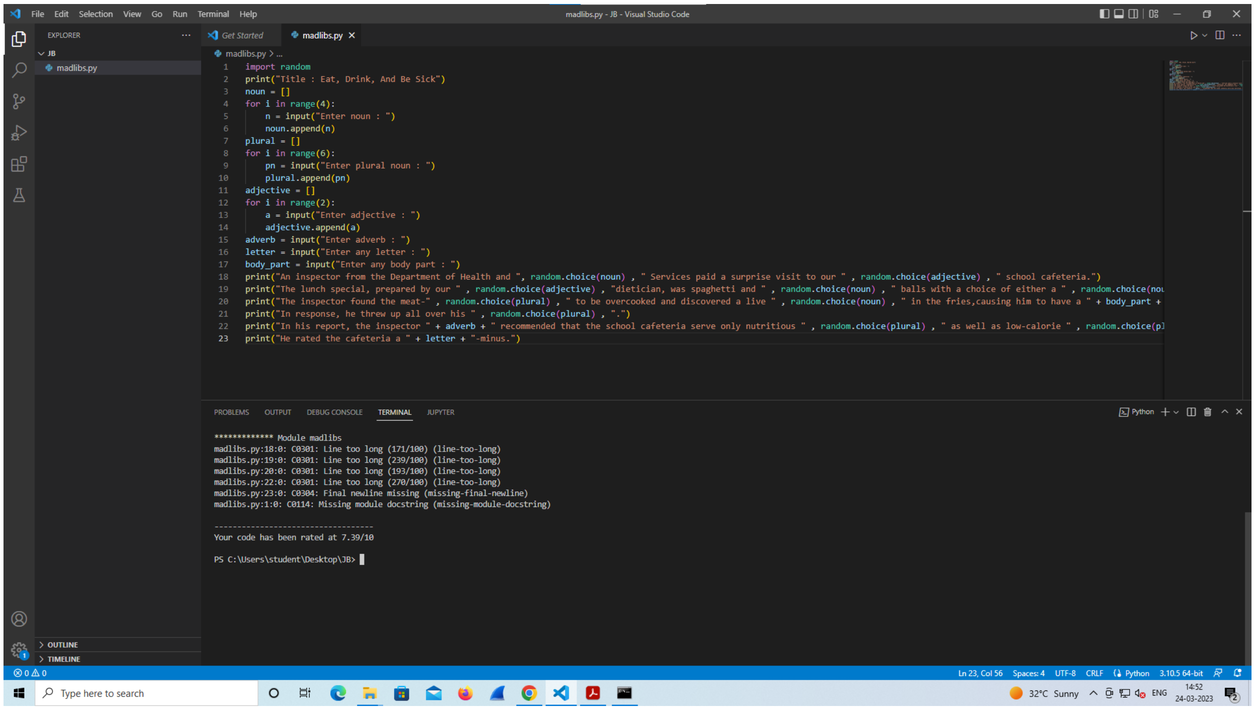


```
Microsoft Windows [Version 10.0.19044.1826]
(c) Microsoft Corporation. All rights reserved.

C:\Users\student\Desktop\JB>python -m pip install pylint
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: pylint in c:\users\student\appdata\roaming\python\python310\site-packages (2.17.0)
Requirement already satisfied: tomlkit>=0.10.1 in c:\users\student\appdata\roaming\python\python310\site-packages (from
pylint) (0.11.6)
Requirement already satisfied: isort<6,>=4.2.5 in c:\users\student\appdata\roaming\python\python310\site-packages (from
pylint) (5.12.0)
Requirement already satisfied: mccabe<0.8,>=0.6 in c:\users\student\appdata\roaming\python\python310\site-packages (from
 pylint) (0.7.0)
Requirement already satisfied: colorama>=0.4.5 in c:\users\student\appdata\roaming\python\python310\site-packages (from
pylint) (0.4.6)
Requirement already satisfied: astroid<=2.17.0-dev0,>=2.15.0 in c:\users\student\appdata\roaming\python\python310\site-p
ackages (from pylint) (2.15.0)
Requirement already satisfied: platformdirs>=2.2.0 in c:\users\student\appdata\roaming\python\python310\site-packages (f
rom pylint) (3.1.1)
Requirement already satisfied: dill>=0.2 in c:\users\student\appdata\roaming\python\python310\site-packages (from pylint
) (0.3.6)
Requirement already satisfied: tomli>=1.1.0 in c:\users\student\appdata\roaming\python\python310\site-packages (from pyl
int) (2.0.1)
Requirement already satisfied: lazy-object-proxy>=1.4.0 in c:\users\student\appdata\roaming\python\python310\site-packag
es (from astroid<=2.17.0-dev0,>=2.15.0->pylint) (1.9.0)
Requirement already satisfied: typing-extensions>=4.0.0 in c:\users\student\appdata\roaming\python\python310\site-packag
es (from astroid<=2.17.0-dev0,>=2.15.0->pylint) (4.5.0)
Requirement already satisfied: wrapt<2,>=1.11 in c:\users\student\appdata\roaming\python\python310\site-packages (from a
stroid<=2.17.0-dev0,>=2.15.0->pylint) (1.15.0)

C:\Users\student\Desktop\JB>
```

Program name : madlibs.py


File Edit Selection View Go Run Terminal Help
madlibs.py - JB - Visual Studio Code
EXPLORER
JB
madlibs.py
Get Started
madlibs.py
OUTLINE
TIMELINE
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL JUPYTER
Python
Ln 23, Col 56 Spaces: 4 UTF-8 CRLF Python 3.10.5 64-bit
Type here to search
32°C Sunny ENG 14:52 24-03-2023

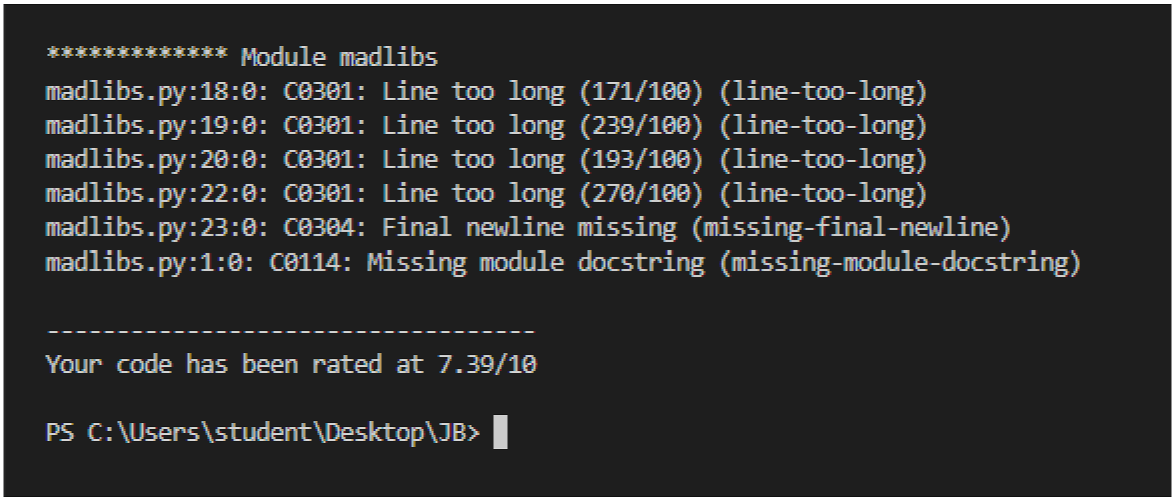
```
1   import random
2   print("Title : Eat, Drink, And Be Sick")
3   noun = []
4   for i in range(4):
5       n = input("Enter noun : ")
6       noun.append(n)
7   plural = []
8   for i in range(6):
9       pn = input("Enter plural noun : ")
10      plural.append(pn)
11  adjective = []
12  for i in range(2):
13      a = input("Enter adjective : ")
14      adjective.append(a)
15  adverb = input("Enter adverb : ")
16  letter = input("Enter any letter : ")
17  body_part = input("Enter any body part : ")
18  print("An inspector from the Department of Health and ", random.choice(noun) , " Services paid a surprise visit to our " , random.choice(adjective) , " school cafeteria.")
19  print("The lunch special, prepared by our " , random.choice(adjective) , "dietician, was spaghetti and " , random.choice(noun) , " balls with a choice of either a " , random.choice(nou
20  print("The inspector found the meat-" , random.choice(plural) , " to be overcooked and discovered a live " , random.choice(noun) , " in the fries,causing him to have a " + body_part +
21  print("In response, he threw up all over his " , random.choice(plural) , ".")
22  print("In his report, the inspector " + adverb + " recommended that the school cafeteria serve only nutritious " , random.choice(plural) , " as well as low-calorie " , random.choice(pl
23  print("He rated the cafeteria a " + letter + "-minus.")
```

```
************* Module madlibs
madlibs.py:18:0: C0301: Line too long (171/100) (line-too-long)
madlibs.py:19:0: C0301: Line too long (239/100) (line-too-long)
madlibs.py:20:0: C0301: Line too long (193/100) (line-too-long)
madlibs.py:22:0: C0301: Line too long (270/100) (line-too-long)
madlibs.py:23:0: C0304: Final newline missing (missing-final-newline)
madlibs.py:1:0: C0114: Missing module docstring (missing-module-docstring)

-----------------------------------
Your code has been rated at 7.39/10

PS C:\Users\student\Desktop\JB> 
```

Error:



```
************* Module madlibs
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madlibs.py:23:0: C0304: Final newline missing (missing-final-newline)
madlibs.py:1:0: C0114: Missing module docstring (missing-module-docstring)

-----------------------------------
Your code has been rated at 7.39/10

PS C:\Users\student\Desktop\JB> 
```

Program rating: 7.39/10

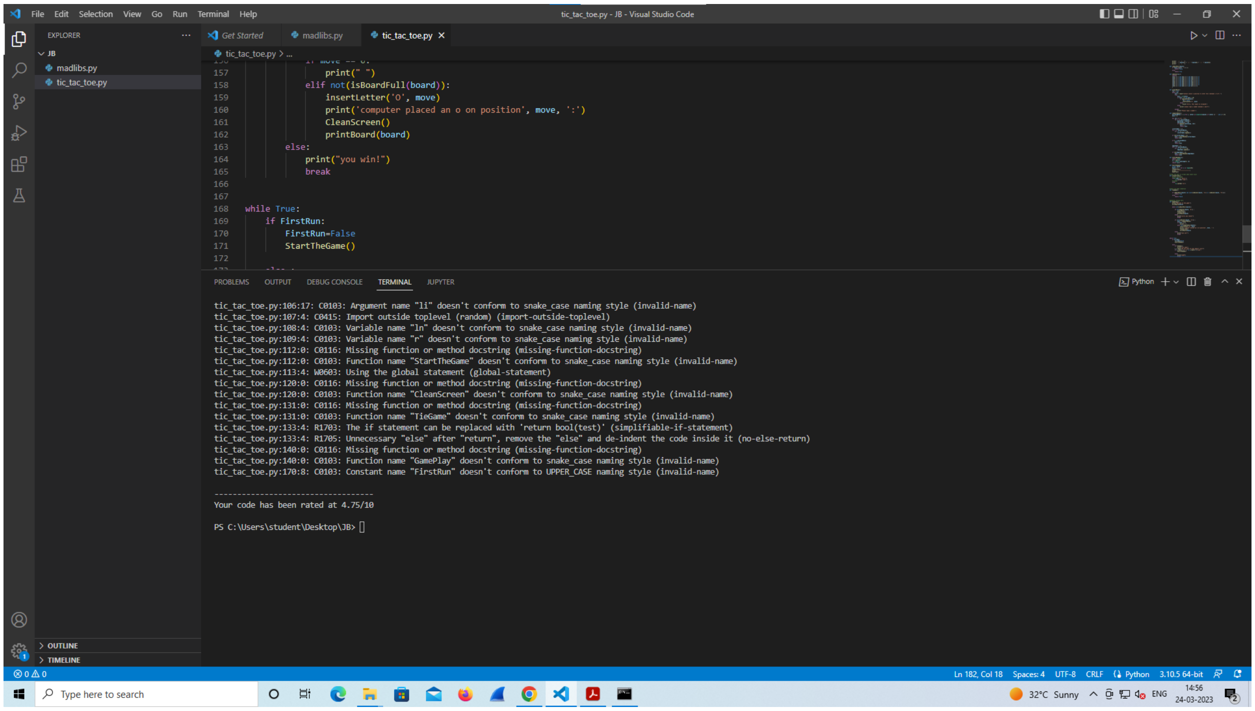
Interpretation:

`Parameter name "x" doesn't follow the snake case naming convention (invalid-name), according to C0103:` This alert shows that the variable name x does not adhere to the suggested naming style of snake case. A better name might be a first name.

Parameter name "y" doesn't follow snake case naming convention (invalid-name), according to C0103: This alert shows that the variable name y does not adhere to the suggested naming style of snake case. Last name might be a better option.

W0621: Defining 'x' as a new name in the outer scope (line 41) (redefined-outer-name): This notice informs the reader that a function is redefinition the variable x. If the variable is used elsewhere else in the code, this could result in confusion and unexpected behaviour.

Program Name: tic_tac_toe.py



```
                print(" ")
            elif not(isBoardFull(board)):
                insertLetter('O', move)
                print('computer placed an o on position', move, ':')
                CleanScreen()
                printBoard(board)
        else:
            print("you win!")
            break


while True:
    if FirstRun:
        FirstRun=False
        StartTheGame()

```

```
tic_tac_toe.py:106:17: C0103: Argument name "li" doesn't conform to snake_case naming style (invalid-name)
tic_tac_toe.py:107:4: C0415: Import outside toplevel (random) (import-outside-toplevel)
tic_tac_toe.py:108:4: C0103: Variable name "ln" doesn't conform to snake_case naming style (invalid-name)
tic_tac_toe.py:109:4: C0103: Variable name "r" doesn't conform to snake_case naming style (invalid-name)
tic_tac_toe.py:112:0: C0116: Missing function or method docstring (missing-function-docstring)
tic_tac_toe.py:112:0: C0103: Function name "StartTheGame" doesn't conform to snake_case naming style (invalid-name)
tic_tac_toe.py:113:4: W0603: Using the global statement (global-statement)
tic_tac_toe.py:120:0: C0116: Missing function or method docstring (missing-function-docstring)
tic_tac_toe.py:120:0: C0103: Function name "CleanScreen" doesn't conform to snake_case naming style (invalid-name)
tic_tac_toe.py:131:0: C0116: Missing function or method docstring (missing-function-docstring)
tic_tac_toe.py:131:0: C0103: Function name "TieGame" doesn't conform to snake_case naming style (invalid-name)
tic_tac_toe.py:133:4: R1703: The if statement can be replaced with 'return bool(test)' (simplifiable-if-statement)
tic_tac_toe.py:133:4: R1705: Unnecessary "else" after "return", remove the "else" and de-indent the code inside it (no-else-return)
tic_tac_toe.py:140:0: C0116: Missing function or method docstring (missing-function-docstring)
tic_tac_toe.py:140:0: C0103: Function name "GamePlay" doesn't conform to snake_case naming style (invalid-name)
tic_tac_toe.py:170:8: C0103: Constant name "FirstRun" doesn't conform to UPPER_CASE naming style (invalid-name)

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Your code has been rated at 4.75/10

PS C:\Users\student\Desktop\JB> 
```
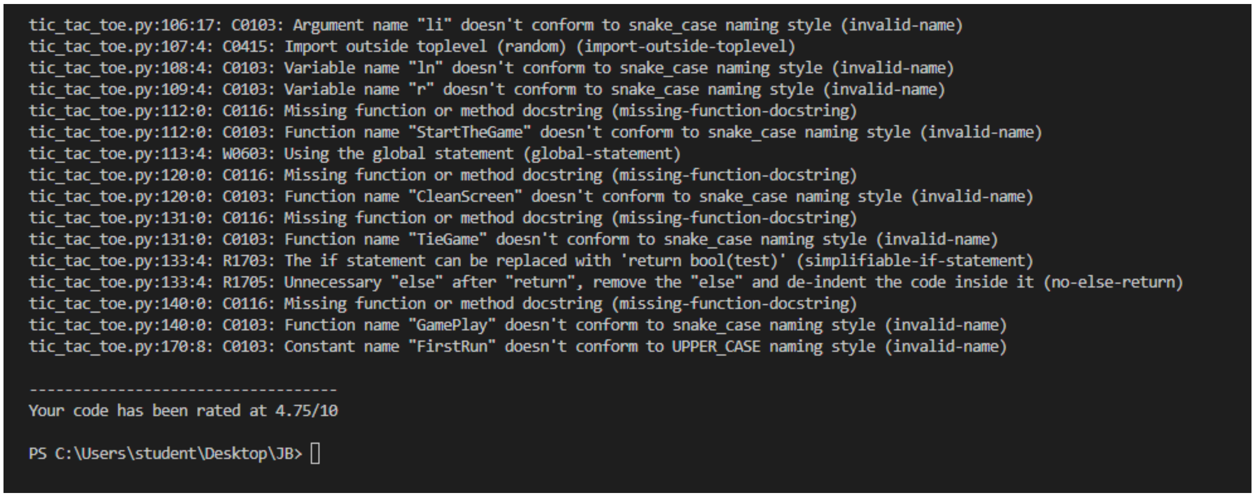

Errors:



```
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Your code has been rated at 4.75/10

PS C:\Users\student\Desktop\JB>
```

Code rating: 4.75/10

Interpretation:

`Missing module docstring:` The script is lacking a module-level docstring that explains what it does.

`Missing function or method docstring:` Docstrings for some functions and methods are absent. These docstrings describe what the functions accomplish.

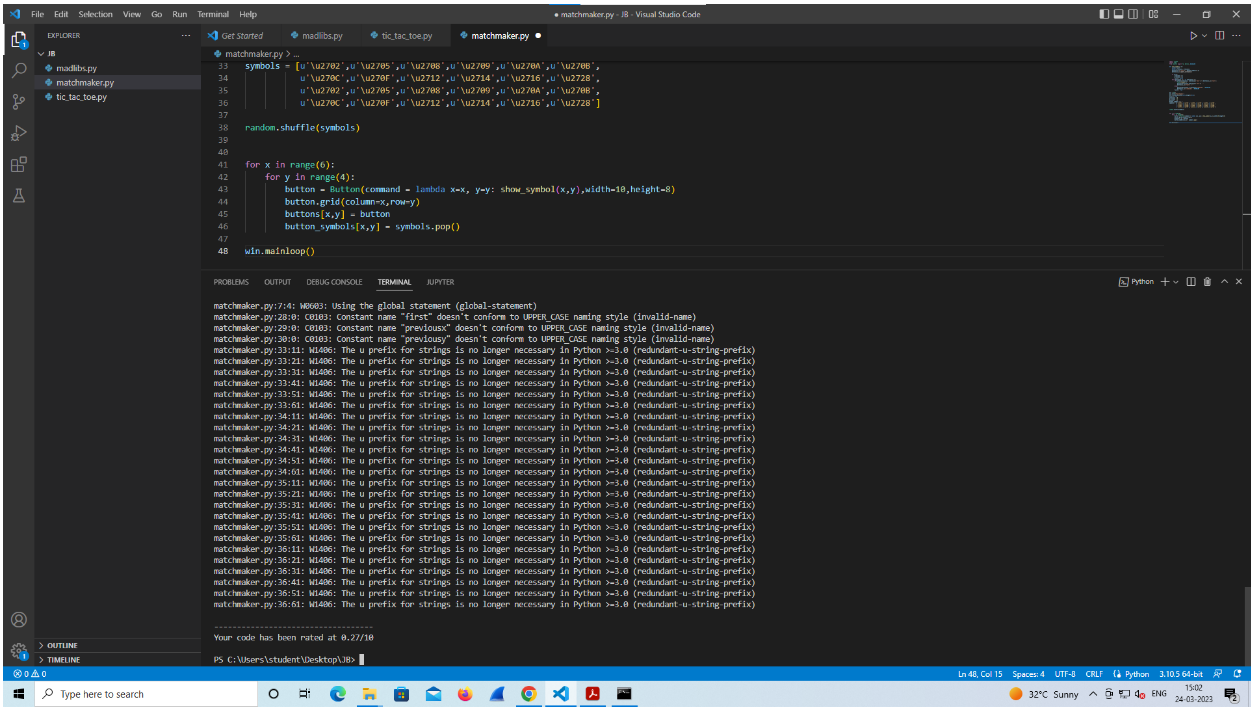
`Invalid name:` A few variable and function names violate the snake case naming convention or fail to accurately describe what they perform.

`Redefining the name "board" from the outer scope:` The global scope defines the variable board, which is then modified in various functions.

`No stated exception type(s) (bare-except):` A bare except: clause will catch an exception, but it is not recommended because it can conceal mistakes.

Inconsistent indentation: Some lines have poor indentation.

Program name: Matchmaker.py



```
symbols = [u'\u2702',u'\u2705',u'\u2708',u'\u2709',u'\u270A',u'\u270B',
           u'\u270C',u'\u270F',u'\u2712',u'\u2714',u'\u2716',u'\u2728',
           u'\u2702',u'\u2705',u'\u2708',u'\u2709',u'\u270A',u'\u270B',
           u'\u270C',u'\u270F',u'\u2712',u'\u2714',u'\u2716',u'\u2728']

random.shuffle(symbols)


for x in range(6):
    for y in range(4):
        button = Button(command = lambda x=x, y=y: show_symbol(x,y),width=10,height=8)
        button.grid(column=x,row=y)
        buttons[x,y] = button
        button_symbols[x,y] = symbols.pop()

win.mainloop()
```

```
matchmaker.py:7:4: W0603: Using the global statement (global-statement)
matchmaker.py:28:0: C0103: Constant name "first" doesn't conform to UPPER_CASE naming style (invalid-name)
matchmaker.py:29:0: C0103: Constant name "previousx" doesn't conform to UPPER_CASE naming style (invalid-name)
matchmaker.py:30:0: C0103: Constant name "previousy" doesn't conform to UPPER_CASE naming style (invalid-name)
matchmaker.py:33:11: W1406: The u prefix for strings is no longer necessary in Python >=3.0 (redundant-u-string-prefix)
matchmaker.py:33:21: W1406: The u prefix for strings is no longer necessary in Python >=3.0 (redundant-u-string-prefix)
matchmaker.py:33:31: W1406: The u prefix for strings is no longer necessary in Python >=3.0 (redundant-u-string-prefix)
matchmaker.py:33:41: W1406: The u prefix for strings is no longer necessary in Python >=3.0 (redundant-u-string-prefix)
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-----------------------------------
Your code has been rated at 0.27/10

PS C:\Users\student\Desktop\JB>
```
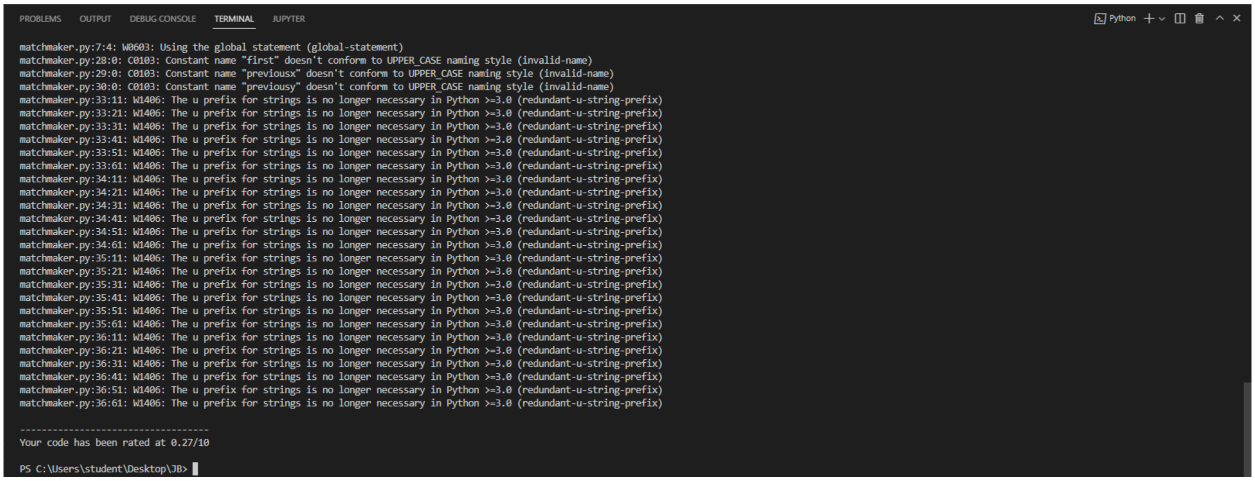

Error:



```
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-----------------------------------
Your code has been rated at 0.27/10

PS C:\Users\student\Desktop\JB>
```

Code rating: 0.27/10

Interpretation:

C0304: Missing-last-newline (final newline missing): The last line of the file should conclude with a newline character (n), according to this warning. It's a Unix-like system convention, and some text editors need it to work properly.

Missing module documentation (C0114: missing-module-docstring) This notice lets you know that the entire module lacks a documentation string. The purpose of the module and its contents should be explained in a module-level docstring that is present at the beginning of the file.

Missing method or function documentation (missing-method-docstring): This notice lets you know that a function's documentation string is missing. A docstring that details each function's goal, arguments, return value, and any side effects is required.

Parameter name "x" doesn't follow the snake case naming convention (invalid-name), according to C0103: This alert shows that the variable name x does not adhere to the suggested naming style of snake case. A better name might be first name.

Parameter name "y" doesn't follow snake case naming convention (invalid-name), according to C0103: This alert shows that the variable name y does not adhere to the suggested naming style of snake case. Last name might be a better option.