Name: Corey Glover SDEV300-6382 Date: Jan. 31, 2022

Objective:

The objective of this program is to introduce the use of numpy. This is accomplished by having the user enter multiple variables such as a telephone and zip code then comparing them to a regular expression format to determine if it is in correct format, if not then ask to re-enter. Next the user is asked if they would like to re-enter or continue. If continuing then the user will input a 9 integer array that is used to make a matrix. This is accomplished with numpy. After the user enters the values for the first and second matrix they are then given a menu of choices on how to handle the matrices. They have the option to add, subtract, multiply or multiply by elements. All will return the value and if use would like to change their values and run the matrix calculator again. If not then it will exit to the original prompt if the user would like to use the application.

Test cases:

Below are some test cases that were used to test the program.

Test Cases:	**User Input:**	**Predicted Output:**	**Actual Output:**	**Pass/Fail:**
1	random key input	Please verify input, reprompt	Please verify input, reprompt	pass, fig 1
2	n, no, No, nO, NO	Thank you for using application	Thank you for using application	pass, fig 1
3	y, yes, yEs, Yes, YES	Please enter your phone number	Please enter your phone number	pass, fig 2
4	random key input	Please verify phone number	Please verify phone number	pass, fig 2
5	1111111111,111-1111111	Please verify phone number	Please verify phone number	pass, fig 2
6	(123)456-7890, 123-456-7890	Please enter your zipcode	Please enter your zipcode	pass, fig 2
7	123456789, 1234-56789	Please verify zipcode	Please verify zipcode	pass, fig 2
8	12345, 12345-6789	Display user phone and zipcode, prompt to re-enter	Display user phone and zipcode, prompt to re-enter	pass, fig 2
9	random key input	Invalid entry, reprompt	Invalid entry, reprompt	pass, fig 2
10	y, yes, yEs, Yes, YES	Please enter phone number	Please enter phone number	pass, fig 2
11	(123)456-7890, 123-456-7890	Please enter your zipcode	Please enter your zipcode	pass, fig 2
12	123456789, 1234-56789	Please verify zipcode	Please verify zipcode	pass, fig 2

13	12345, 12345-6789	Display user phone and zip code, prompt to re-enter	Display user phone and zip code, prompt to re-enter	pass, fig 2
14	n, no, No, nO, NO	Please enter your first 3x3 matrix values	Please enter your first 3x3 matrix values	pass, fig 2
15	123456789	Please verify input, want to use the app?	Please verify input, want to use the app?	pass, fig 2
16	1,2,3,4,5,6,7,8,9	Please enter second 3x3 matrix	Please enter second 3x3 matrix	pass, fig 3
17	random key input	Please verify input, want to use the app?	Please verify input, want to use the app?	pass, fig 3
18	1234567890	Please verify input, want to use the app?	Please verify input, want to use the app?	pass, fig 4
19		Please enter your first 3x3 matrix values	Please enter your first 3x3 matrix values	pass, fig 5
20	1,2,3,4,5,6,7,8,9	Please enter your second 3x3 matrix values	Please enter your second 3x3 matrix values	pass, fig 6
21	2,2,2,2,2,2,2,2,2	Matrix operation menu, select operation	Matrix operation menu, select operation	pass, fig 7
22	random key entry	Not valid selection, enter new matrix?	Not valid selection, enter new matrix?	pass, fig 7
23	y, yes, yEs, Yes, YES	Please enter your first 3x3 matrix values	Please enter your first 3x3 matrix values	pass, fig 7
24	1,2,3,4,5,6,7,8,9	Please enter your second 3x3 matrix values	Please enter your second 3x3 matrix values	pass, fig 7
25	2,2,2,2,2,2,2,2,2	Matrix operation menu, select operation	Matrix operation menu, select operation	pass, fig 7
26	1(addition)	display matrix addition, transpose, mean, enter another matrix	display matrix addition, transpose, mean, enter another matrix	pass, fig 7
	2(subtraction)	display matrix subtraction, transpose, mean, enter another matrix	display matrix subtraction, transpose, mean, enter another matrix	pass, fig 8

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	3(multiply)	display matrix multiplication ,transpose, mean, enter another matrix	display matrix multiplication ,transpose, mean, enter another matrix	pass, fig 9
	4(multiply elements)	display matrix multiplication ,transpose, mean, enter another matrix	display matrix multiplication ,transpose, mean, enter another matrix	pass, fig 10
28	random key entry	Not valid selection, return to start	Not valid selection, return to start	pass, fig 11
29	no, n	Do you want to use app?	Do you want to use app?	pass, fig 11
30	no, n	Thank you for using application	Thank you for using application	pass, fig 11

Below are the images associated with the above test cases.

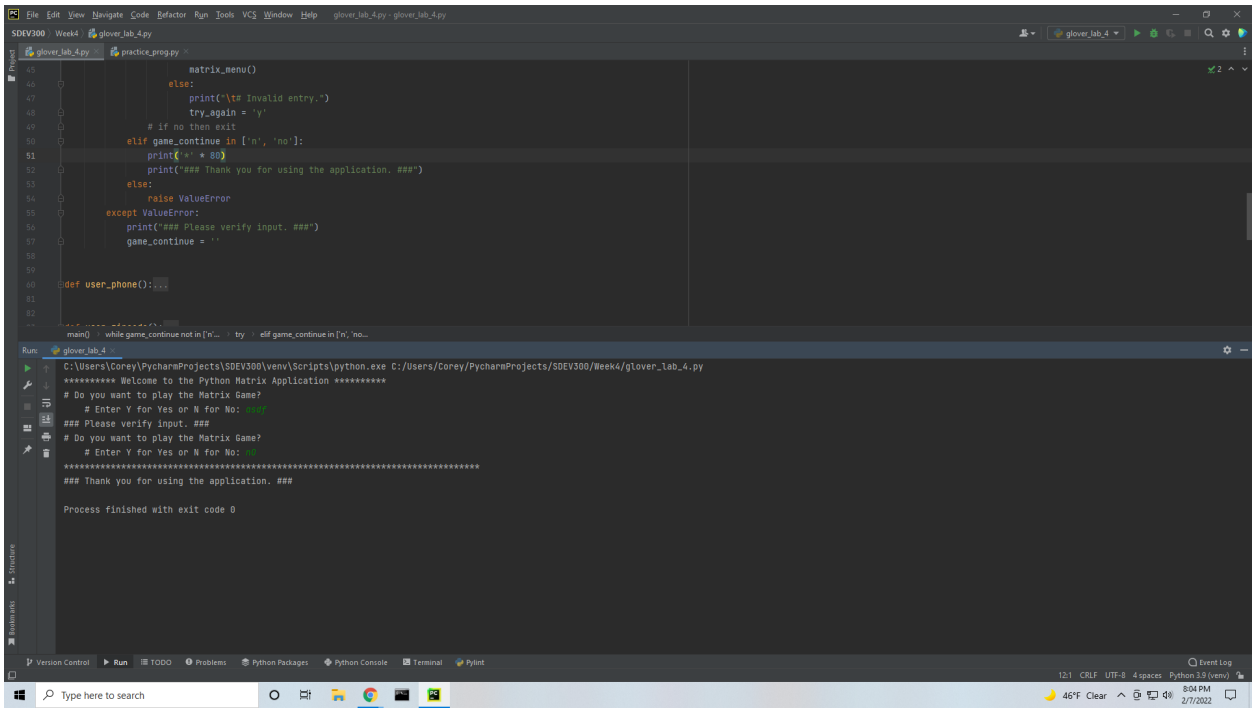
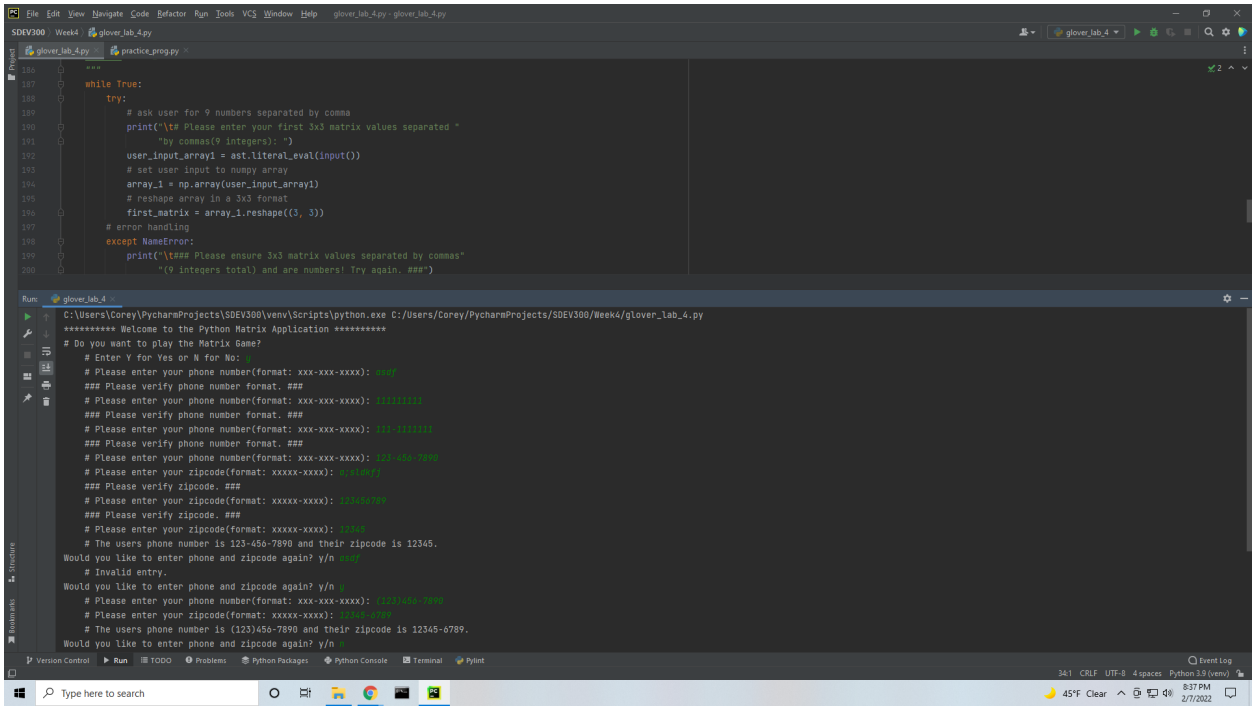


Fig 1

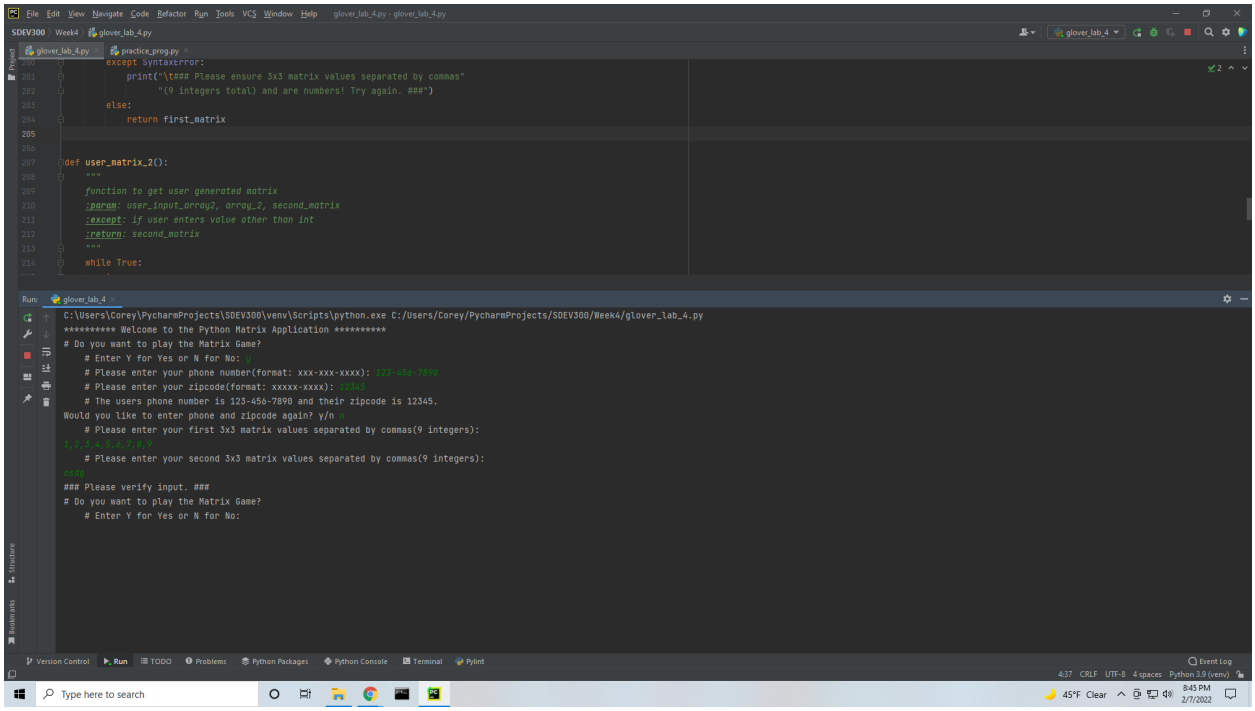
Name: Corey Glover SDEV300-6382 Date: Jan. 31, 2022



```
    """
    while True:
        try:
            # ask user for 9 numbers separated by comma
            print("\t# Please enter your first 3x3 matrix values separated "
                  "by commas(9 integers): ")
            user_input_array1 = ast.literal_eval(input())
            # set user input to numpy array
            array_1 = np.array(user_input_array1)
            # reshape array in a 3x3 format
            first_matrix = array_1.reshape((3, 3))
        # error handling
        except NameError:
            print("\t### Please ensure 3x3 matrix values separated by commas"
                  "(9 integers total) and are numbers! Try again. ###")
```

```
C:\Users\Corey\PycharmProjects\SDEV300\venv\Scripts\python.exe C:/Users/Corey/PycharmProjects/SDEV300/Week4/glover_lab_4.py
********** Welcome to the Python Matrix Application **********
# Do you want to play the Matrix Game?
    # Enter Y for Yes or N for No: y
    # Please enter your phone number(format: xxx-xxx-xxxx): asdf
    ### Please verify phone number format. ###
    # Please enter your phone number(format: xxx-xxx-xxxx): 111111111
    ### Please verify phone number format. ###
    # Please enter your phone number(format: xxx-xxx-xxxx): 111-1111111
    ### Please verify phone number format. ###
    # Please enter your phone number(format: xxx-xxx-xxxx): 123-456-7890
    # Please enter your zipcode(format: xxxxx-xxxx): 0;slAkfj
    ### Please verify zipcode. ###
    # Please enter your zipcode(format: xxxxx-xxxx): 12345a789
    ### Please verify zipcode. ###
    # Please enter your zipcode(format: xxxxx-xxxx): 12345
    # The users phone number is 123-456-7890 and their zipcode is 12345.
Would you like to enter phone and zipcode again? y/n asdf
    # Invalid entry.
Would you like to enter phone and zipcode again? y/n y
    # Please enter your phone number(format: xxx-xxx-xxxx): (123)456-7890
    # Please enter your zipcode(format: xxxxx-xxxx): 12345-6789
    # The users phone number is (123)456-7890 and their zipcode is 12345-6789.
Would you like to enter phone and zipcode again? y/n n
```

Fig 2



```
        except SyntaxError:
            print("\t### Please ensure 3x3 matrix values separated by commas"
                  "(9 integers total) and are numbers! Try again. ###")
        else:
            return first_matrix


def user_matrix_2():
    """
    function to get user generated matrix
    :param: user_input_array2, array_2, second_matrix
    :except: if user enters value other than int
    :return: second_matrix
    """
    while True:
```

```
C:\Users\Corey\PycharmProjects\SDEV300\venv\Scripts\python.exe C:/Users/Corey/PycharmProjects/SDEV300/Week4/glover_lab_4.py
********** Welcome to the Python Matrix Application **********
# Do you want to play the Matrix Game?
    # Enter Y for Yes or N for No: y
    # Please enter your phone number(format: xxx-xxx-xxxx): 123-456-7890
    # Please enter your zipcode(format: xxxxx-xxxx): 12345
    # The users phone number is 123-456-7890 and their zipcode is 12345.
Would you like to enter phone and zipcode again? y/n n
    # Please enter your first 3x3 matrix values separated by commas(9 integers):
1,2,3,4,5,6,7,8,9
    # Please enter your second 3x3 matrix values separated by commas(9 integers):
asdg
### Please verify input. ###
# Do you want to play the Matrix Game?
    # Enter Y for Yes or N for No:
```

Fig 3

Name: Corey Glover SDEV300-6382 Date: Jan. 31, 2022

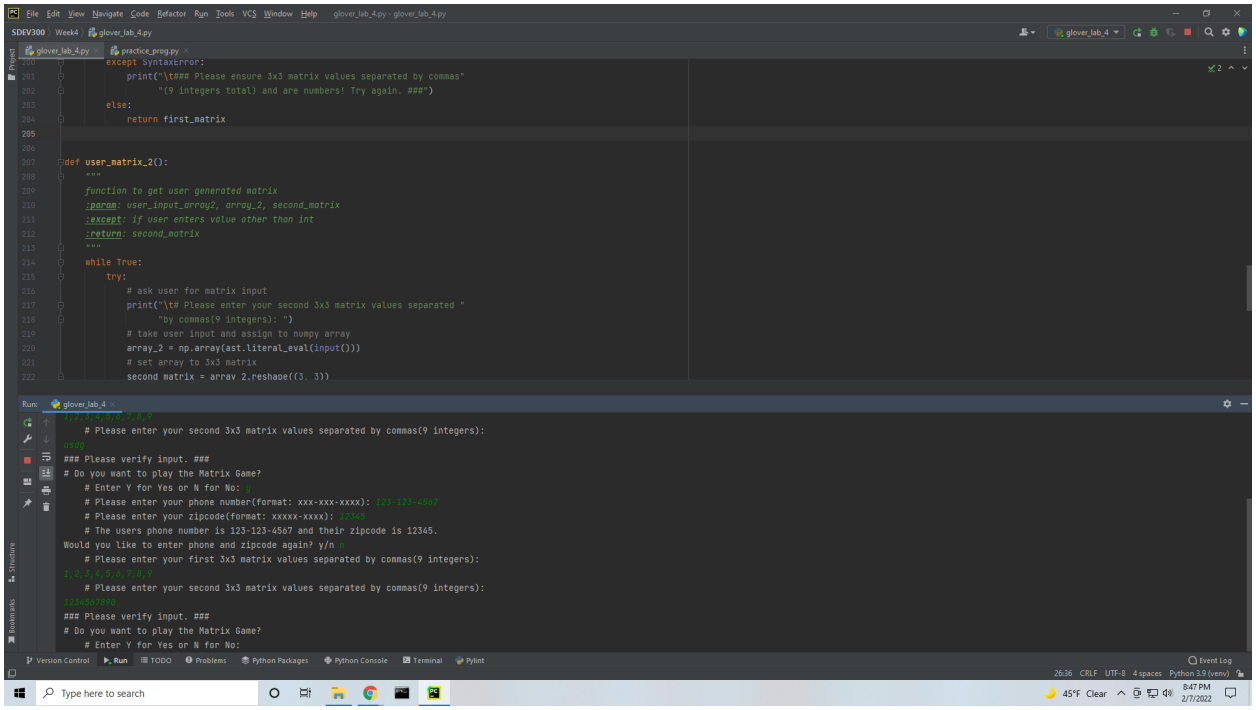


Fig 4

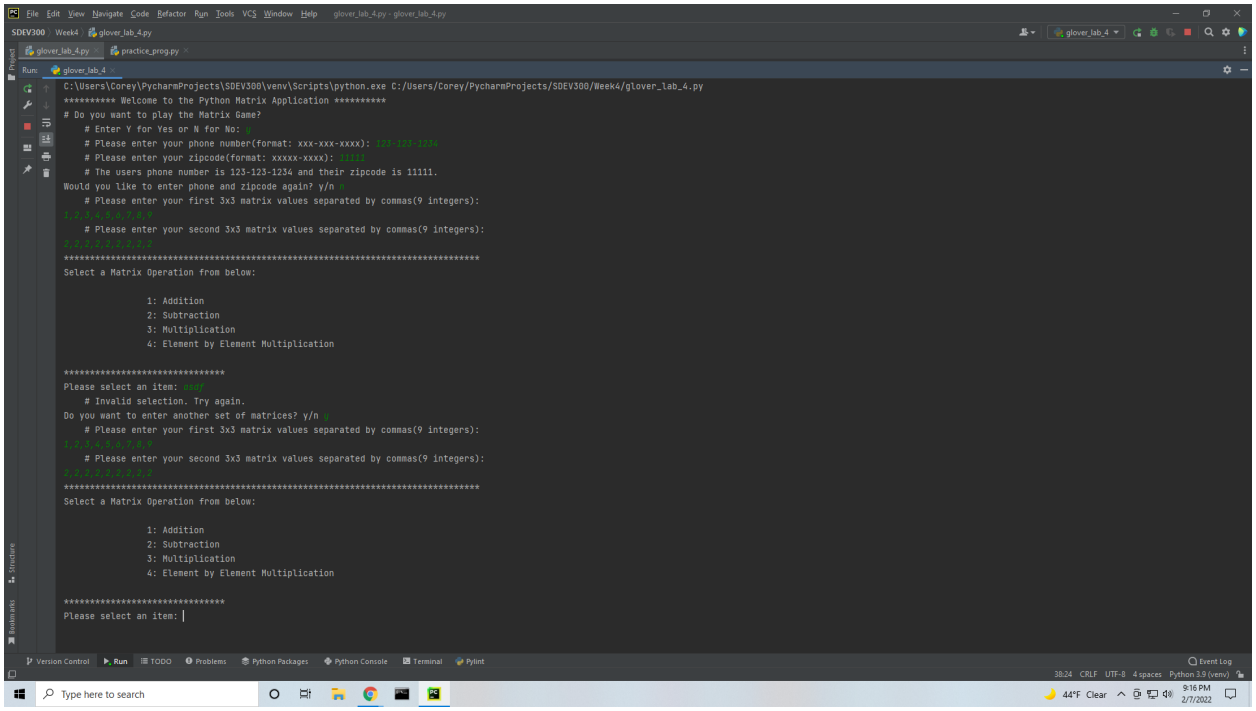


Fig 5

Name: Corey Glover SDEV300-6382 Date: Jan. 31, 2022

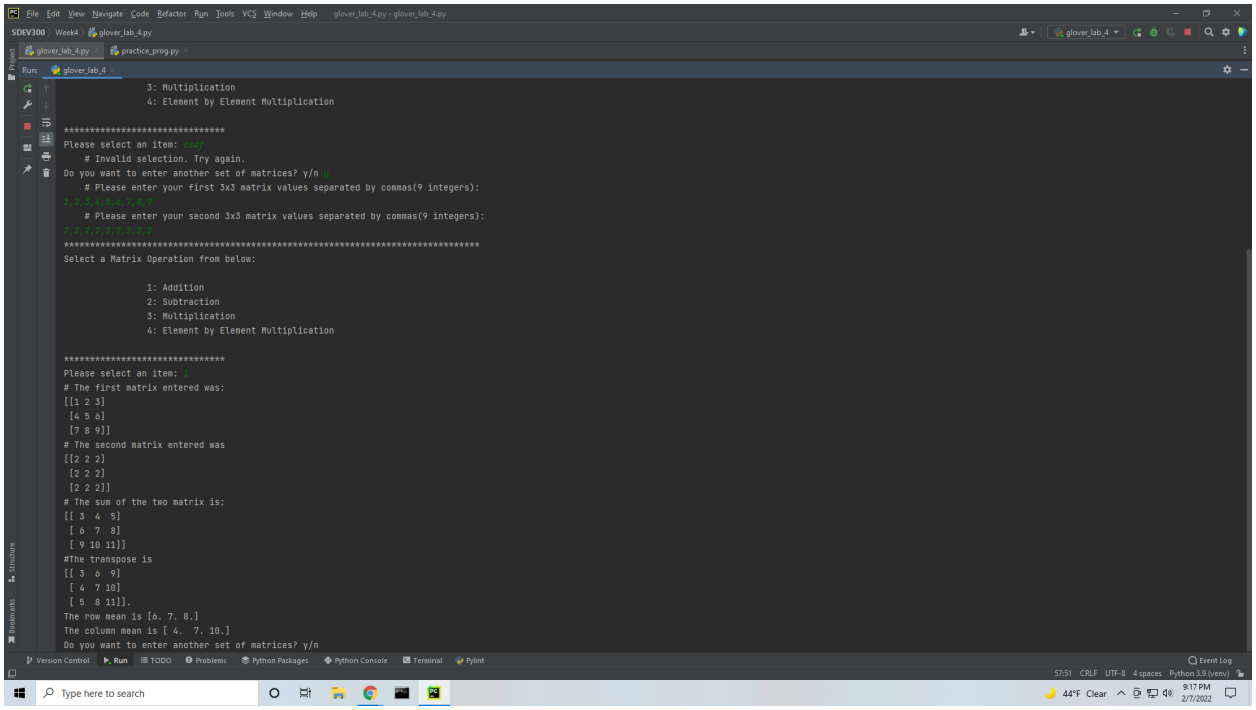


Fig 6

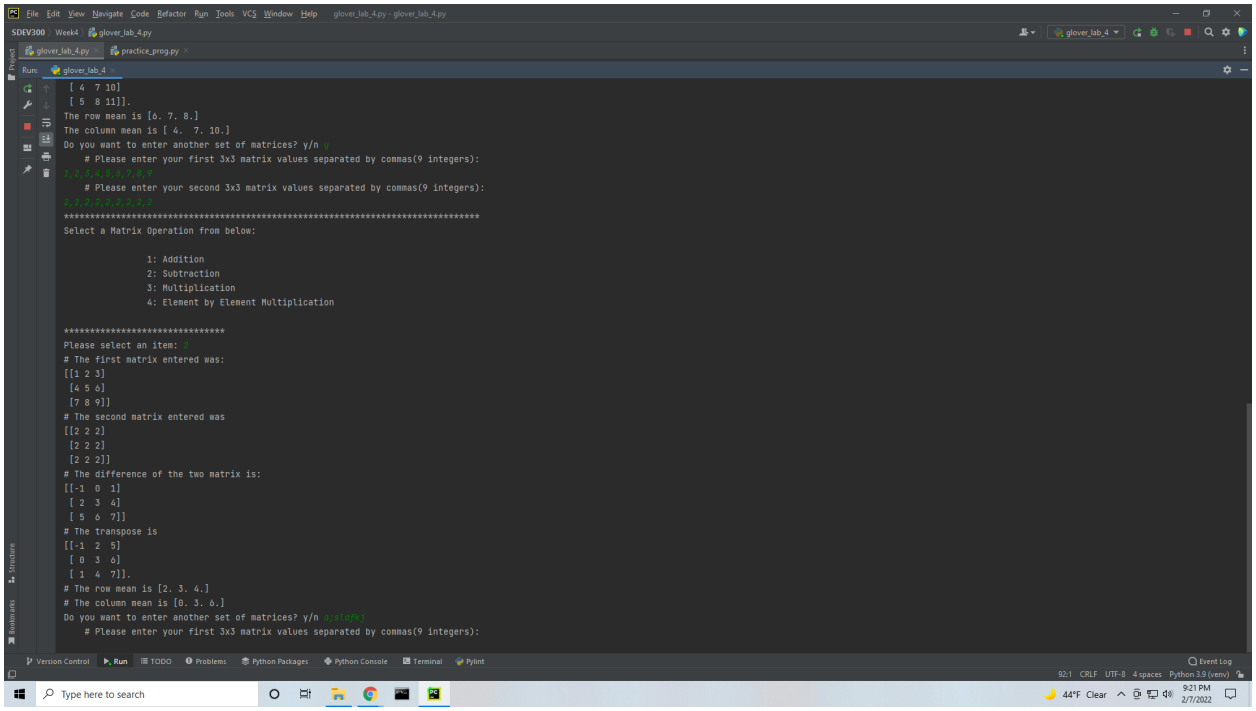


Fig 7

Name: Corey Glover SDEV300-6382 Date: Jan. 31, 2022

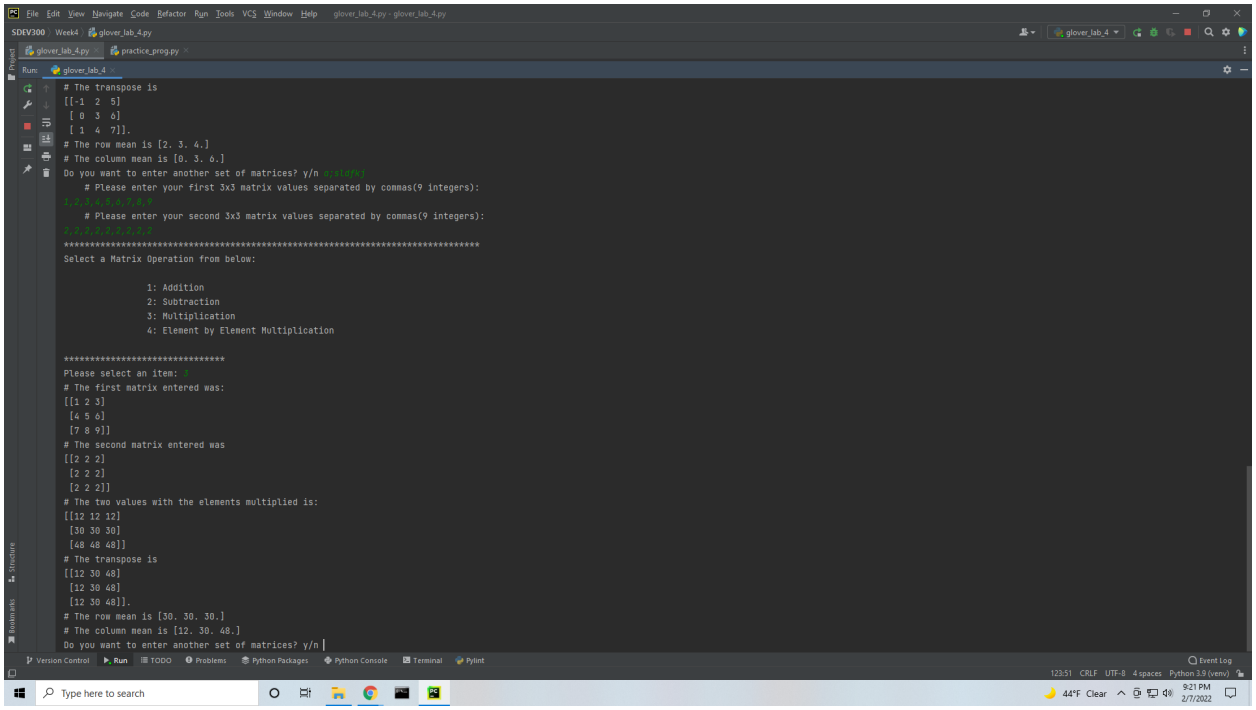


Fig 8

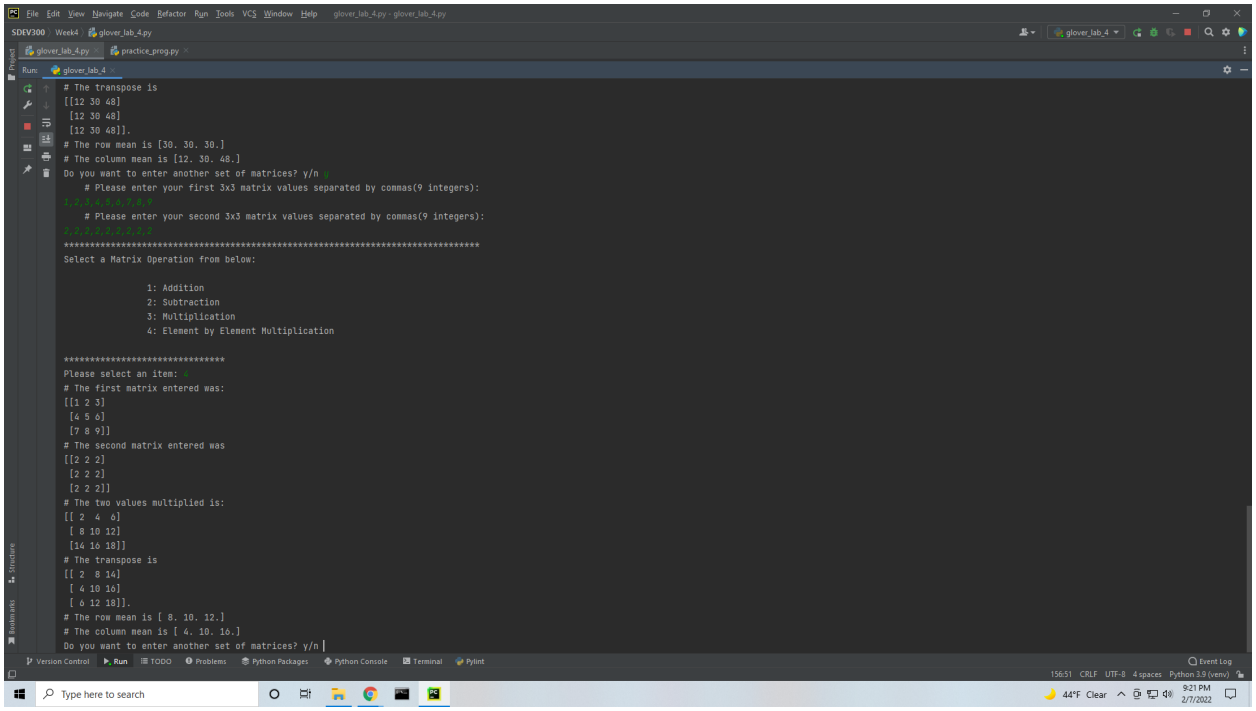


Fig 9

Name: Corey Glover SDEV300-6382 Date: Jan. 31, 2022

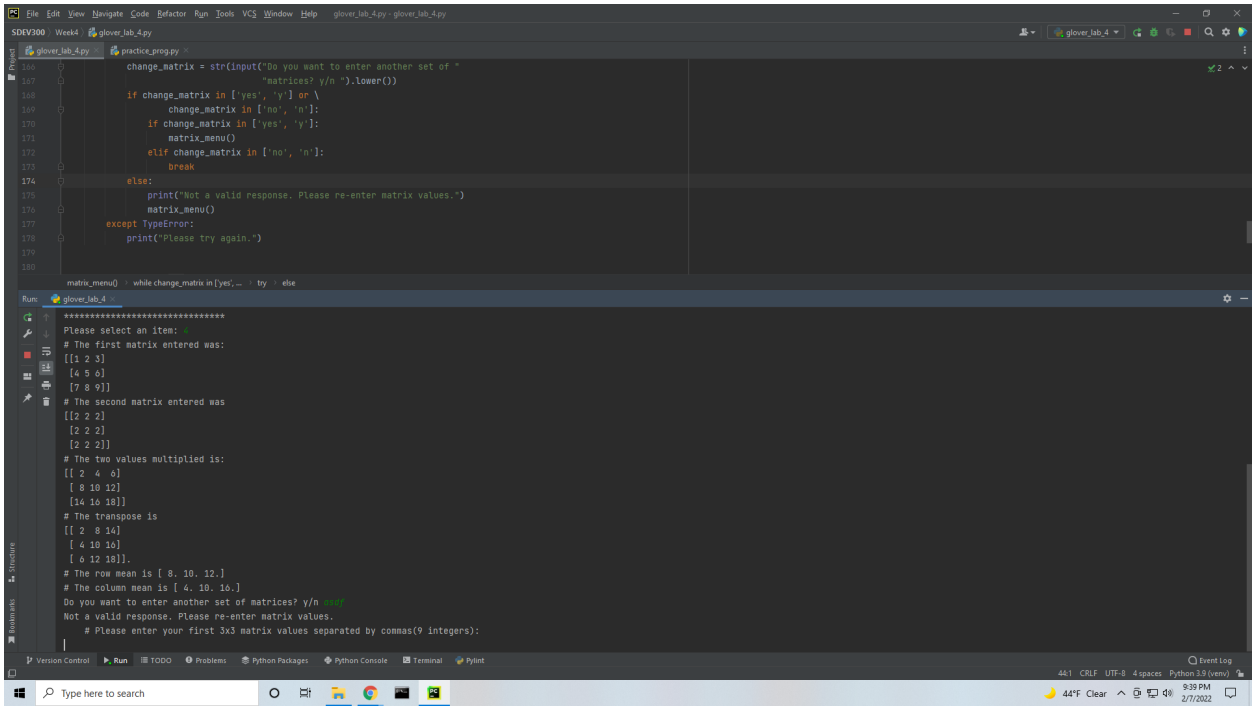


Fig 10

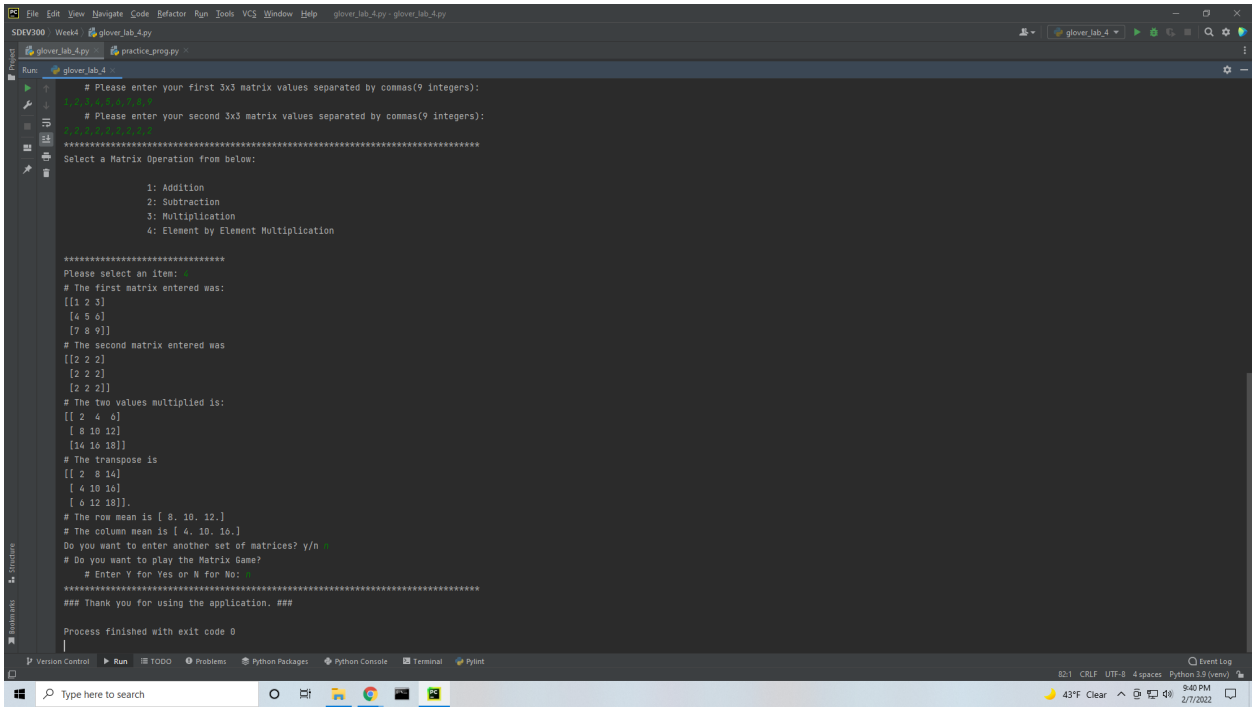
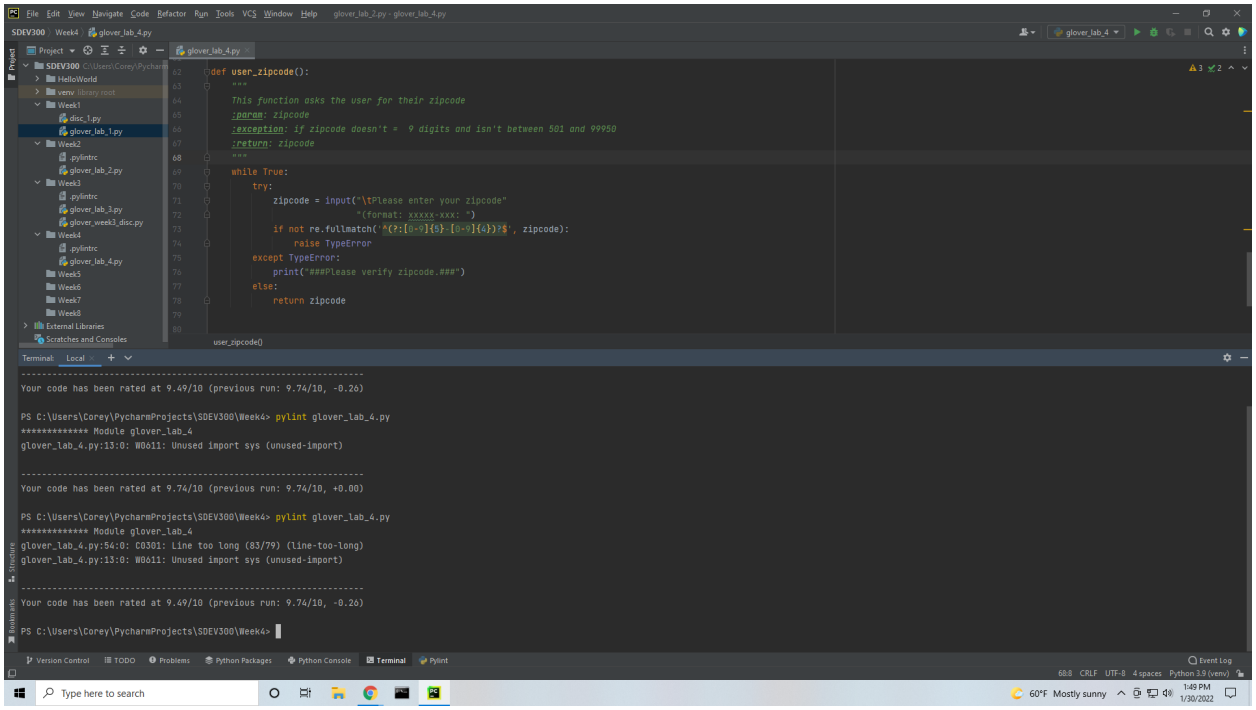


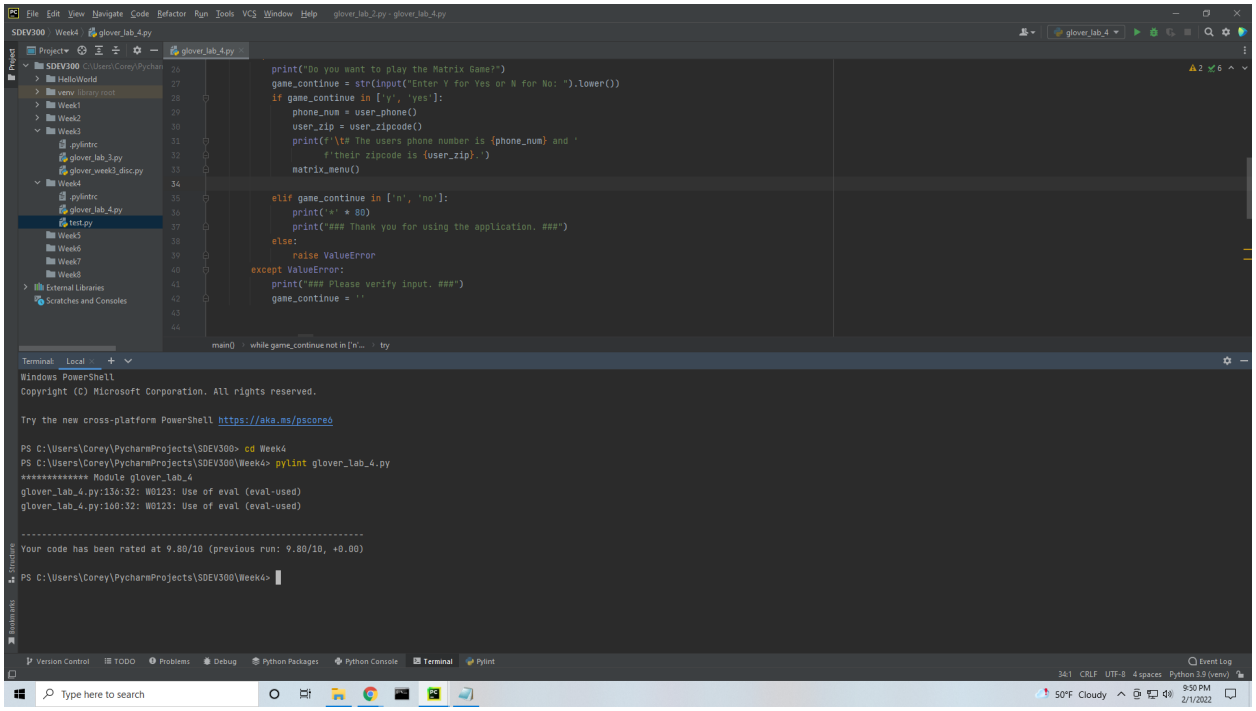
Fig 11

Below are some screenshots of pylint running on the program along with comments on how they were corrected.

Name: Corey Glover SDEV300-6382 Date: Jan. 31, 2022

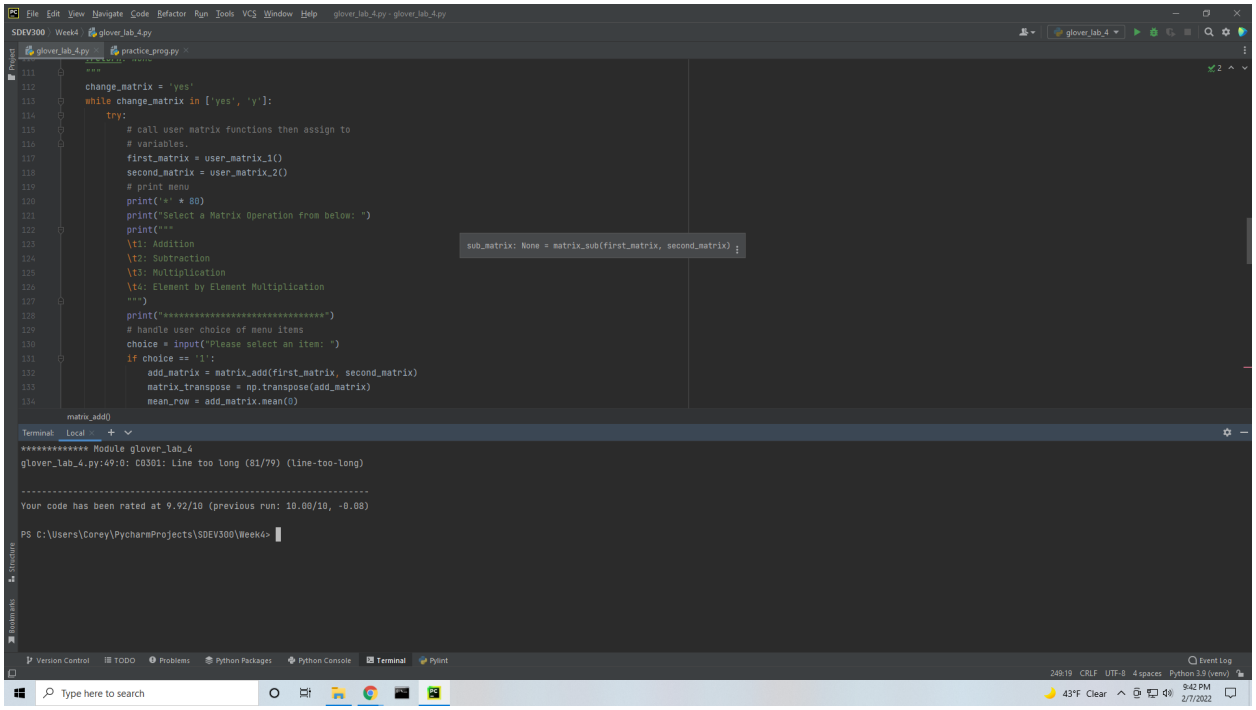


To correct the above issue the unused import was deleted and the line was backspaced until it was on the previous line then returned so Pycharm would auto-format



To correct the use of eval, ast.literal_eval was used in its place.

Name: Corey Glover SDEV300-6382 Date: Jan. 31, 2022



Returning a 10/10

Below are the test cases as well as some screen shots of running the encrypt program and then running the hashed passwords on a decrypt site.

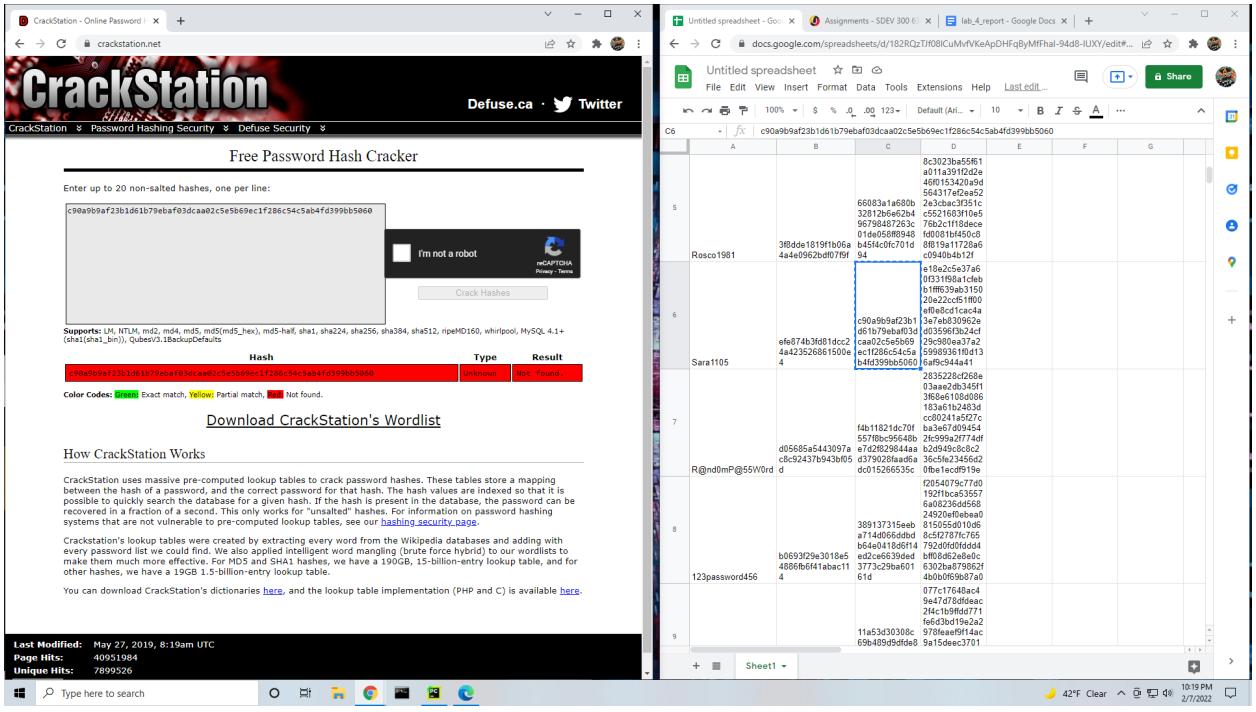
Test Cases:	MD5:	SHA-256:	SHA-512:	Results:
Passw0rd	d41e98d1eafa6d6011d3a70f1a5b92f0	ab38eadaeb746599f2c1ee90f8267f31f467347462764a24d71ac1843ee77fe3	fe0d8456dd3f1a0f68cde11860c34bddce97dcbc20f389f534af8c4c49e225f6307ca16e414ac04c8d67b80821690edceb86f8de0d5286dd37ee562e3dcf2e80	Exact Match
s0ngb1rd5	e3f838a629d3246fc6fb053b09b8d271	f345d4437843f40d028f1be4c843290652a810263608b21c1c43b2d05daa3364	3c8d8ae09d0e5c1b13747bfcd1289144ecd78b42129edee7fb74c8d9a3bffd9cf638a71e400f9f4341384c45bb070b8b52944fa84d104a1946	Not Found

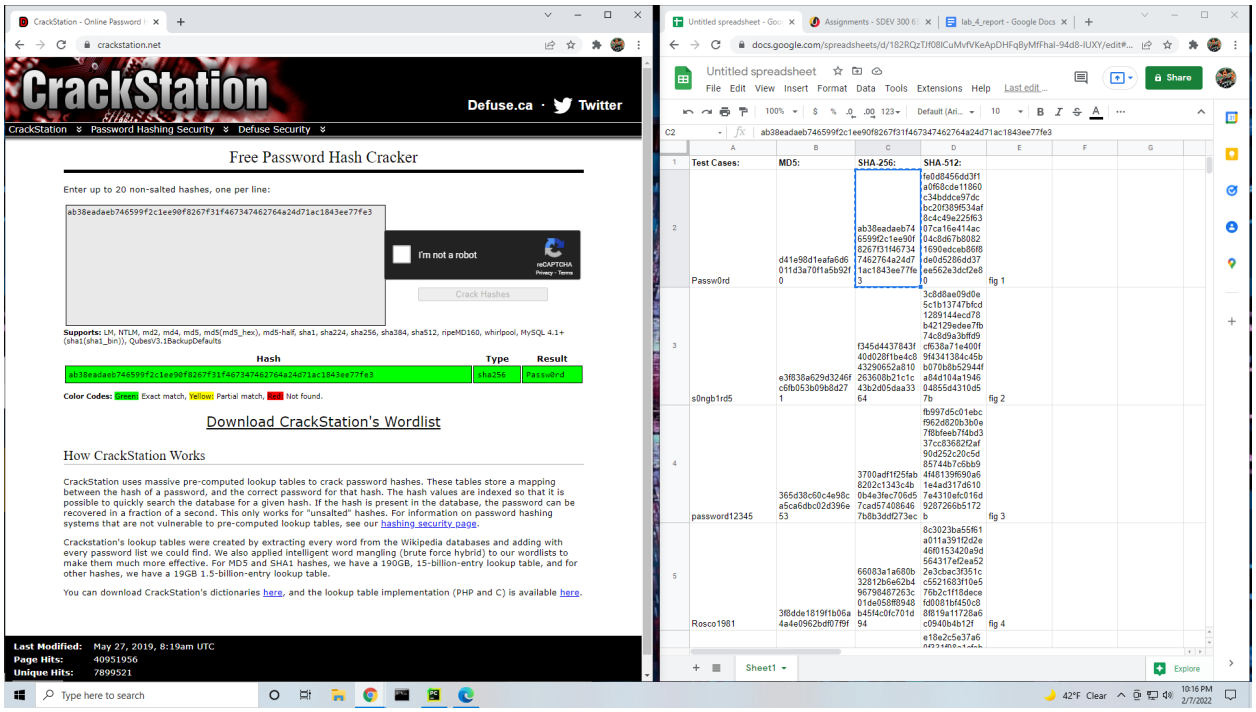
			04855d4310d57b	
password12345	365d38c60c4e98ca5ca6dbc02d396e53	3700adf1f25fab8202c1343c4b0b4e3fec706d57cad574086467b8b3ddf273ec	fb997d5c01ebcf962d820b3b0e7f8bfeeb7f4bd337cc83682f2af90d252c20c5d85744b7c6bb94f48139f690a61e4ad317d6107e4310efc016d9287266b5172b	Exact Match
Rosco1981	3f8dde1819f1b06a4a4e0962bdf07f9f	66083a1a680b32812b6e62b496798487263c01de058ff8948b45f4c0fc701d94	8c3023ba55f61a011a391f2d2e46f0153420a9d564317ef2ea522e3cbac3f351cc5521683f10e576b2c1f18decefd0081bf450c88f819a11728a6c0940b4b12f	Not Found
Sara1105	efe874b3fd81dcc24a423526861500e4	c90a9b9af23b1d61b79ebaf03dcaa02c5e5b69ec1f286c54c5ab4fd399bb5060	e18e2c5e37a60f331f98a1cfebb1fff639ab315020e22ccf51ff00ef0e8cd1cac4a3e7eb830962ed03596f3b24cf29c980ea37a259989361f0d136af9c944a41	Not Found
R@nd0mP@55W0rd	d05685a5443097ac8c92437b943bf05d	f4b11821dc70f557f8bc95648be7d2f829844aad379028faad6adc015266535c	2835228cf268e03aae2db345f13f68e6108d086183a61b2483dcc80241a5f27cba3e67d094542fc999a2f774dfb2d949c8c8c236c5fe23456d20fbe1ecdf919e	Not Found

123password456	b0693f29e3018e54886fb6f41abac114	389137315eeba714d066ddbdb64e0418d6f14ed2ce6639ded3773c29ba60161d	f2054079c77d0192f1bca535576a08236dd56824920ef0ebea0815055d010d68c5f2787fc765792d0fd0fddd4bff08d62e8e0c6302ba879862f4b0b0f69b87a0	Exact Match
Str0ngP@ssW0rd	25a86b775faaa19d7e41efdd7864f516	11a53d30308c69b489d9dfde84df84dcea3c2347d4a30805891d5e15ab772091	077c17648ac49e47d78dfdeac2f4c1b9ffdd771fe6d3bd19e2a2978feaef9f14ac9a15deec370147af9a76c41575dd3650c351fea38039ca3a55d975787fcf90	Not Found
Birthday1980	c47f5cdf6461c2918bf0671b4b192d3a	989d346b2ef87fbd85fd82194c49d106dcb7941d7dec976530c56cc950c803b0	a7d5a778ab601e12458c02035760d9fffee8a4cfa2cd6fe4f8c8ad1dfbf34a6859e1d541c03e0c0b312f85f5d7d6efd51ca9b33e26553d5ca55c3d745a258662	Not Found
DogName10111998	212603722388b94a7ba62f1a7f5c9622	51cd279cdebd23d8637f15cf01de56dd8d0a78db0993d37a33ed5f2126f04b84	07faf70ed99a9133156d6c45b97d0c92945d7726be22b26b993d31a248f2dd0e52f4375f147d019941d8f827d8a0a3e5f3709cf5c8dda0e3eb78441e9dc3a866	Not Found

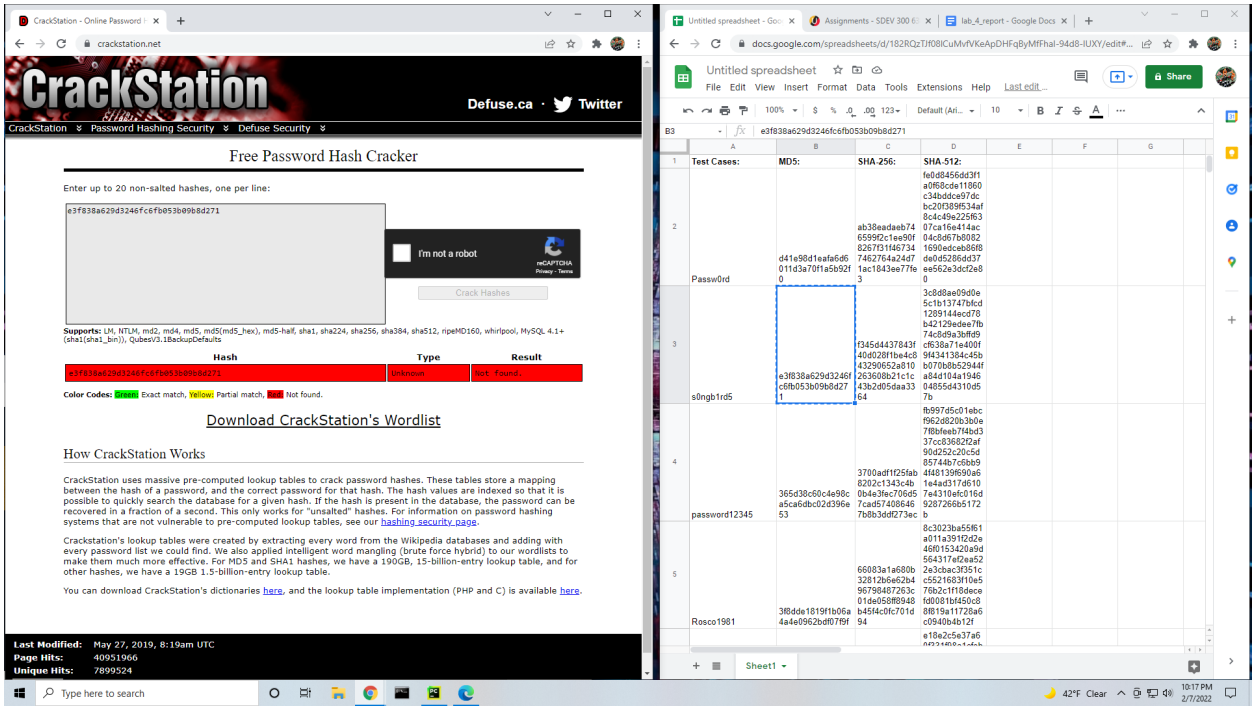
Below are some screenshots of the above passwords and the use of Crackstation.net.

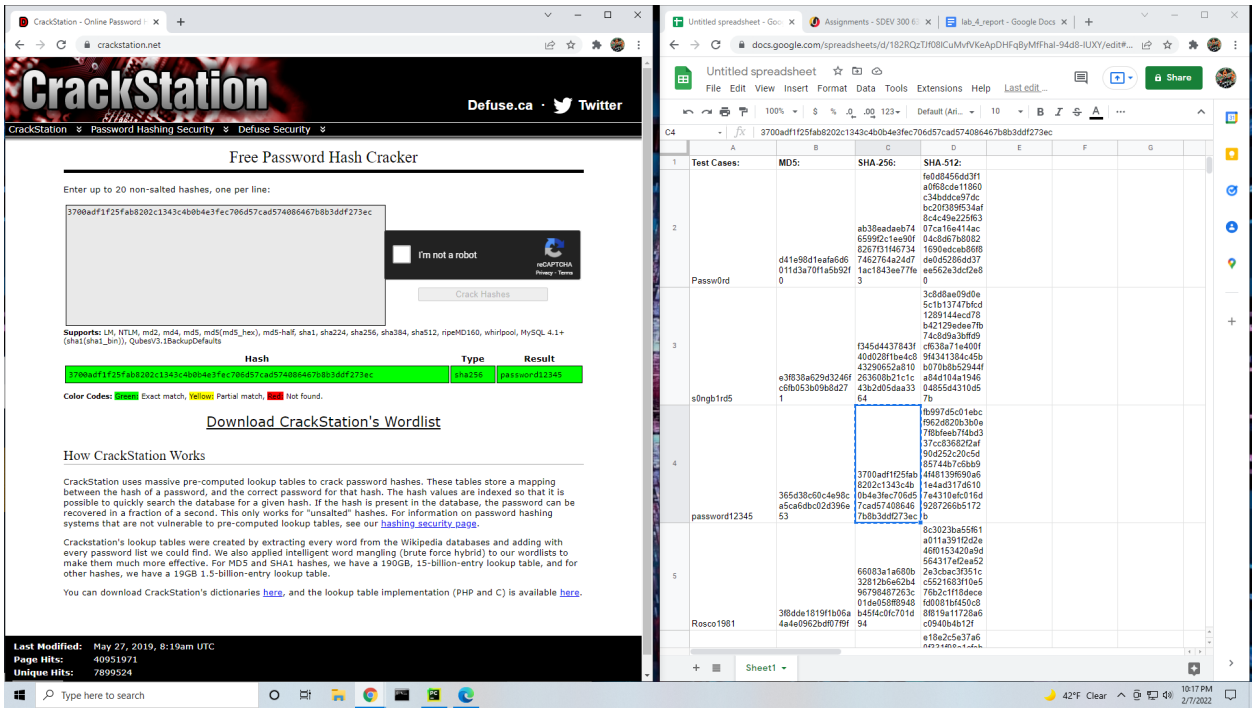
Name: Corey Glover SDEV300-6382 Date: Jan. 31, 2022





Name: Corey Glover SDEV300-6382 Date: Jan. 31, 2022





Overall conclusion and learning:

This experiment helped prove what is a strong password and what was not a strong password. It also helped solidify the understanding of hashing a password, the use of password cracking and how easy it would be to determine one's password, no matter the overall complexity.