

Objective:

The goal of this program was to show the proper use of packages used in the python programming language. This was accomplished by using several packages such as datetime, math, sys, secrets and numpy among others. The program starts off with displaying a menu to user and asking what they want to do. Depending on the user choice depends on what is performed. They can either create a secure password, calculate and format a percentage from a fraction, calculate how many days from today's date to a specified date, use the Law of Cosines to calculate the leg of a triangle, or calculate the volume of a cylinder.

Test Cases:

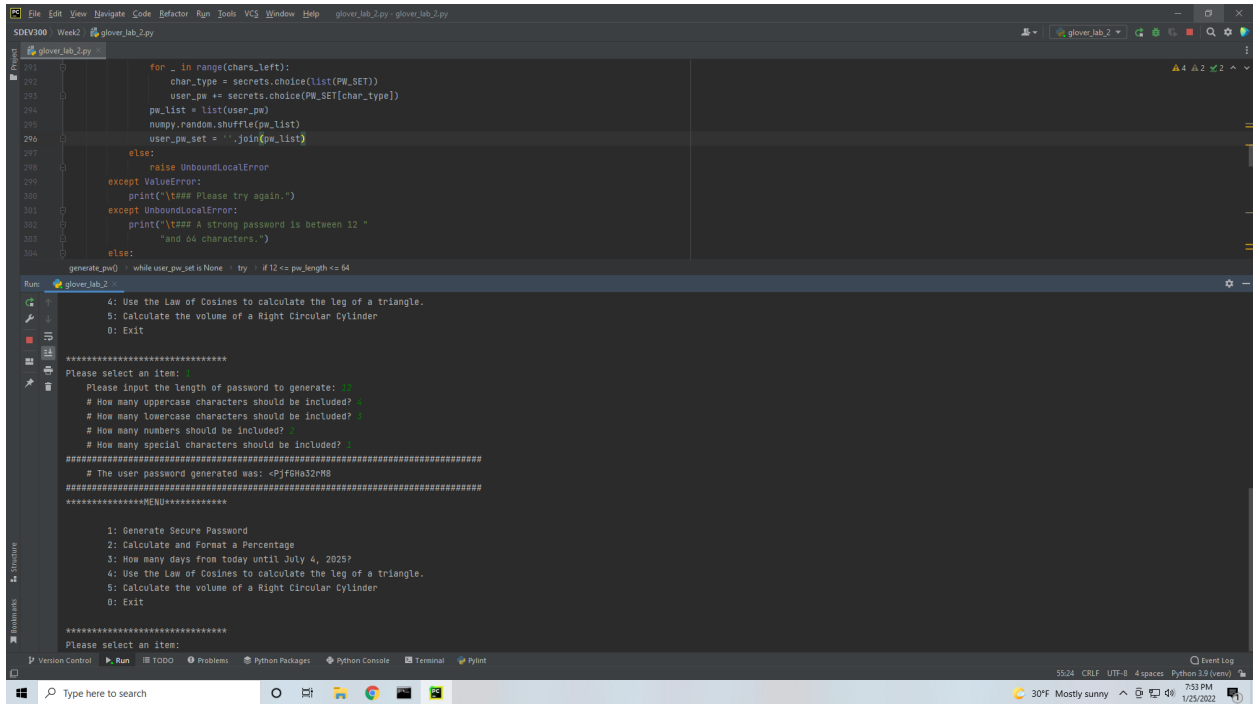
Below is the table used for test cases and the predicted vs actual output.

Test Cases:	User Input:	Predicted Output:	Actual Output:	Pass/Fail:
1	random key entry	"Not a valid selection" re-prompt	"Not a valid selection" re-prompt	pass, fig 1
2	1	"Input Password length"	"Input Password length"	pass, fig 2
3	random key entry	Please try again'	Please try again'	pass, fig 2
4	5	Strong password is 12-64'	Strong password is 12-64'	pass, fig 2
5	100	Strong password is 12-64'	Strong password is 12-64'	pass, fig 2
6	12	How many Uppercase?'	How many Uppercase?'	pass, fig 2
7	random key entry	Please try again', re-prompt length	Please try again', re-prompt length	pass, fig 2
8	5,5,5,5	Please keep pw characters set to length entered', display characters entered, return main menu	Please keep pw characters set to length entered', display characters entered, return main menu	pass, fig 2
9	4,3,2,1	User pw generate was:', generated password	User pw generate was:', generated password	pass, fig 3
10	2	Please input numerator:'	Please input numerator:'	pass, fig 4
11	random key entry, 2.5, 3/4	Please ensure that entries are whole numbers'	Please ensure that entries are whole numbers'	pass, fig 4
12	2	enter denominator'	enter denominator'	pass, fig 4

13	3	enter number of digits'	enter number of digits'	pass, fig 4
14	4	Fraction 2/3 as percent is: 66.6667%'	Fraction 2/3 as percent is: 66.6667%'	pass, fig 4
15	3	There are 1255 days until July 4, 2025 from today," date	There are 1255 days until July 4, 2025 from today," date	pass, fig 5
16	4	Input value side 1:	Input value side 1:	pass, fig 6
17	random key entry	Please verify input	Please verify input	pass, fig 6
18	3,4,30	Display law of cosines, value for side a=3.0, value for side b=4.0, calculated side = 2.05	Display law of cosines, value for side a=3.0, value for side b=4.0, calculated side = 2.05	pass, fig 6
19	5	do you know the radius or circumference?	do you know the radius or circumference?	pass, fig 7
20	random key entry	Please verify input	please verify input	pass, fig 7
21	r or radius	Please input radius:	Please input radius:	pass, fig 7
22	random key entry	Please verify input, re-prompt	Please verify input, re-prompt	pass, fig 7
23	3	input height	input height	pass, fig 7
24	4	C= 18.85, rad.= 3.00, H=4.0, volume=113.10	C= 18.85, rad.= 3.00, H=4.0, volume=113.10	pass, fig 7
25	5	do you know the radius or circumference?	do you know the radius or circumference?	pass, fig 8
26	c, circumference	Please input circumference	Please input circumference	pass, fig 8
27	3	input height	input height	pass, fig 8
28	4	circumference=3, rad.=.48, h=4.0, volume= 2.86	circumference=3, rad.=.48, h=4.0, volume= 2.86	pass, fig 8
29	0	Thank you for using application	Thank you for using application	pass, fig 9

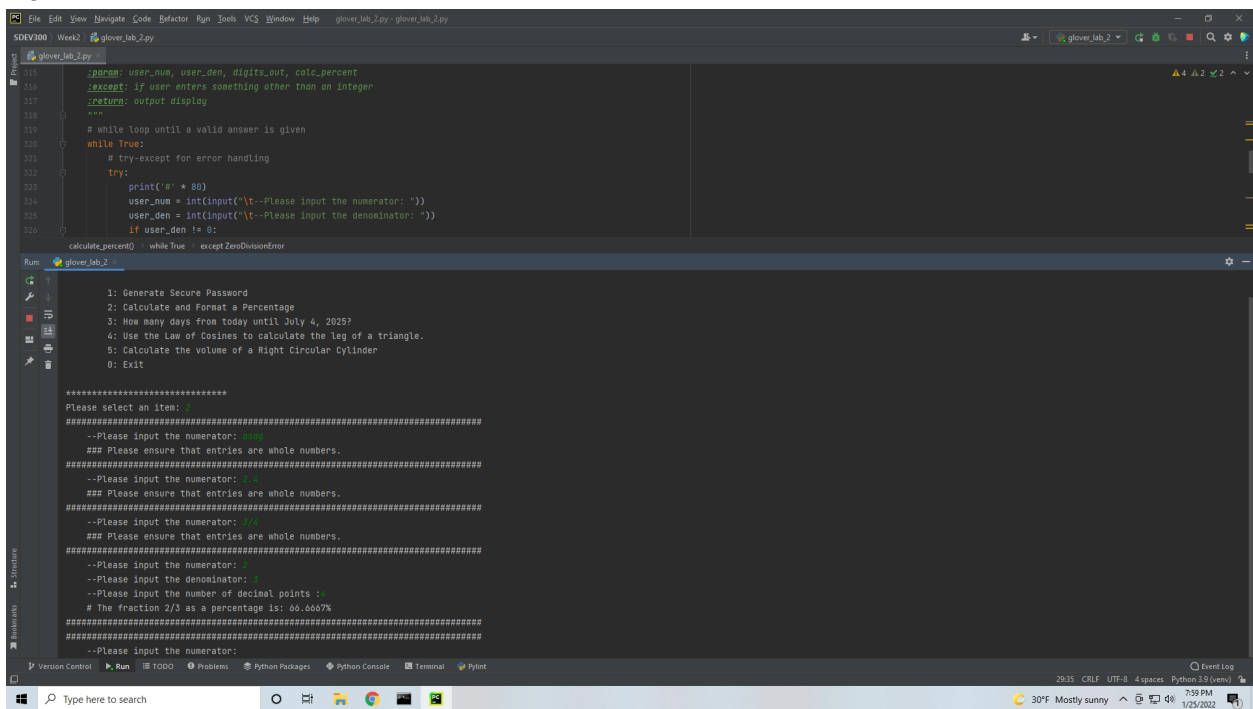
Below are some screenshots of the file running and its corresponding output as referenced in the case study.





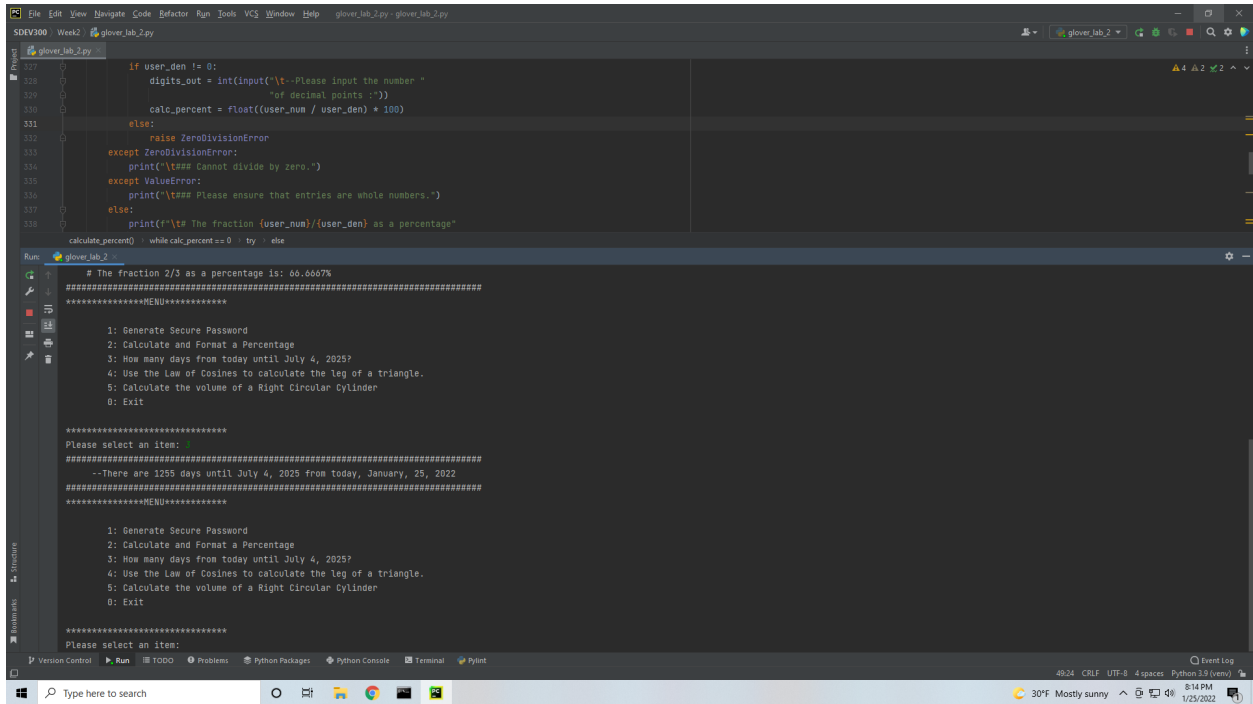
```
291     for _ in range(chars_left):
292         char_type = secrets.choice(list(PW_SET))
293         user_pw += secrets.choice(PW_SET[char_type])
294     pw_list = list(user_pw)
295     numpy.random.shuffle(pw_list)
296     user_pw_set = ''.join(pw_list)
297
298     else:
299         raise UnboundLocalError
300 except ValueError:
301     print("\t## Please try again.")
302 except UnboundLocalError:
303     print("\t## A strong password is between 12 "
304           "and 64 characters.")
305
306 else:
307     generate_pwd() while user_pw_set is None : try : if 12 <= pw_length <= 64
308
309 Run: glover_lab_2
310
311 4: Use the Law of Cosines to calculate the leg of a triangle.
312 5: Calculate the volume of a Right Circular Cylinder
313 0: Exit
314
315 *****
316 Please select an item:
317
318 Please input the length of password to generate:
319 # How many uppercase characters should be included?
320 # How many lowercase characters should be included?
321 # How many numbers should be included?
322 # How many special characters should be included?
323
324 *****
325 # The user password generated was: <PjFGHa32rMS
326 *****
327 *****MENU*****
328
329 1: Generate Secure Password
330 2: Calculate and Format a Percentage
331 3: How many days from today until July 4, 2029?
332 4: Use the Law of Cosines to calculate the leg of a triangle.
333 5: Calculate the volume of a Right Circular Cylinder
334 0: Exit
335
336 *****
337 Please select an item:
```

Fig. 3



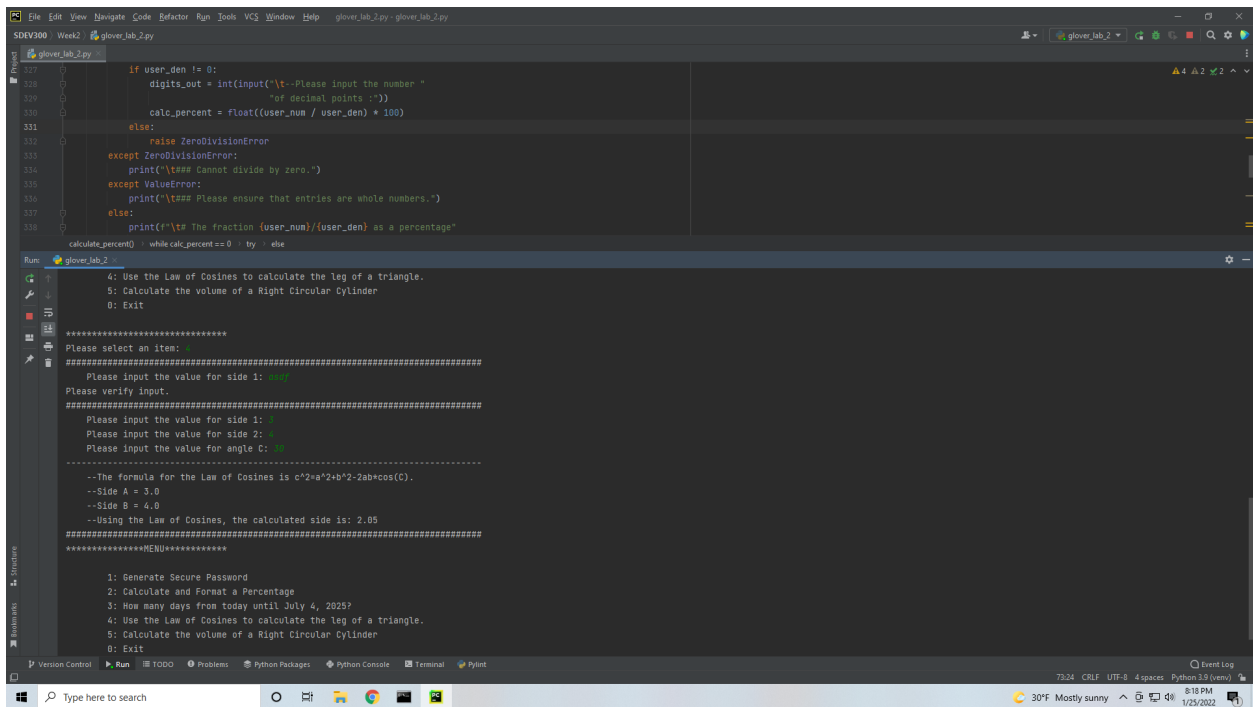
```
315 :param: user_num, user_den, digits_out, calc_percent
316 :except: if user enters something other than an integer
317 :return: output display
318
319 # while loop until a valid answer is given
320 while True:
321     # try-except for error handling
322     try:
323         print('\n * 80)
324         user_num = int(input("\t--Please input the numerator: "))
325         user_den = int(input("\t--Please input the denominator: "))
326         if user_den != 0:
327             calculate_percent() while True : except ZeroDivisionError
328
329 Run: glover_lab_2
330
331 1: Generate Secure Password
332 2: Calculate and Format a Percentage
333 3: How many days from today until July 4, 2029?
334 4: Use the Law of Cosines to calculate the leg of a triangle.
335 5: Calculate the volume of a Right Circular Cylinder
336 0: Exit
337
338 *****
339 Please select an item:
340
341 --Please input the numerator:
342 ### Please ensure that entries are whole numbers.
343 *****
344 --Please input the numerator:
345 ### Please ensure that entries are whole numbers.
346 *****
347 --Please input the numerator:
348 ### Please ensure that entries are whole numbers.
349 *****
350 --Please input the denominator:
351 --Please input the number of decimal points :
352 # The fraction 2/3 as a percentage is: 66.6667%
353 *****
354 --Please input the numerator:
```

Fig. 4



```
327         if user_den != 0:
328             digits_out = int(input("\t--Please input the number "
329                                   "\tof decimal points :"))
330             calc_percent = float((user_num / user_den) * 100)
331         else:
332             raise ZeroDivisionError
333     except ZeroDivisionError:
334         print("\t### Cannot divide by zero.")
335     except ValueError:
336         print("\t### Please ensure that entries are whole numbers.")
337     else:
338         print("\t# The fraction (user_num)/(user_den) as a percentage"
339               " calculate_percent() : while calc_percent == 0 : try : else
340
341 Run: glover_lab_2
342 # The fraction 2/3 as a percentage is: 66.6667%
343 *****MENU*****
344
345 1: Generate Secure Password
346 2: Calculate and Format a Percentage
347 3: How many days from today until July 4, 2025?
348 4: Use the Law of Cosines to calculate the leg of a triangle.
349 5: Calculate the volume of a Right Circular Cylinder
350 0: Exit
351
352 *****
353 Please select an item:
354 *****
355 --There are 1255 days until July 4, 2025 from today, January, 25, 2022
356 *****
357 *****MENU*****
358
359 1: Generate Secure Password
360 2: Calculate and Format a Percentage
361 3: How many days from today until July 4, 2025?
362 4: Use the Law of Cosines to calculate the leg of a triangle.
363 5: Calculate the volume of a Right Circular Cylinder
364 0: Exit
365
366 *****
367 Please select an item:
```

Fig. 5



```
327         if user_den != 0:
328             digits_out = int(input("\t--Please input the number "
329                                   "\tof decimal points :"))
330             calc_percent = float((user_num / user_den) * 100)
331         else:
332             raise ZeroDivisionError
333     except ZeroDivisionError:
334         print("\t### Cannot divide by zero.")
335     except ValueError:
336         print("\t### Please ensure that entries are whole numbers.")
337     else:
338         print("\t# The fraction (user_num)/(user_den) as a percentage"
339               " calculate_percent() : while calc_percent == 0 : try : else
340
341 Run: glover_lab_2
342 4: Use the Law of Cosines to calculate the leg of a triangle.
343 5: Calculate the volume of a Right Circular Cylinder
344 0: Exit
345
346 *****
347 Please select an item:
348 *****
349 Please input the value for side 1: 3.0
350 Please verify input.
351 *****
352 Please input the value for side 1:
353 Please input the value for side 2:
354 Please input the value for angle C: 90
355 -----
356 --The formula for the Law of Cosines is c^2=a^2+b^2-2ab*cos(C).
357 --Side A = 3.0
358 --Side B = 4.0
359 --Using the Law of Cosines, the calculated side is: 2.05
360 *****
361 *****MENU*****
362
363 1: Generate Secure Password
364 2: Calculate and Format a Percentage
365 3: How many days from today until July 4, 2025?
366 4: Use the Law of Cosines to calculate the leg of a triangle.
367 5: Calculate the volume of a Right Circular Cylinder
368 0: Exit
```

Fig. 6

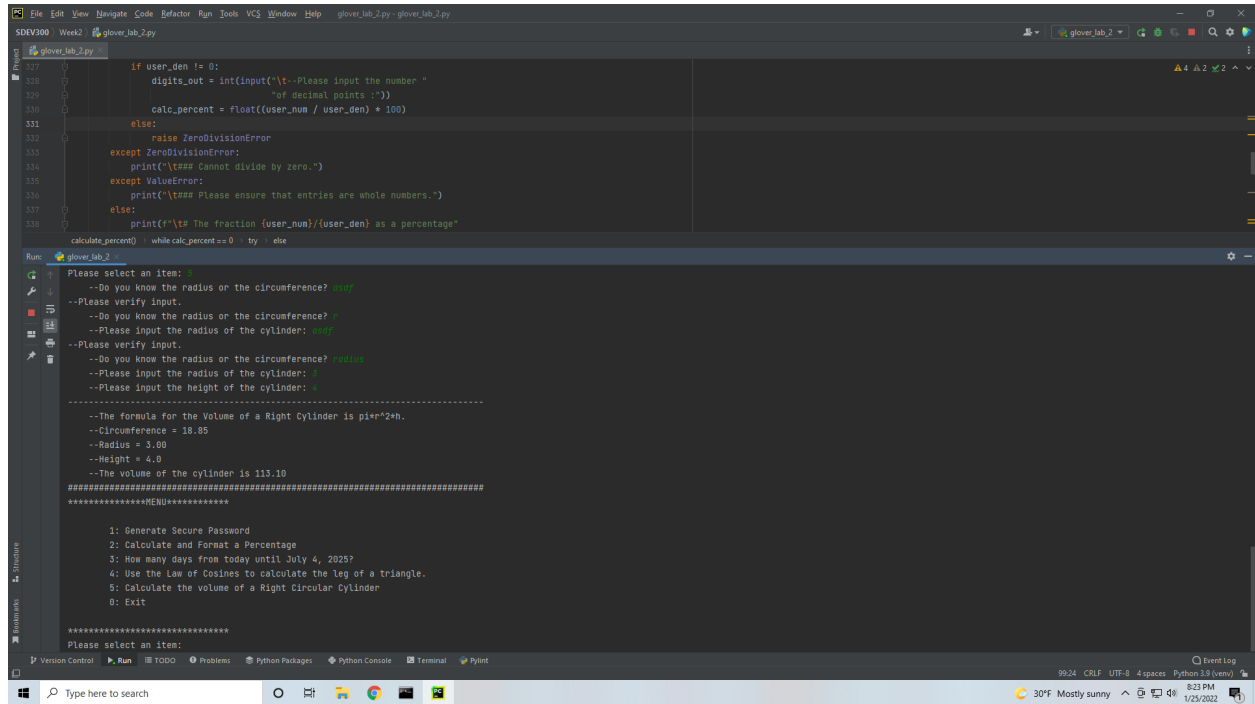


Fig. 7

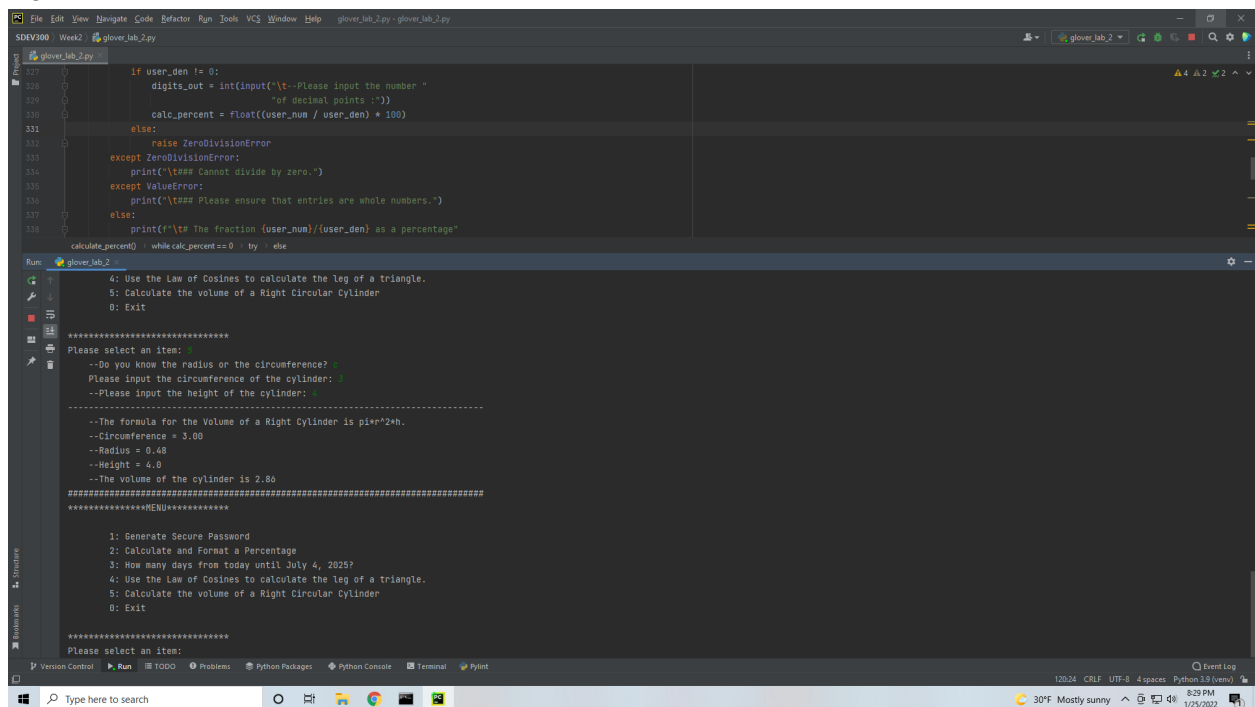


Fig. 8

```

327     if user_den != 0:
328         digits_out = int(input('\t- Please input the number "
329                               "of decimal points "'))
330         calc_percent = float(user_num / user_den) * 100
331     else:
332         raise ZeroDivisionError
333     except ZeroDivisionError:
334         print("\t### Cannot divide by zero.")
335     except ValueError:
336         print("\t### Please ensure that entries are whole numbers.")
337     else:
338         print("\t# The fraction (user_num)/user_den as a percentage"
339               "calculate percent) : while calc_percent == 0 : try : else
340
341 Run: glover_lab_2
342 *****
343 Please select an item:
344 --Do you know the radius or the circumference?
345 Please input the circumference of the cylinder:
346 --Please input the height of the cylinder:
347 -----
348 --The formula for the Volume of a Right Cylinder is pi*r^2*h.
349 --Circumference = 3.00
350 --Radius = 0.48
351 --Height = 4.0
352 --The volume of the cylinder is 2.86
353 *****MENU*****
354
355 1: Generate Secure Password
356 2: Calculate and Format a Percentage
357 3: How many days from today until July 4, 2025?
358 4: Use the Law of Cosines to calculate the leg of a triangle.
359 5: Calculate the volume of a Right Circular Cylinder
360 0: Exit
361
362 *****
363 Please select an item:
364 Thank you for using the application.
365
366 Process finished with exit code 0
  
```

Fig. 9

Correction of Pylint with Screenshots:

Below are screenshots of pylint with information on how they were handled.

```

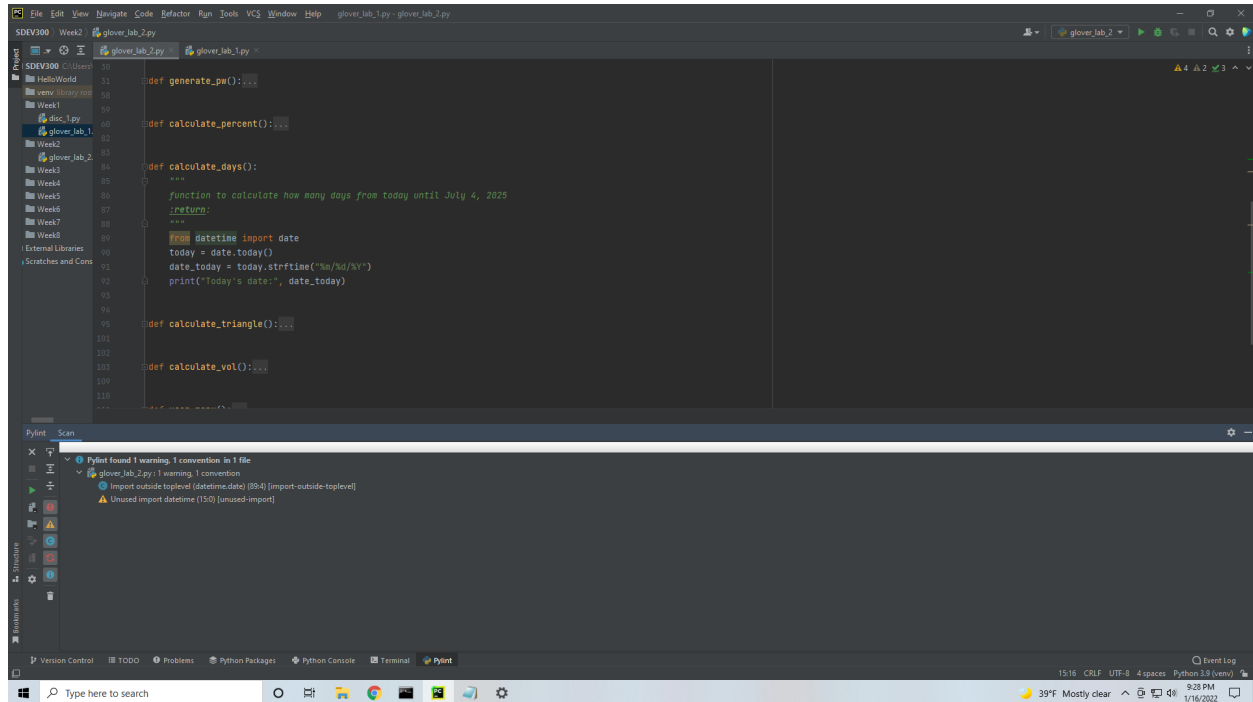
1 ..version: "1.0.0"
2 ..maintainer: "Corey Glover"
3 ..email: "corey.j.glover@student.unq.edu"
4 ..description: "This program displays a menu then asks user which function to perform or exit."
5
6 import sys
7
8 def generate_pw():
9     print("Gen pw working")
10
11 def calculate_percent():
12     print("calc perc working")
13
14 def calculate_days():
15     print("calc days working")
16
17 def calculate_triangle():
18     print("calc triangle working")
19
20 if __name__ == "__main__":
21     generate_pw()
  
```

Pylint Scan

Pylint found 5 conventions in 1 file

- glover_lab_2.py: 5 conventions
 - Missing function or method docstring (160) [missing-function-docstring]
 - Missing function or method docstring (200) [missing-function-docstring]
 - Missing function or method docstring (240) [missing-function-docstring]
 - Missing function or method docstring (280) [missing-function-docstring]
 - Missing function or method docstring (320) [missing-function-docstring]

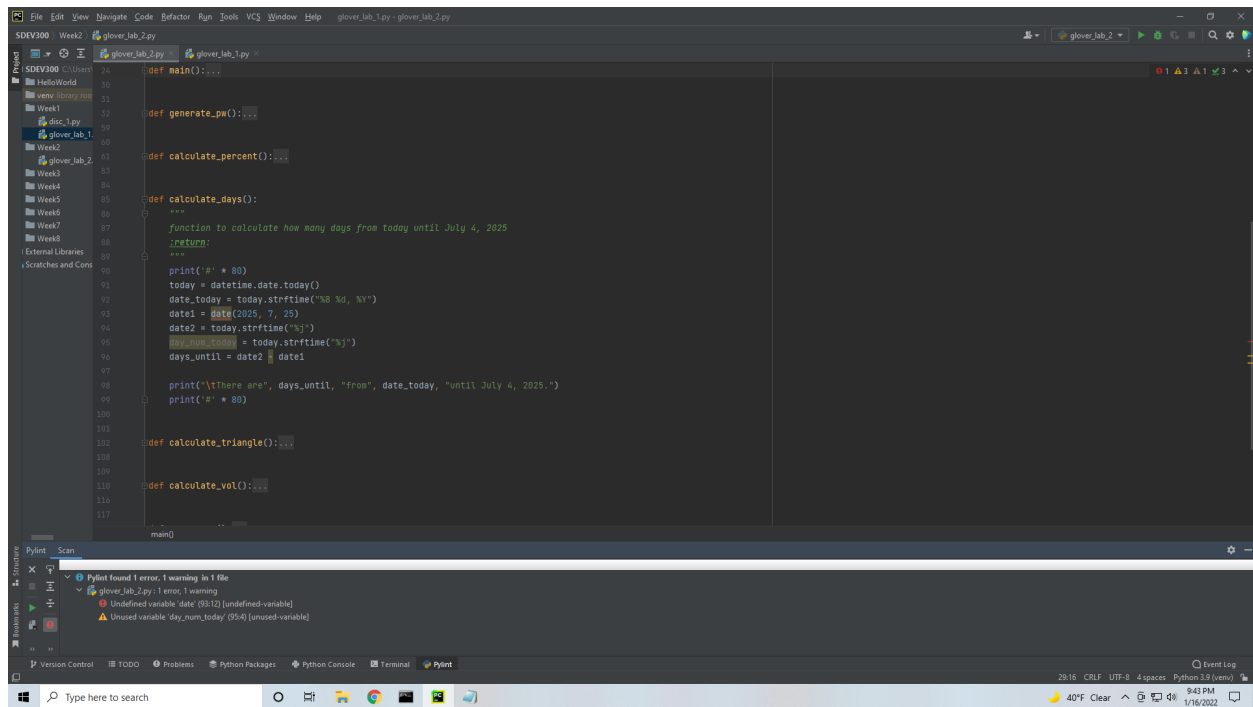
Trailing whitespace: This was corrected by backspacing to previous line, returning then letting Pycharm auto-format



The screenshot shows the VS Code editor with the file `glover_lab_2.py` open. The code contains several functions: `generate_pw()`, `calculate_percent()`, `calculate_days()`, `calculate_triangle()`, and `calculate_vol()`. The `calculate_days()` function includes a docstring and a return statement. The Pylint panel at the bottom shows two warnings: "Import outside toplevel (datetime.date) (89:4) [import-outside-toplevel]" and "Unused import datetime (150) [unused-import]".

```
def generate_pw():  
    pass  
  
def calculate_percent():  
    pass  
  
def calculate_days():  
    """  
    function to calculate how many days from today until July 4, 2025  
    :return:  
    """  
    from datetime import date  
    today = date.today()  
    date_today = today.strftime("%m/%d/%Y")  
    print("Today's date:", date_today)  
  
def calculate_triangle():  
    pass  
  
def calculate_vol():  
    pass
```

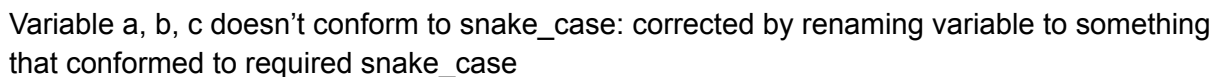
Import outside toplevel, unused import- Corrected by removing or commenting out the unused lines

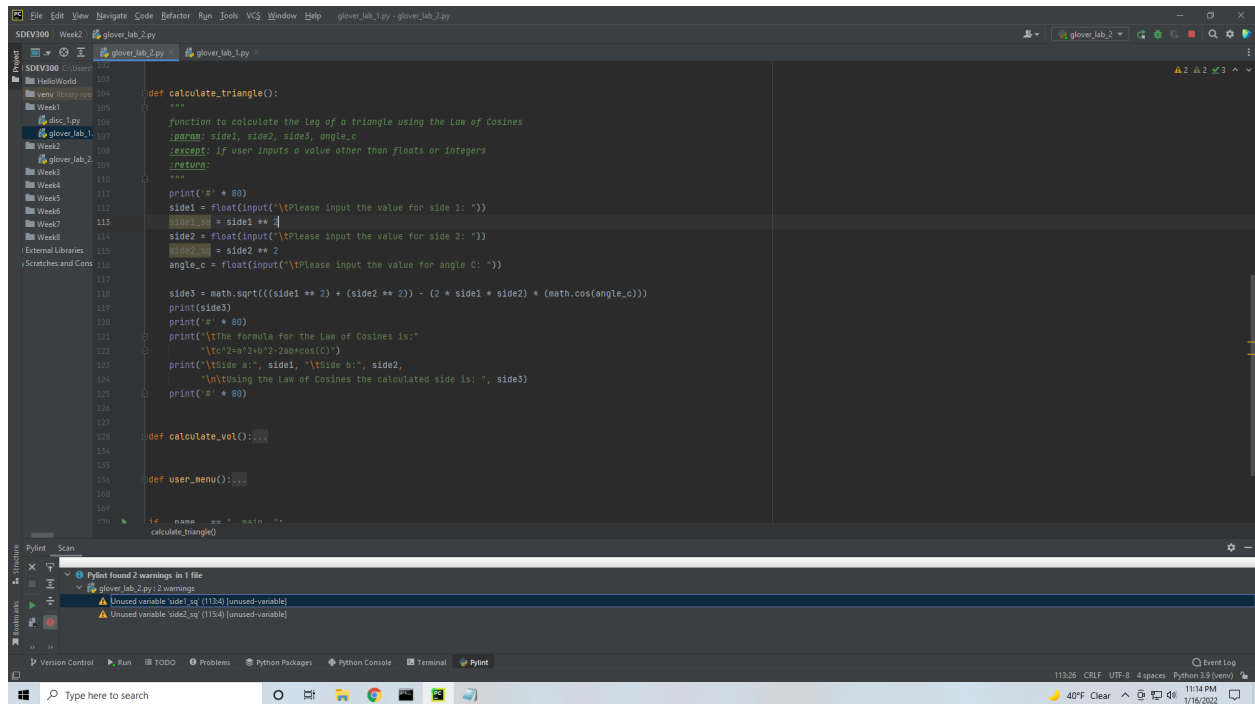


The screenshot shows the VS Code editor with the file `glover_lab_2.py` open. The code has been updated to include a `main()` function. The Pylint panel at the bottom shows one error and one warning: "Undefined variable 'date' (93:12) [undefined-variable]" and "Unused variable 'day_num_today' (95:4) [unused-variable]".

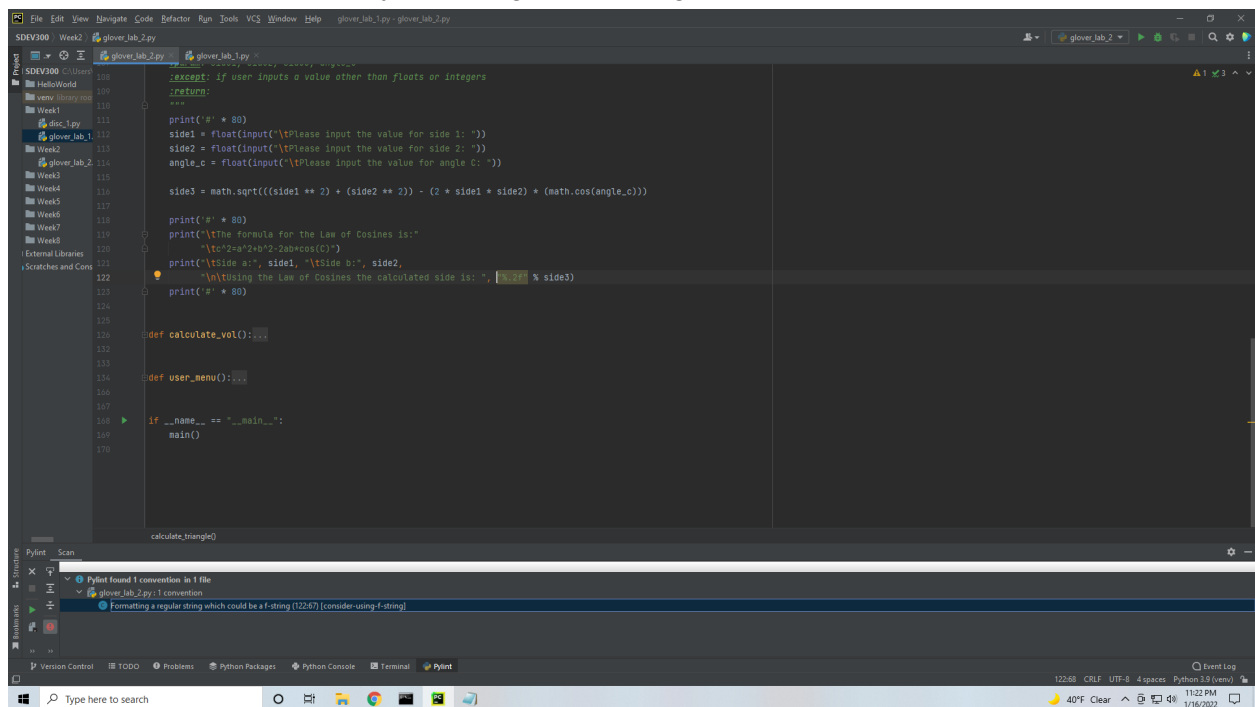
```
def main():  
    pass  
  
def generate_pw():  
    pass  
  
def calculate_percent():  
    pass  
  
def calculate_days():  
    """  
    function to calculate how many days from today until July 4, 2025  
    :return:  
    """  
    print("#" * 80)  
    today = datetime.date.today()  
    date_today = today.strftime("%m/%d/%Y")  
    date1 = date(2025, 7, 25)  
    date2 = today.strftime("%Y")  
    day_num_today = today.strftime("%Y")  
    days_until = date2 - date1  
  
    print("\nThere are", days_until, "from", date_today, "until July 4, 2025.")  
    print("#" * 80)  
  
def calculate_triangle():  
    pass  
  
def calculate_vol():  
    pass  
  
main()
```

Undefined variable 'date', unused variable day_num_today- Renamed variable day_num_today then corrected undefined date by importing date from datetime

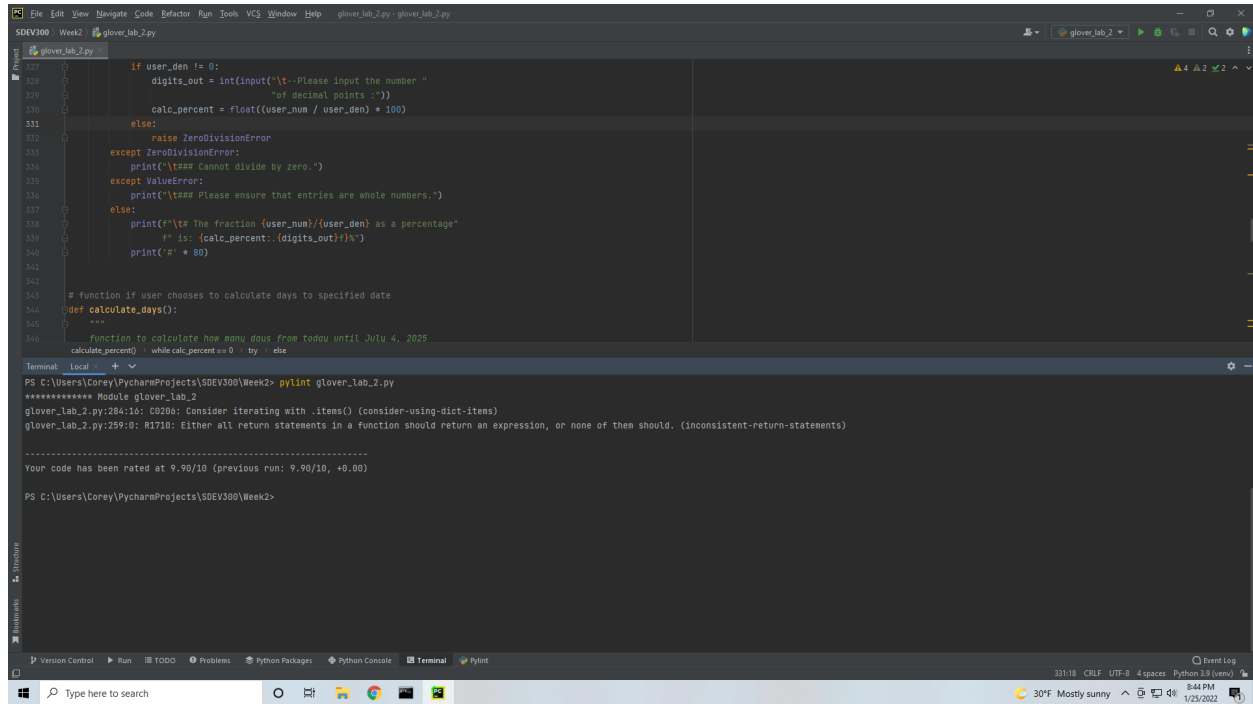




Unused variable- corrected by renaming or removing variable



Formatting a regular string which could be f-string: reconfigured string as an f-string



The screenshot shows the PyCharm IDE interface. The top pane displays a Python script named `glover_lab_2.py` with the following code:

```
327: if user_den != 0:
328:     digits_out = int(input('\t: Please input the number "
329:         "of decimal points :'))
330:     calc_percent = float((user_num / user_den) * 100)
331: else:
332:     raise ZeroDivisionError
333: except ZeroDivisionError:
334:     print('\t### Cannot divide by zero.')
335: except ValueError:
336:     print('\t### Please ensure that entries are whole numbers.')
337: else:
338:     print(f'\t# The fraction (user_num)/user_den as a percentage'
339:         f' is: {calc_percent:.{digits_out}f}%')
340:     print('#' * 80)
341:
342:
343: # function if user chooses to calculate days to specified date
344: def calculate_days():
345:     """
346:     function to calculate how many days from today until July 4, 2025
347:     calculate_percent() while calc_percent == 0 : try : else
```

The bottom pane shows the Pylint output in the Terminal:

```
PS C:\Users\Corey\PycharmProjects\SDEV300\Week2> pylint Glover_lab_2.py
***** Module Glover_lab_2
Glover_lab_2.py:284:16: C0200: Consider iterating with .items() (consider-using-dict-items)
Glover_lab_2.py:299:0: R1710: Either all return statements in a function should return an expression, or none of them should. (inconsistent-return-statements)

-----
Your code has been rated at 9.90/10 (previous run: 9.90/10, +0.00)

PS C:\Users\Corey\PycharmProjects\SDEV300\Week2>
```

Final pylint- Unfortunately this was as close to 10 as I could get and still have the program work properly or throwing more pylint issues.