

Homework 1 – Basic input/output and computation

Due: Monday, February 6, 2017 11:59 PM

Instructions:

Write/type the answers for questions 1-5 (no python code necessary).

For questions 6-8 write Python scripts (.py files). Use variables where necessary and give meaningful names to variables. All script files should have a comment block at the top indicating your name section and collaborators. Provide screenshots of the code and output in the solution. Upload a .pdf file containing your solution along with your .py files.

Any solutions done on paper should be scanned to .pdf in good quality using CamScanner/Office Lens/iScanner.

Collaboration is allowed for homework. However, you must acknowledge your collaborators (check syllabus for details on collaboration policy). **Individual submissions are required even if you collaborate.**

Full credit will be given only if all instructions are adhered to.

Problem 1. Indicate whether the following variables are valid or invalid:

[5 points]

- (a) my name
- (b) new_sum
- (c) 21guns
- (d) simon&garfunkel
- (e) _total

Answer:

- (a) invalid
- (b) valid
- (c) invalid
- (d) invalid
- (e) valid

Problem 2. What will be the output of the following code?

[5 points]

```
total = 99
print("Total = ", "total")
```

Answer:

Total = total

Problem 3. For the given assignment statements, what will be the Python data type of the variables? **[5 points]**

- (a) `val1 = 20.00`
- (b) `val2 = 5`
- (c) `val3 = "10"`
- (d) `val4 = 1.618`
- (e) `val5 = "hello"`

Answer:

- (a) float
- (b) int
- (c) string
- (d) float
- (e) string

Problem 4: Write python statements for the following arithmetic operations: **[10 points]**

- (a) Add 5 to variable b and assign the result to variable a
- (b) Subtract 10 from variable b and assign the result to variable a
- (c) Multiply variable b by 7 and assign the result to variable a
- (d) Divide variable b by 10 and assign the result to variable a
- (e) Increment the value in variable a by 5

Answer:

- (a) `a = b + 5`
- (b) `a = b - 10`
- (c) `a = b * 7`
- (d) `a = b / 10`
- (e) `a = a + 5` or `a += 5`

Problem 5: Choose the correct answer for the following questions: **[10 points]**

1. Python is a(n):
 - A. Assembly language
 - B. Machine language
 - C. High-level language ✓
 - D. Operating System
2. The identifiers `myvar` and `myVar`, when used in the same python program refer to the same variable.
 - A. True
 - B. False ✓

3. What will be the output of the following program, if you provide 1, 2 and 3 as inputs in separate lines?

```
print("Enter three numbers: ")
num1 = eval(input())
num2 = eval(input())
num3 = eval(input())

avg = (num1 + num2 + num3) / 3
print(avg)
```

- A. 1
B. 2
C. 2.0 ✓
D. <Error>
4. What will be the output of the following code?

```
x = 1
x = x + 2.5
print(x)
```

- A. 1
B. 3
C. 3.5 ✓
D. <Error>
5. What will be the output of the following code?

```
a = 3
b = 11
b = a
a = b

print(a,b)
```

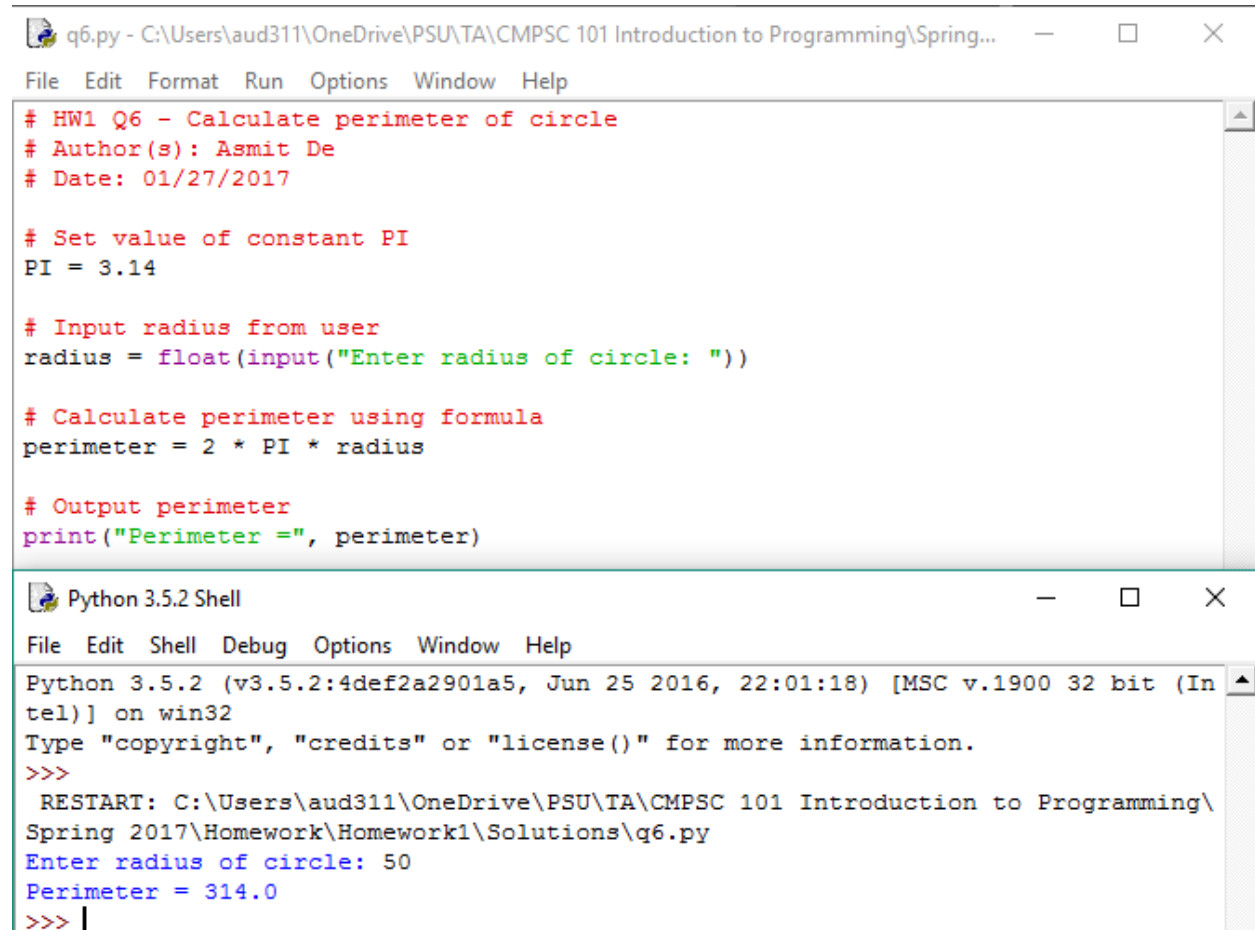
- A. 3 11
B. 11 3
C. 3 3 ✓
D. 11 11

Problem 6. Write a program to calculate perimeter of a circle using the formula: $perimeter = 2 \times PI \times radius$. The program should prompt the user to enter the radius of the circle. Use $PI = 3.14$. Make sure your code works for any given radius. **[20 points]**

Sample program output:

```
Enter radius of circle: 50
Perimeter = 314.0
```

Answer:



```
q6.py - C:\Users\aud311\OneDrive\PSU\TA\CMPSC 101 Introduction to Programming\Spring...
File Edit Format Run Options Window Help

# HW1 Q6 - Calculate perimeter of circle
# Author(s): Asmit De
# Date: 01/27/2017

# Set value of constant PI
PI = 3.14

# Input radius from user
radius = float(input("Enter radius of circle: "))

# Calculate perimeter using formula
perimeter = 2 * PI * radius

# Output perimeter
print("Perimeter =", perimeter)

Python 3.5.2 Shell
File Edit Shell Debug Options Window Help

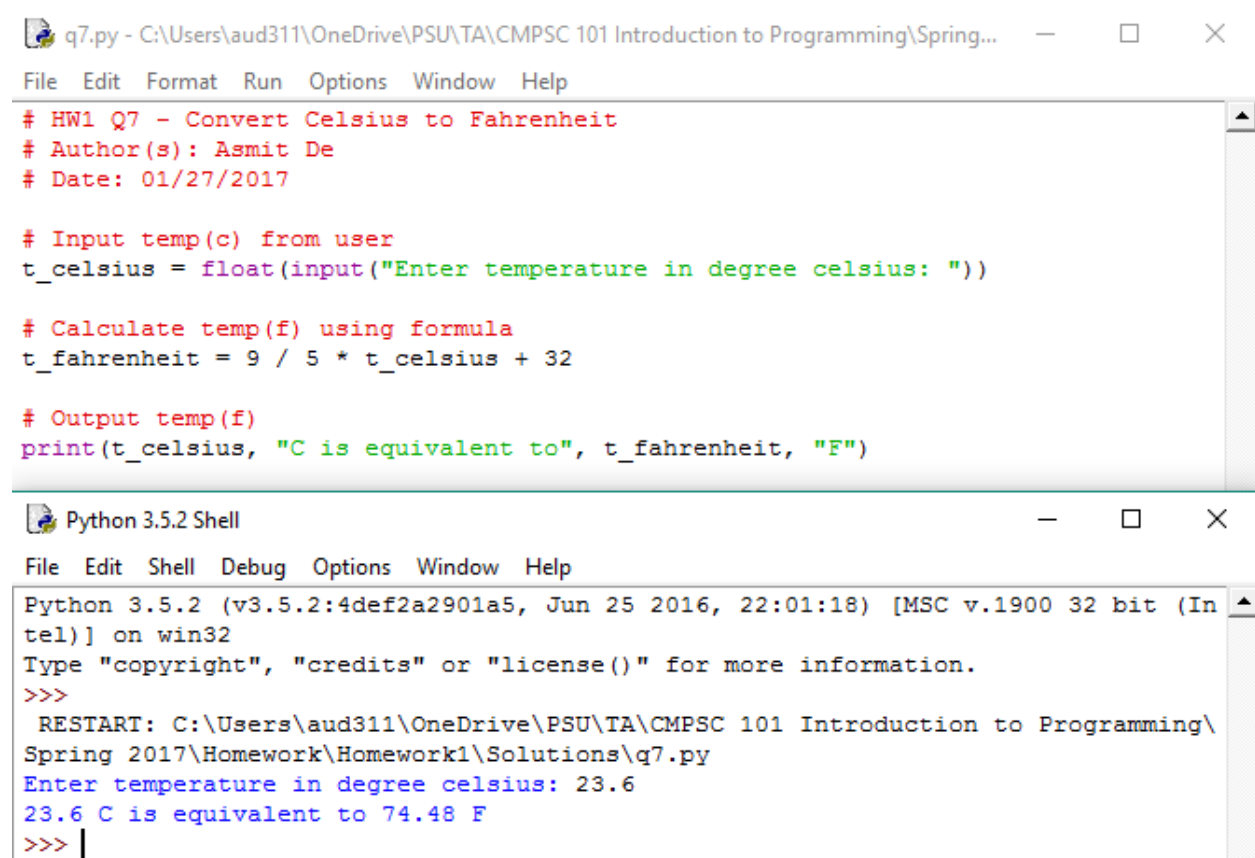
Python 3.5.2 (v3.5.2:4def2a2901a5, Jun 25 2016, 22:01:18) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:\Users\aud311\OneDrive\PSU\TA\CMPSC 101 Introduction to Programming\
Spring 2017\Homework\Homework1\Solutions\q6.py
Enter radius of circle: 50
Perimeter = 314.0
>>> |
```

Problem 7: Write a program to convert temperature from Celsius to Fahrenheit scale using the formula: $F = \frac{9}{5}C + 32$. Prompt the user to enter the temperature in degree Celsius and display the equivalent temperature in degree Fahrenheit. Make sure your code works for any given temperature value. **[20 points]**

Sample program output:

```
Enter temperature in degree Celsius: 23.6
23.5 C is equivalent to 74.48 F
```

Answer:



```
q7.py - C:\Users\aud311\OneDrive\PSU\TA\CMPSC 101 Introduction to Programming\Spring...
File Edit Format Run Options Window Help
# HW1 Q7 - Convert Celsius to Fahrenheit
# Author(s): Asmit De
# Date: 01/27/2017

# Input temp(c) from user
t_celsius = float(input("Enter temperature in degree celsius: "))

# Calculate temp(f) using formula
t_fahrenheit = 9 / 5 * t_celsius + 32

# Output temp(f)
print(t_celsius, "C is equivalent to", t_fahrenheit, "F")

Python 3.5.2 Shell
File Edit Shell Debug Options Window Help
Python 3.5.2 (v3.5.2:4def2a2901a5, Jun 25 2016, 22:01:18) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:\Users\aud311\OneDrive\PSU\TA\CMPSC 101 Introduction to Programming\
Spring 2017\Homework\Homework1\Solutions\q7.py
Enter temperature in degree celsius: 23.6
23.6 C is equivalent to 74.48 F
>>> |
```

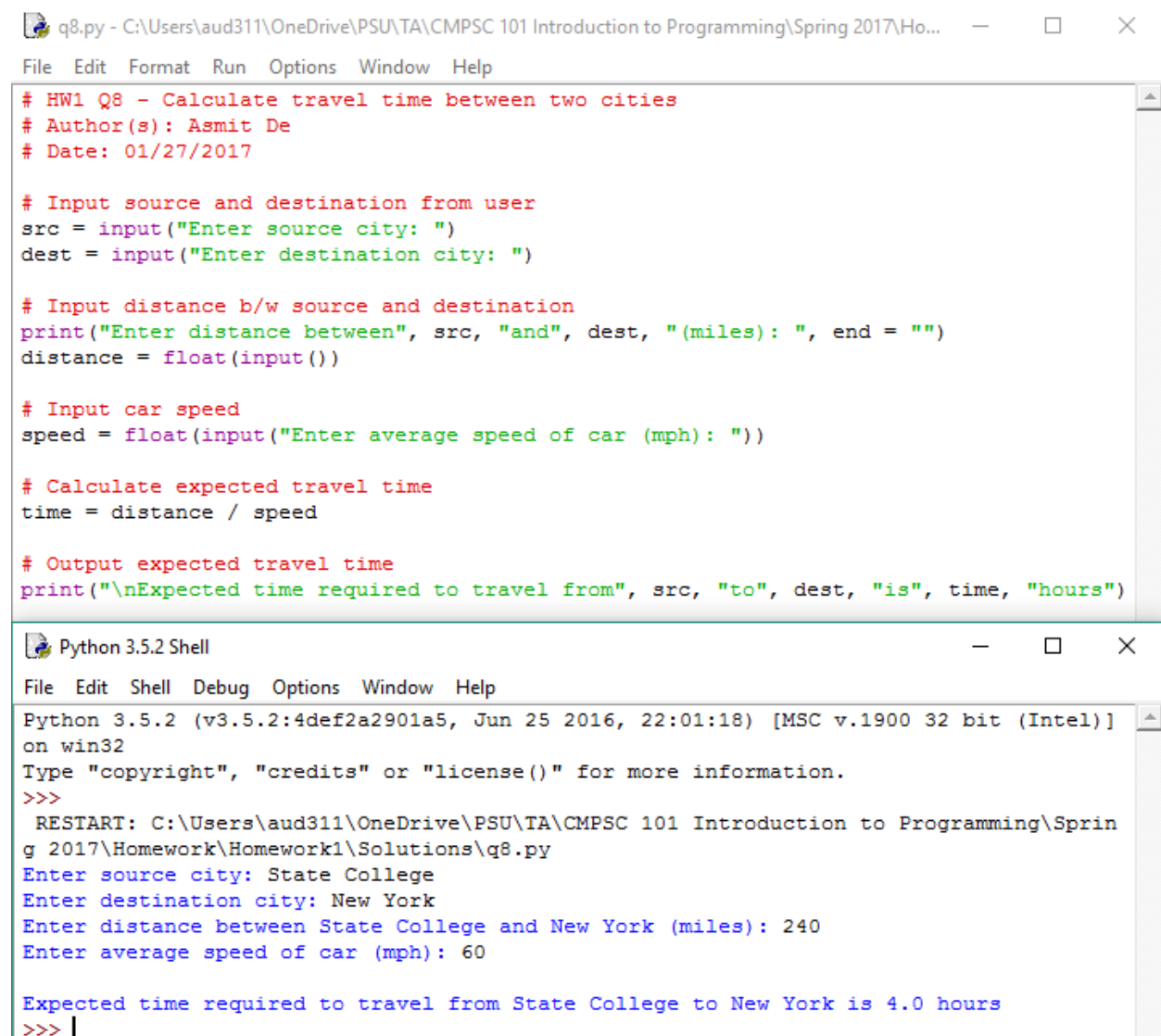
Problem 8: Write a program to calculate the time taken by a car to reach from one city to another. Prompt the user to enter the names of the two cities, distance between the two cities in miles (mention the names of the cities), and average speed of the car (in miles/hour). Display the expected time required (in hours) to travel from the source to the destination city. Make sure your code works for any given distance and speed. **[25 points]**

Sample program output:

```
Enter source city: State College
Enter destination city: New York
Enter distance between State College and New York (miles): 240
Enter average speed of the car (mph): 60

Expected time required to travel from State College to New York is 4.0 hours
```

Answer:



```
q8.py - C:\Users\aud311\OneDrive\PSU\TA\CMPSC 101 Introduction to Programming\Spring 2017\Ho...
File Edit Format Run Options Window Help

# HW1 Q8 - Calculate travel time between two cities
# Author(s): Asmit De
# Date: 01/27/2017

# Input source and destination from user
src = input("Enter source city: ")
dest = input("Enter destination city: ")

# Input distance b/w source and destination
print("Enter distance between", src, "and", dest, "(miles): ", end = "")
distance = float(input())

# Input car speed
speed = float(input("Enter average speed of car (mph): "))

# Calculate expected travel time
time = distance / speed

# Output expected travel time
print("\nExpected time required to travel from", src, "to", dest, "is", time, "hours")

Python 3.5.2 Shell
File Edit Shell Debug Options Window Help
Python 3.5.2 (v3.5.2:4def2a2901a5, Jun 25 2016, 22:01:18) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:\Users\aud311\OneDrive\PSU\TA\CMPSC 101 Introduction to Programming\Spring
2017\Homework\Homework1\Solutions\q8.py
Enter source city: State College
Enter destination city: New York
Enter distance between State College and New York (miles): 240
Enter average speed of car (mph): 60

Expected time required to travel from State College to New York is 4.0 hours
>>> |
```

The following files should be uploaded on Canvas:

1. hw1_solution.pdf

This file should contain answers for questions 1-5 and screenshots of code and output for questions 6-8.

2. q6.py

This file should have the code for problem 6, and should be runnable in Python3.

3. q7.py

This file should have the code for problem 7, and should be runnable in Python3.

4. q8.py

This file should have the code for problem 8, and should be runnable in Python3.