# **Programming Assignment Unit 2**

Computer Science, University of the People

CS 1101-01 Programming Fundamentals - AY2024-T1

Instructor, Jose Alvarado

September 20, 2023

## Part 1: Calculating a circle circumference

For the first part of this assignment, we were asked to build a short script in Python that calculates the circumference of a circle using the equation: 2πr. The following is the script code that defines the function:  
**Explanation:**   
The first thing we do is define a constant ‘PI’ with the required 5-point accurate value [3.14159]. An important note is that we describe this variable as a constant, even though it is only a constant by convention and standards. Meaning that by naming the variable in all upper-case letters we are signaling other programmers that this is a constant and should be treated as such. Next, we define the function called ‘print\_circum(radius)’ this function will take in a single value representing the radius of the circle to calculate the circumference. After that, we create and initialize a new variable called ‘circumference’. The value set into it is based on the equation above where we multiply our constant PI by 2 and then multiply that by the value passed to the function in radius. Finally, we print out the result of the equation to the console using a formatted text output in order to make sure the circumference is printed out to only 5 points after the decimal point. The following is a test of the function above where we call it 3 times, each time with a different value so that we show 3 results each calculating the circumference of the circle in question.  
**Testing the code:  
  
Results:**

# define a constant for π and initialize the value

PI = 3.14159

def print\_circum(radius):

# Calculate the circumference using the formula 2 \* π \* radius

circumference = 2 \* PI \* radius

# Print the calculated circumference

print(f"The circumference of a circle with radius {radius} is {circumference:.5f}")

# Test the function with three different radius values

print\_circum(42)

print\_circum(PI)

print\_circum(2 / PI)

The circumference of a circle with radius 42 is 263.89356

The circumference of a circle with radius 3.14159 is 19.73918

The circumference of a circle with radius 0.6366203100977531 is 4.00000

## Part 2: Catalog with discounts

For this assignment, we were asked to write a Python program that prints out a catalogue in the required format and calculates the values according to the algorithm supplied. The discount calculations are:

1. 0% discount if only a single item is purchased.
2. 10% discount if a combo deal of 2 items is purchased.
3. 25% discount if a combo deal of 3 items is purchased.

The following is the script that generates the catalogue broken into parts and explained:

# This function takes a total amount and returns the new discounted total

def calc\_discount(total\_price, item\_count):

if item\_count == 2:

return total\_price \* 0.9 # 10% discount

elif item\_count == 3:

return total\_price \* 0.75 # 25% discount

else:

return total\_price # 0% discount

**Explanation:** This part of the script defines a function that takes 2 parameters, the first being the grand total of the items in question before discount. The second is the number of items in the combo package. The function then checks the number of items given and acording to the logic explaind above it returns the total cost with the apropriate discount add. The new value is then returned.

# Prices for individual items

item1\_price = 200.0

item2\_price = 400.0

item3\_price = 600.0

# Calculate combo prices

combo1\_price = calc\_discount((item1\_price + item2\_price), 2)

combo2\_price = calc\_discount((item2\_price + item3\_price), 2)

combo3\_price = calc\_discount((item1\_price + item3\_price), 2)

combo4\_price = calc\_discount((item1\_price + item2\_price + item3\_price), 3)

**Explanation:**This part of the code defines the variables both the single items and the combo packages. The single items prices are set to the values required using a decimal point to verify that they are created as a floating number type as required. After that the combo packages are defined and initialized using the function from above ‘calc\_discount’ each time passing in the correct values. For instance for ‘combo1\_price’ we pass in the sum value of item1 (200.0) and item2 (400.0) wich gives a total of 600.0, Along with that we pass the second parameter of 2 indicating that we used 2 single items in this combo. The result will be 540.0 which is the result of 600 with a 10% discount (60.0).

# Generating the catalog output

output = "Online Store\n"

output += "--------------------------------\n"

output += "Product(s) | Price\n"

output += "Item 1 | " + str(item1\_price) + "\n"

output += "Item 2 | " + str(item2\_price) + "\n"

output += "Item 3 | " + str(item3\_price) + "\n"

output += "Combo 1(Item 1 + 2) | " + str(combo1\_price) + "\n"

output += "Combo 2(Item 2 + 3) | " + str(combo2\_price) + "\n"

output += "Combo 3(Item 1 + 3) | " + str(combo3\_price) + "\n"

output += "Combo 4(Item 1 + 2 + 3) | " + str(combo4\_price) + "\n"

output += "--------------------------------\n"

output += "For delivery Contact:98764678899\n"

print(output)

**Explanation:** The final part of the code first collects and builds the required output defined in the requirements. Each line of string is concatenated on to the previous line before it in a variable called ‘output’. The output variable is then printed out to the console using the print command.

**Result:**

Online Store

--------------------------------

Product(s) | Price

Item 1 | 200.0

Item 2 | 400.0

Item 3 | 600.0

Combo 1(Item 1 + 2) | 540.0

Combo 2(Item 2 + 3) | 900.0

Combo 3(Item 1 + 3) | 720.0

Combo 4(Item 1 + 2 + 3) | 900.0

--------------------------------

For delivery Contact:98764678899

**Explanation:** The above represents the output to the console window after running the script above.

## Conclusion

To conclude this assignment, we learned how to define, build, and use functions and parameters. We built several different functions each taking different parameters and doing different actions.

## References

Python 3 Documentation

<https://docs.python.org/3/>

Think Python - How to Think Like a Computer Scientist (2nd Edition, Version 2.4.0)

Chapter 2 - Variables, expressions and statements

Chapter 3 - Functions

Source Scripts:



