

ITP122 ASSESSMENT 2

INTERMEDIATE PROGRAMMING TASKS

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Task 1 - Coding for Simple Loops

1. Complete the following programming exercises using python programming language:

- Print first 10 numbers using while loop (e.g., 1, 2, 3, ..., 8, 9, 10)
- Print first 10 even numbers using for loop (e.g., 2, 4, 6, ..., 16, 18, 20)
- Print first 10 odd numbers using while loop (e.g., 1, 3, 5, ..., 15, 17, 19)
- Print sum of first 10 numbers using for loop (e.g., print the sum of $1 + 2 + 3 + \dots + 8 + 9 + 10$).

```
# A2_Task1_Exercise1.py
#!/usr/bin/env python3
# -*- coding: utf-8 -*-
"""
Created on Thu Mar 30 22:00:56 2023

@author: tiamegan
"""

#!/usr/bin/env python3
# -*- coding: utf-8 -*-
"""
Created on Thu Mar 30 22:25:20 2023

@author: tiamegan
"""

# TASK 1 - CODING FOR SIMPLE LOOPS

# EXERCISE 1:
# Complete the following:

num = 1; # Defined Num or i

# A. Print first 10 numbers using while loop (e.g., 1, 2, 3, ..., 8, 9, 10)
print("First 10 numbers using while loop")
while(num <= 10):
    print(num)
    num += 1

# B. Print first 10 even numbers using for loop (e.g., 2, 4, 6, ..., 16, 18, 20)
print("First 10 even numbers using for loop")
for num in range(1,11):
    print(num*2)

# For loop, count variable range which is greater
# than or equal to 1 and less than 11.
# Output num integer multiplied by 2 to keep numbers posit

print("First 10 even numbers using for loop")
for num in range(1,10+1):
    # For loop, count variable range which is greater
    # than or equal to 1 and less than 11.
    if(num%2==0):
        # If num can be divided into 2, is true.
        print(num)
        num = num + 1
    # add 1 to value and re-loop

# C. Print first 10 odd numbers using while loop (e.g., 1, 3, 5, ..., 15, 17, 19)
num = 1
print("First 10 odd numbers using for loop")
while num <= 10:
    if(num % 2 != 0):
        # If num can be divided into 2, is false.
        print(num)
        num = num + 1
    # Print odd number
    # add 1 to value and re-loop

# D. Print sum of first 10 numbers using for loop (e.g., print the sum of 1+ 2 + 3 + ... + 8 + 9 + 10).
space = ""
sum = 0
# String Variable
# Final Number Variable

for num in range(1, 11):
    # For loop, count variable range which is greater
    # than or equal to 1 and less than 11.
    space += str(num)
    if num < 10:
        space += " + "
    sum += num
    # Convert the integer to string
    # If num is smaller than 10 then...
    # With num now space (string of num) add a + between each i
    # Add all Num together to get Sum
    # Output space with a "+" and then sum
    # Output should be in a single line

print(space, "=", sum)
```

Console 1/A

```
In [107]: runfile('/Users/tiamegan/Desktop/u n 1/ITP122/Assessments/Assessment 2/Task 1/Exercise 1/py/A2_Task1_Exercise1.py', wdir='/Users/tiamegan/Desktop/u n 1/ITP122/Assessments/Assessment 2/Task 1/Exercise 1/py')
First 10 numbers using while loop
1
2
3
4
5
6
7
8
9
10

First 10 even numbers using for loop
2
4
6
8
10
12
14
16
18
20

First 10 even numbers using for loop
2
4
6
8
10

First 10 odd numbers using for loop
1
3
5
7
9

Print sum of first 10 numbers using for loop
1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = 55

In [108]:
```

Filepath: Assessment 2 / Task 1 / Exercise 1 / py / A2_Task1_Exercise1.py

2. Write a python program that ask for an integer input from the user and prints its multiplications on the screen. The program should follow these steps:

Print on the screen, prompting for an input number from the user (e.g., 'Enter an integer value')

Print the multiplication tables of a given number for 10 times

An example of the program output when a user enters 5:

5 x 1 = 5
5 x 2 = 10
5 x 3 = 15
5 x 4 = 20
5 x 5 = 25
5 x 6 = 30
5 x 7 = 35
5 x 8 = 40
5 x 9 = 45
5 x 10 = 50

The screenshot shows a Jupyter Notebook interface. The left pane displays a Python script named `A2_Task1_Exercise2.py`. The script includes a docstring, a task description, and a function that prompts the user for an integer value and prints its multiplication table for 10 times. The right pane shows the variable explorer with a table containing the following data:

Name	Type	Size	Value
average	float	1	4.5
r	int	1	11

Below the variable explorer, the console output shows the execution of the script, which prompts the user for an integer value and displays the multiplication table for the number 5.

```
In [108]: runfile('/Users/tiamegan/Desktop/u n i/ITP122/Assessments/Assessment 2/Task 1/Exercise 2/py/A2_Task1_Exercise2.py', wdir='/Users/tiamegan/Desktop/u n i/ITP122/Assessments/Assessment 2/Task 1/Exercise 2/py')
MULTIPLICATION TABLE GENERATOR
Enter an integer value: 5
The Multiplication Table of number: 5
5 x 1 = 5
5 x 2 = 10
5 x 3 = 15
5 x 4 = 20
5 x 5 = 25
5 x 6 = 30
5 x 7 = 35
5 x 8 = 40
5 x 9 = 45
5 x 10 = 50
```

Filepath: Assessment 2 / Task 1 / Exercise 1 / py / A2_Task1_Exercise2.py

Task 2 - Coding For Different Types of Loops

3. Convert the following for loops into the equivalent while loop:

a)

```
for i in range(1,10):  
    print (i,i*i)
```

Run the program. Include a screenshot of the output on the screen in your zip file.

b)

```
sum = 0  
for i in range (10,0,-1):  
    sum = sum + i  
    print (i,sum)
```

Run the program. Include a screenshot of the output on the screen in your zip file.

The screenshot shows a Python IDE with a file named 'A2_Task2.py'. The code is as follows:

```
#!/usr/bin/env python3  
# -*- coding: utf-8 -*-  
'''  
Created on Thu Mar 30 23:34:26 2023  
@author: tiamegan  
'''  
  
# TASK 2 - CODING FOR DIFFERENT TYPES OF LOOPS  
# Convert the following loops into the equivalent WHILE loop  
  
# a\  
print("A. For Loop:")  
for i in range(1,10):  
    print (i,i*i)  
  
print("\nA. While Loop:")  
i = 1  
# Initialise i to 1 before loop  
while i < 10:  
    # While i is smaller than 10, loop  
    print (i,i*i)  
    # Print i and it's square number  
    i += 1  
    # Increase i by 1 to loop until 1 is larger than 10  
  
# b\  
print("\nB. For Loop:")  
sum = 0  
for i in range(10,0,-1):  
    sum = sum + i  
    print(i,sum)  
  
print("\nB. While Loop:")  
sum = 0  
# Initialise sum to 0  
i = 10  
# Initialise i to 10  
while i > 0:  
    # While i smaller than 10, loop  
    sum = sum + i  
    # Add i to sum  
    i -= 1  
    # decrease i by 1 each time  
    print(i, sum)  
    # Print value of i and sum after loop.  
# Sum will be equal to the sum of numbers from 1 to 10
```

The Variable Explorer on the right shows the following variables:

Name	Type	Size	Value
average	float	1	4.5
c	int	1	13
count	int	1	10
hob	str	4	Gold
hobby	list	3	['Shopping', 'Swimming', 'Gold']

The Console shows the output of the program:

```
In [120]: runfile('/Users/tiamegan/Desktop/u n i/ITP122/Assessments/Assessment 2/Task 1/  
Exercise 2/py/untitled18.py', wdir='/Users/tiamegan/Desktop/u n i/ITP122/Assessments/  
Assessment 2/Task 1/Exercise 2/py')  
A. For Loop:  
1 1  
2 4  
3 9  
4 16  
5 25  
6 36  
7 49  
8 64  
9 81  
A. While Loop:  
1 1  
2 4  
3 9  
4 16  
5 25  
6 36  
7 49  
8 64  
9 81  
B. For Loop:  
10 0  
9 1  
8 2  
7 3  
6 4  
5 5  
4 6  
3 7  
2 8  
1 9  
0 10  
B. While Loop:  
10 0  
9 1  
8 2  
7 3  
6 4  
5 5  
4 6  
3 7  
2 8  
1 9  
0 10
```

Filepath: Assessment 2 / Task 2 / py / A2_Task1_Exercise2.py

Task 3 - Interpretation of Loop Codes

- a. `b=10`
`While (b<10)`
`Print ("Hello")`
`b+=1`

Explain the code with comments and write down the expected output.

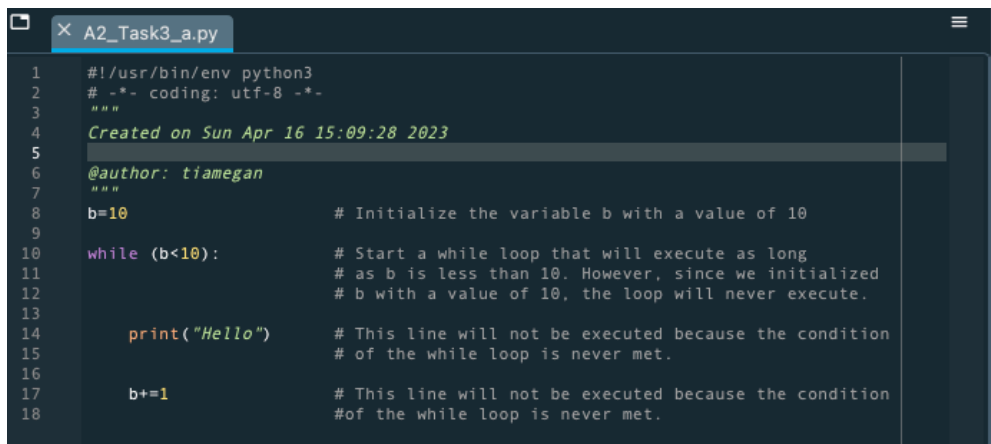
- b. `i=1`
`while i<3:`
`print(i)`
`i=i+1`
`else:`
`print(0)`

Explain the code with comments and write down the expected output.

a.

```
b = 10
While (b<10)
    print("Hello")
    b+1
```

Is a piece of pseudo-code that demonstrates the use of a while loop. Below is a breakdown.



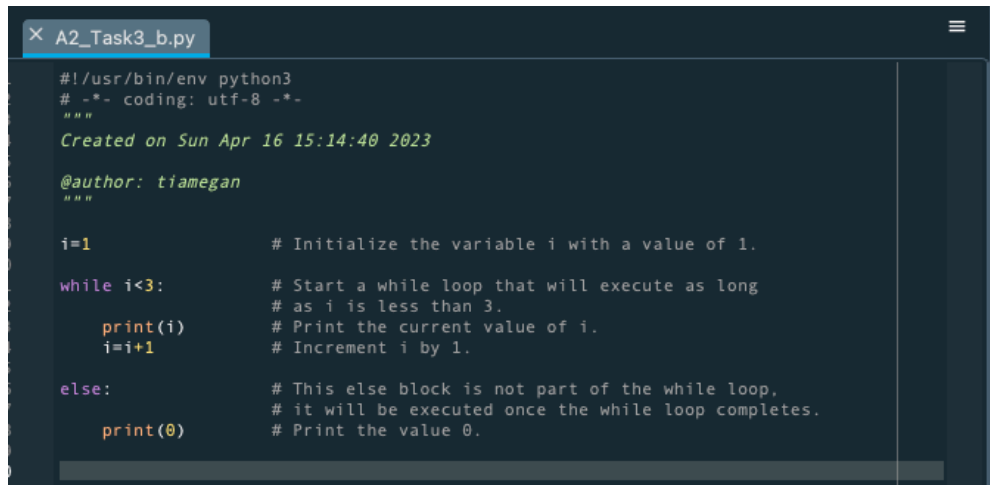
```
1  #!/usr/bin/env python3
2  # -*- coding: utf-8 -*-
3  """
4  Created on Sun Apr 16 15:09:28 2023
5
6  @author: tiamegan
7  """
8  b=10          # Initialize the variable b with a value of 10
9
10 while (b<10):  # Start a while loop that will execute as long
11               # as b is less than 10. However, since we initialized
12               # b with a value of 10, the loop will never execute.
13
14     print("Hello") # This line will not be executed because the condition
15                   # of the while loop is never met.
16
17     b+=1         # This line will not be executed because the condition
18               # of the while loop is never met.
```

Since the condition of the while loop is never met, the output of this code will be nothing, and the program will terminate without printing anything.

Filepath: Assessment 2 / Task 3 / py / A2_Task3_a.py

b.

Is a piece of pseudo-code that demonstrates the use of a while loop with an else statement. Below is a breakdown.



```
#!/usr/bin/env python3
# -*- coding: utf-8 -*-
"""
Created on Sun Apr 16 15:14:40 2023

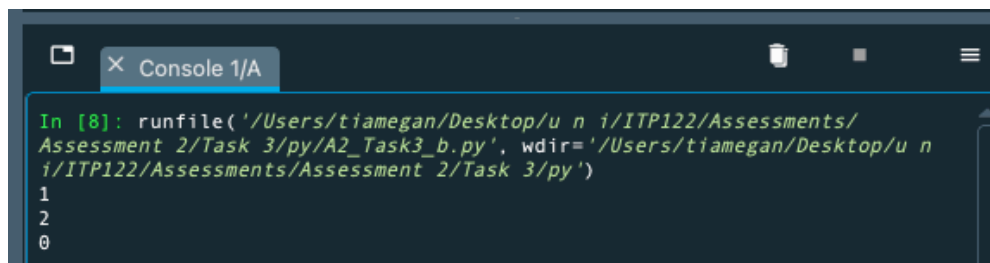
@author: tiamegan
"""

i=1          # Initialize the variable i with a value of 1.

while i<3:   # Start a while loop that will execute as long
    # as i is less than 3.
    print(i) # Print the current value of i.
    i=i+1    # Increment i by 1.

else:        # This else block is not part of the while loop,
    # it will be executed once the while loop completes.
    print(0) # Print the value 0.
```

Since the while loop will execute twice, printing the values 1 and 2, and then terminate, the output of the code is showcased below.



```
In [8]: runfile('/Users/tiamegan/Desktop/u n i/ITP122/Assessments/
Assessment 2/Task 3/py/A2_Task3_b.py', wdir='/Users/tiamegan/Desktop/u n
i/ITP122/Assessments/Assessment 2/Task 3/py')
1
2
0
```

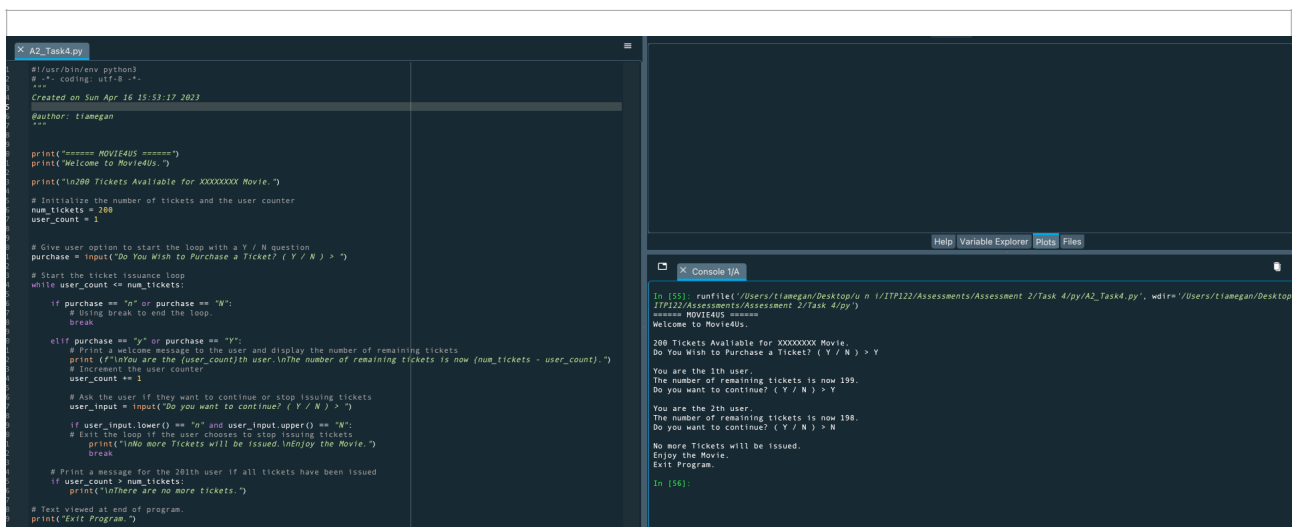
The final '0' is printed by the else block after the while loop has finished executing.

Filepath: Assessment 2 / Task 3 / py / A2_Task3_b.py

Task 4 - Simple Coding for Case Sample

You are hired as a software coder for Movies4Us Pty Ltd located in Melbourne, Australia. Your task is to develop a software program that issues 200 movie tickets. Your software program is to print “welcome to Movie4Us” to the first 200 users but write “there is no more ticket” to the 201th user. The software also needs to display how many tickets are available to each customer.

For example, if Tim is 50th user to buy the movie ticket, your software program should display “You are the 50th user. The number of remaining tickets is now 150”. Prepare software code with sufficient comments to explain the progress.



```
# A2_Task4.py
#!/usr/bin/env python3
# -*- coding: utf-8 -*-
"""
Created on Sun Apr 16 15:53:17 2023
@author: tiamegan
"""

print("===== MOVIE4US =====")
print("Welcome to Movie4Us.")
print("\n200 Tickets Available for XXXXXXXX Movie.")

# Initialize the number of tickets and the user counter
num_tickets = 200
user_count = 1

# Give user option to start the loop with a Y / N question
purchase = input("Do You Wish to Purchase a Ticket? ( Y / N ) > ")
# Start the ticket issuance loop
while user_count <= num_tickets:
    if purchase == "n" or purchase == "N":
        # Using break to end the loop.
        break
    elif purchase == "y" or purchase == "Y":
        # Print a welcome message to the user and display the number of remaining tickets
        print(f"You are the {user_count}th user.\nThe number of remaining tickets is now {num_tickets - user_count}.")
        # Increment the user counter
        user_count += 1
        # Ask the user if they want to continue or stop issuing tickets
        user_input = input("Do you want to continue? ( Y / N ) > ")
        if user_input.lower() == "n" and user_input.upper() == "N":
            # Exit the loop if the user chooses to stop issuing tickets
            print("No more Tickets will be issued. Enjoy the Movie.")
            break
        # Print a message for the 201th user if all tickets have been issued
        if user_count > num_tickets:
            print("\nThere are no more tickets.")

# Text viewed at end of program.
print("Exit Program.")
```

```
In [55]: runfile('/Users/tiamegan/Desktop/u n i/ITP122/Assessments/Assessment 2/Task 4/py/A2_Task4.py', wdir='/Users/tiamegan/Desktop/ITP122/Assessments/Assessment 2/Task 4/py')
===== MOVIE4US =====
Welcome to Movie4Us.

200 Tickets Available for XXXXXXXX Movie.
Do You Wish to Purchase a Ticket? ( Y / N ) > Y
You are the 1th user.
The number of remaining tickets is now 199.
Do you want to continue? ( Y / N ) > Y
You are the 2th user.
The number of remaining tickets is now 198.
Do you want to continue? ( Y / N ) > N
No more Tickets will be issued.
Enjoy the Movie.
Exit Program.

In [56]:
```

A breakdown of the above code in bullet points:

- Initialise the number of tickets to 200, and the user counter to 1.
- Asking the first question, primarily for visual purposes about purchasing a ticket.
- Starting a ‘while’ loop that will continue until either all 200 tickets have been issued or the user stops purchasing tickets.
- Inside the loop, a message will print with the user count and the number of remaining tickets. Using f-strings to format the message dynamically with the values of the user counter and the difference between the total number of tickets and the user count.
- Increase the user count by 1 after each iteration of the loop
- Using the ‘input’ function to see if the user wishes to continue.
- After the loop, checking the value of the user counter to determine whether all the tickets have been issued. If the counter is greater than 200, printing a message indicating that there are no more tickets available.

In the code, I’ve used both `.lower()` and `.upper()` to handle uppercase and lowercase functions for the input of ‘n’ and ‘y’.

Filepath: Assessment 2 / Task 4 / py / A2_Task4.py

End of Assessment 2.