Session 3: Loops, Conditionals, and Sequential Thinking

3.1 Counting with for loops

In [ ]:
```
# Increasing a variable example
#  1. Run the code and see what happens.
#  2. Change the line i=3 and see what happens.
#  3. Change the line i=i+2 and see what happens.

i = 3
print(i)

# Note special example:
#     i = i + 2
# In regular algebra, this is IMPOSSIBLE. Why?
# However, the computer will process this fine!
#  1. It processes the right-hand-side first.
#  2. Then it assigns the result to i (the left-hand-side)
# What happened here?

i = i + 2
print(i)
```

In [1]:
```
# The following example shows repearing code.
# Can you see which code is repeated?

# Work through this code line-by-line
# 1. Change start_i to see what happens.
# 2. Change step_i  to see what happens.

start_i = 1
step_i  = 1

i = start_i
print(i)

i = i + step_i # increases i
print(i)

i = i + step_i # increases i
print(i)
```

```
1
2
3
```

In [3]:
```
# for loop
# 1. Run the code below and see what happens.
# 2. Compare the results with the previous statement.
# 3. Which variables control the loop?

# Note the special syntax for for:
# - NO empty space at the begining of a line.
# - Note the range() command that generates 1, 2, 3.
# - The for-loop ends with  :
# - After the for-loop, you must have some leading space for the repeating
 code.
# - ALL of the code INSIDE the for-loop must START at the same position.

start_i = 1
step_i  = 1

# Stop at 4.
stop_i  = 4

for i in range(start_i, stop_i, step_i):
    print(i)
    # The COMMENT starts at the same position as print(i)
    # Everything inside the loop starts at the SAME position.
```

```
1
2
3
```

In [ ]:
```
# Write the code to count from 1 to 10
# Your code should output: 1, 2, 3, ..., 10.
# Copy and paste the code from above and be careful about the syntax!
```

In [ ]:
```
# Write the code to count from 2 to 20 by 2
# Your code should ouput:  2, 4, 6, ..., 20.
```

In [ ]:
```
# Create your own loop to count as far as you want and by the step you want.
```

3.2 Write a game to Guess a random number

Write a game that asks the user to guess a random number.
Then, give the user a hint if the number is high or low.
When the right number is found, print a success message.
To write the code for this game, follow the examples below!

In [ ]:
```
# Simple if statement.
# 1. Run the code and enter 6. Observe what happens.
# 2. Repeat for different numbers.
# 3. Replace the ??? with your text.

# Note that int() converts it to an integer.
# int(1.1) gives 1 so that spaces are removed :-).
number = int(input(" Input your number "))
secret_number = 5
if (number == secret_number):
    # Which number(s) will execute the code below?
    # For number=???, the following code works:
    print("You guessed it!")
    print("You win.")
else:
    # Which number(s) will execute the code below?
    # For number=???, the following code works.
    print("You did not guess it correctly!")
    print("I win!")

print("End of the game!")
```

In [ ]:
```
# Complex if statement.
# 1. Run the code with different numbers.
# 2. FIX messages I, II, III to help the guessing.
# 3. Replace ??? with your text.

number = int(input(" Input your number "))
secret_number = 5

if (secret_number > number):
    # Which number(s) will execute the code below?
    # For number=???, the following code works.
    print("Your guess is ... I") # FIX the message
elif (secret_number < number):
    # Which number(s) will execute the code below?
    # For number=???, the following code works.
    print("Your guess is ... II") # FIX the message
else:
    # Which number(s) will execute the code below?
    # For number=???, the following code works.
    print("Your guess is ... III") # FIX the message

print(" ")
print("End of game")
```

In [ ]:
```
# Random number example:
# 1. Run the code multiple times.
# 2. Fill-in the comment with ??? when done.
from random import *
print(randint(1, 10)) # The code generates the numbers ????
```

In [ ]:
```
# while loop example:
# 1. Run the code multiple times.
# 2. Replace the ??? with your understanding of the code.

from random import *
secret_number = randint(1, 10) # generates the numbers ???

computer_guess_number = 1
# We execute the code inside the loop when ???
while (computer_guess_number != secret_number):
    # We are inside the loop when ???
    print("I tried "+str(computer_guess_number))
    computer_guess_number = computer_guess_number + 1

# We exit the loop when ???


print("I guessed it!")
print("The random number is "+str(computer_guess_number))
```

Based on the examples above, you can write all of the remaining code for the game!

Hint: You need to use while and if.