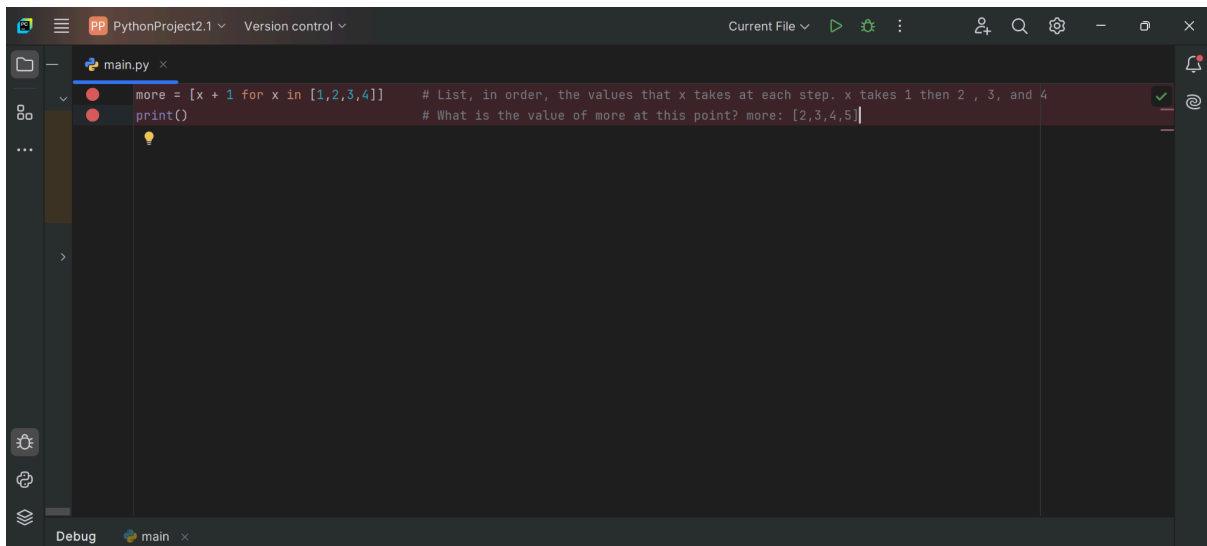


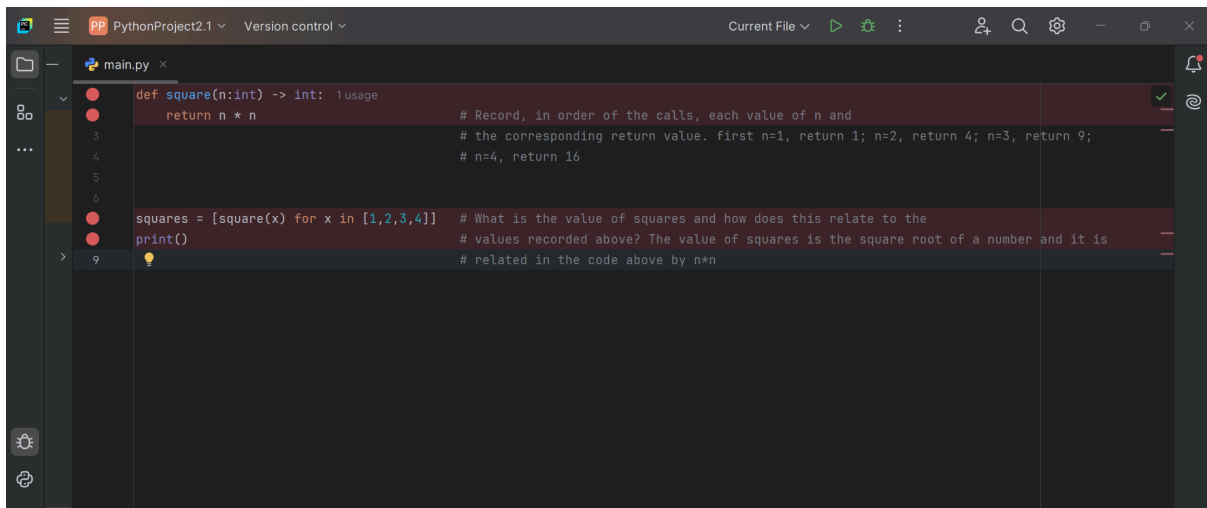
Task 1 : Evaluating Code with List Comprehensions

a.



```
main.py
more = [x + 1 for x in [1,2,3,4]] # List, in order, the values that x takes at each step. x takes 1 then 2 , 3, and 4
print() # What is the value of more at this point? more: [2,3,4,5]
```

b.



```
main.py
def square(n:int) -> int: 1usage
    return n * n # Record, in order of the calls, each value of n and
                # the corresponding return value. first n=1, return 1; n=2, return 4; n=3, return 9;
                # n=4, return 16
squares = [square(x) for x in [1,2,3,4]] # What is the value of squares and how does this relate to the
print() # values recorded above? The value of squares is the square root of a number and it is
        # related in the code above by n*n
```

c.

```
def check(n:int) -> bool: 1 usage
    return n > 2           # Record, in order of the calls, each value of n and
                           # the corresponding return value. n=0, False; n=1, False; n=2, False; n=3, True; n=4, True

answer = [x for x in range(5) if check(x)] # What is the value of answer? [3,4]
print()
```

d.

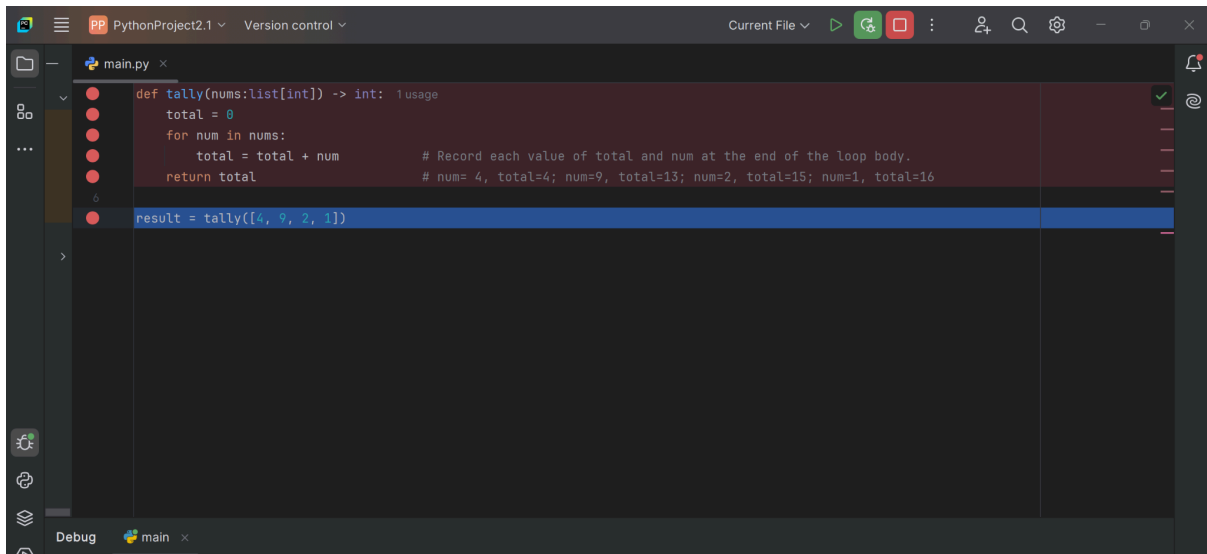
```
def inc(m:int) -> int: 1 usage
    return m + 1         # Record, in order of the calls, each value of m and
                           # the corresponding return value. inc(3)= 4, inc(4)= 5

def check(n:int) -> bool: 1 usage
    return n > 2           # Record, in order of the calls, each value of n and
                           # the corresponding return value. n=0, False; n=1, False; n=2, False; n=3, True
                           # n=4, True

answer = [inc(x) for x in range(5) if check(x)] # What is the value of answer? [4,5]
print()
```

Task 2 Evaluating Code with Loops

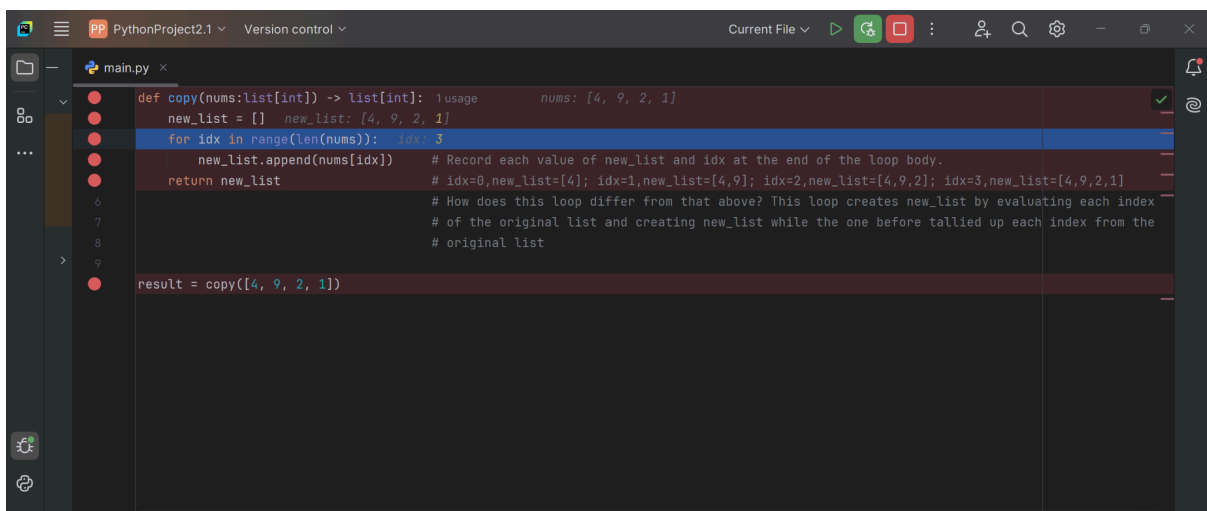
a.



```
def tally(nums:list[int]) -> int: 1 usage
    total = 0
    for num in nums:
        total = total + num      # Record each value of total and num at the end of the loop body.
    return total                # num= 4, total=4; num=9, total=13; num=2, total=15; num=1, total=16

result = tally([4, 9, 2, 1])
```

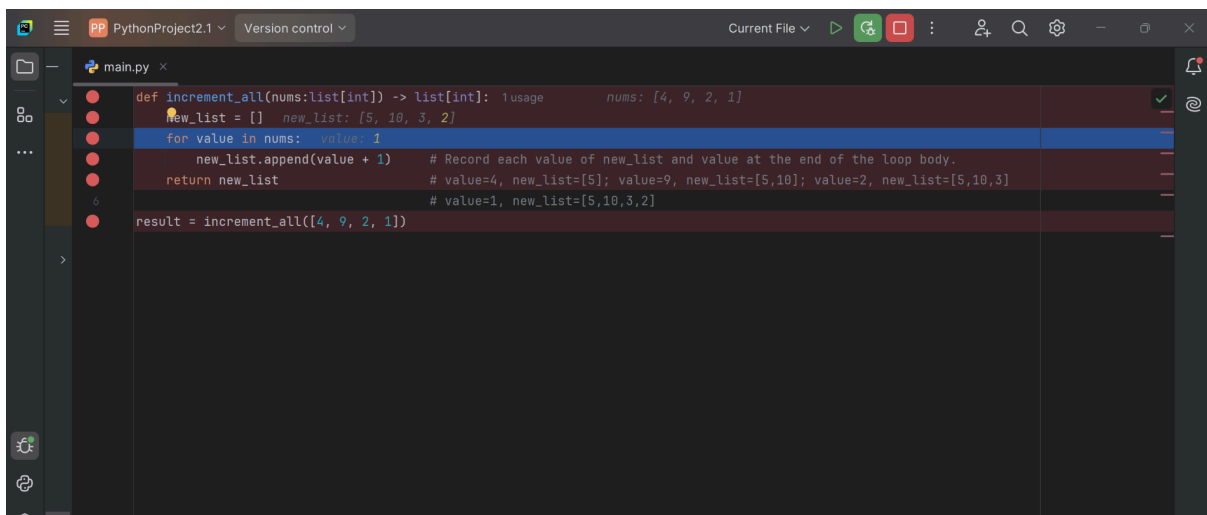
b.



```
def copy(nums:list[int]) -> list[int]: 1 usage      nums: [4, 9, 2, 1]
    new_list = []  new_list: [4, 9, 2, 1]
    for idx in range(len(nums)):  idx: 3
        new_list.append(nums[idx])  # Record each value of new_list and idx at the end of the loop body.
    return new_list                # idx=0,new_list=[4]; idx=1,new_list=[4,9]; idx=2,new_list=[4,9,2]; idx=3,new_list=[4,9,2,1]
    # How does this loop differ from that above? This loop creates new_list by evaluating each index
    # of the original list and creating new_list while the one before tallied up each index from the
    # original list

result = copy([4, 9, 2, 1])
```

c.



```
def increment_all(nums:list[int]) -> list[int]: 1 usage      nums: [4, 9, 2, 1]
    new_list = []  new_list: [5, 10, 3, 2]
    for value in nums:  value: 1
        new_list.append(value + 1)  # Record each value of new_list and value at the end of the loop body.
    return new_list                # value=4, new_list=[5]; value=9, new_list=[5,10]; value=2, new_list=[5,10,3]
    # value=1, new_list=[5,10,3,2]

result = increment_all([4, 9, 2, 1])
```

Task 3 Evaluating Code with Test Cases

<https://github.com/CSC-101/lab3-omardadam.git>

Worksheets

Week 3 Worksheet 1.

1.) $[n + 2 \text{ for } n \text{ in } [4, 6, 3]]$

$n = n = n =$

$[4, 6, 3]$

$n+2 = n+2 = n+2 =$

$[8, 12, 6]$

2.) $x=10$

$[n+10 \text{ for } n \text{ in } [4, 6, 3]]$

$n = n = n =$

$[4, 6, 3]$

$n+10 = n+10 = n+10 =$

$[40, 60, 30]$

3.) $\text{def } f(a: \text{int}) \rightarrow \text{int}:$

if $a > 0$

return a

else:

return 0

$[f(n) \text{ for } n \text{ in } [4, -2, -3, 5]]$

$a = a = a = a =$

$[4, -2, -3, 5]$

$f(a) = f(a) = f(a) = f(a) =$

$[4, 0, 0, 5]$

Week 3 Worksheet 2

1. [n for n in [4, 6, 3] if n < 5]

n = n = n =

[4, 6, 3]

n = n =
[4, 3]

2.) x = 4 [n for n in [4, 6, 3] if n >= 4]

n = n = n =

[4, 6, 3]

n = n =
[4, 6]

3.) [s for s in ['hello', 'aloha', 'ciao', 'holo'] if
vowel_count(s) > 2]

s = s = s = s = aloha

['hello', 'aloha', 'ciao', 'holo']

s = s =
['aloha', 'ciao']

Week 3 Worksheet 2

1. list1 = [3, 1, 4, 5, 2]

2. max = list1[0]

3. for n in list1:

if n > max:

max = n

known Binding 5

Line 5

iteration 1	iteration 2	iteration 5
list1 = #list1	list1 = #list1	list1 = #list1
max = 3,	max = 3,	max = 5
n = 3	n = 1	n = 2

Week 3 Worksheet 4

1.

1. list 1 = [3, 1, 4, 5, 2]

$$2 m c x - i d x = 0$$

3 For idy in range(1, n(list 1)):

if $list1[id_x] > list1[max_idx]$.

$$m_{\text{ex}} - i d_x = i d_x$$

List 5

list2 = [3, 1, 4, 5, 2]

Known Binding

Line 1

line 1 List = [3, 1, 4, 5, 2]

Line 2

Line 2 $\max_{i \in I} x_i = 0$

Iteration

Iteration

Iteration

Iteration

Iteration 5.

1

2

2

4

Line 3

$$dy = 0$$
$$id_X = \textcircled{1}$$
$$id_X = 2$$
$$\text{id}_X = 3$$
$$\int dx = 4$$

line 4

$$\text{id}^+[\text{id}_x] = 3$$
$$\text{lis} + 1[\text{id}_x] = 1$$
$$\text{list}[id_x] = 4$$
$$11546127 = 5$$
$$15 + 1[\text{dx}] = 2$$

live 5

$$\text{max_idx} = 0$$
$$\max_{id_x} = 0$$

max_idx = 2

$$\text{max_idx} = 3$$
$$\max_{j \in I} x_j = 3$$