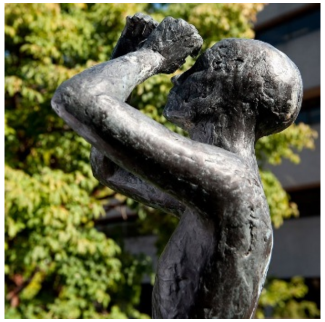

CS1117 – Introduction to Programming

Dr. Jason Quinlan,

School of Computer Science and Information Technology

A TRADITION OF INDEPENDENT THINKING

UCC

University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

While Recap

We introduced While loops as a mechanism for repeating code

We use While loop when we don’t know how long the loops will last

While the condition remains True we continue to execute the statement block of code

But… we need some mechanism to make the condition false, otherwise we loop forever…

While Recap

Counters are very important to While loops

They not only allow us to loop in the While a certain number of times

But they also allow us to use list indexing to gather and set information

Incorrect counting can cause the majority of the bugs seen in While loops

While

break

Is a Python mechanism for stopping loops

It terminates the execution of the statement block code in the loop

And Python moves out of the while loop and to the next location in the code

```
print("Phew. The While has stopped")
```

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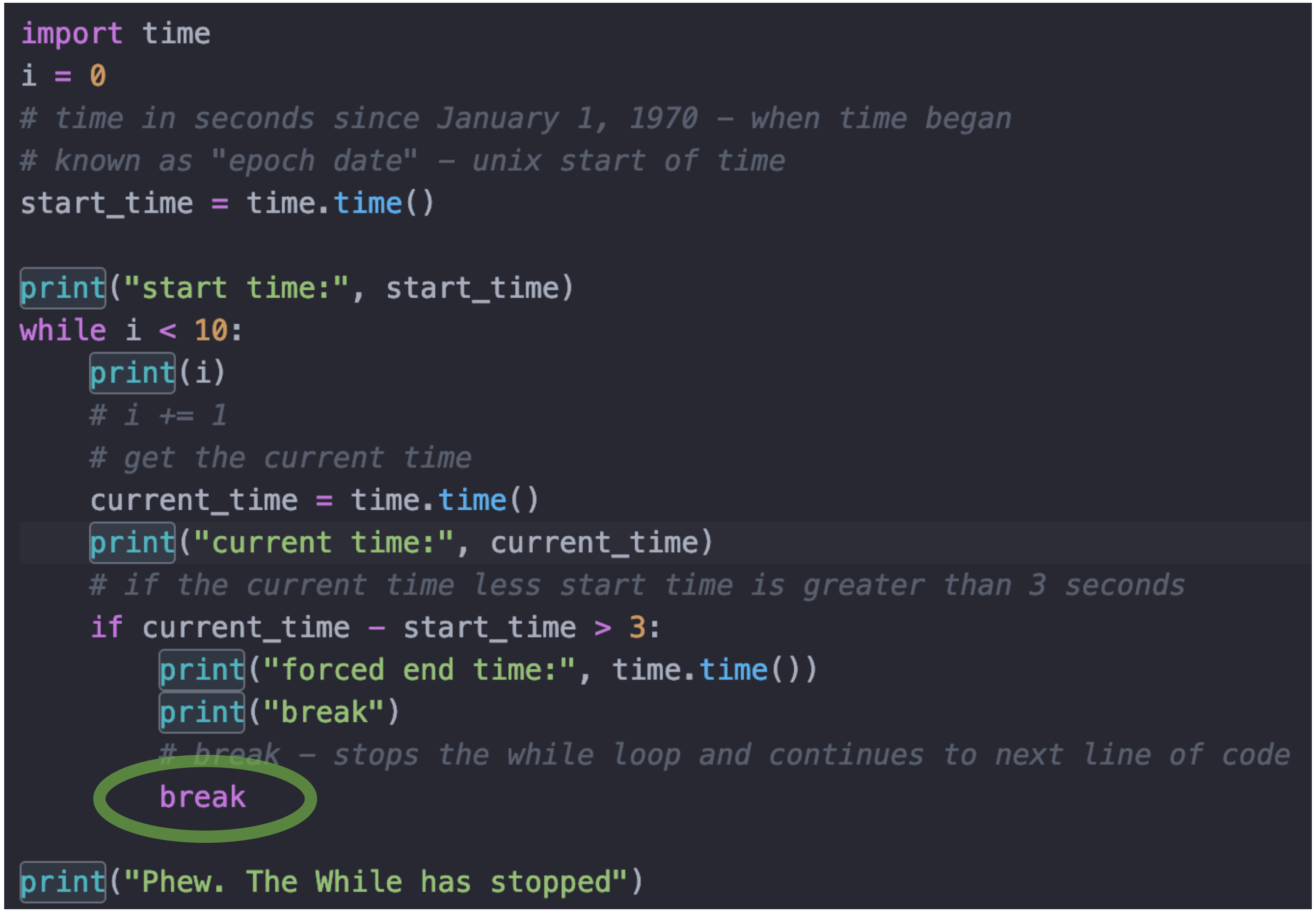
While

We add a Boolean check



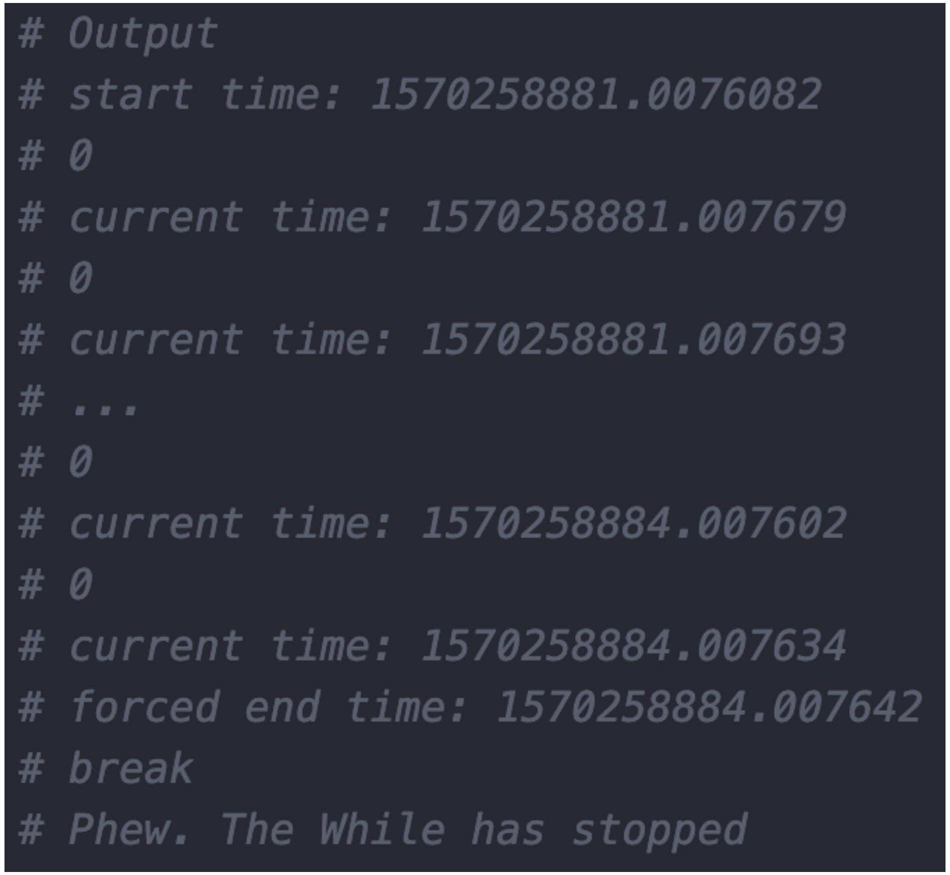
```python
import time
i = 0
# time in seconds since January 1, 1970 - when time began
# known as "epoch date" - unix start of time
start_time = time.time()

print("start time:", start_time)
while i < 10:
    print(i)
    # i += 1
    # get the current time
    current_time = time.time()
    print("current time:", current_time)
    # if the current time less start time is greater than 3 seconds
    if current_time - start_time > 3:
        print("forced end time:", time.time())
        print("break")
        # break - stops the while loop and continues to next line of code
        break

print("Phew. The While has stopped")
```

While

Let’s look at output



```
# Output
# start time: 1570258881.0076082
# 0
# current time: 1570258881.007679
# 0
# current time: 1570258881.007693
# ...
# 0
# current time: 1570258884.007602
# 0
# current time: 1570258884.007634
# forced end time: 1570258884.007642
# break
# Phew. The While has stopped
```

While

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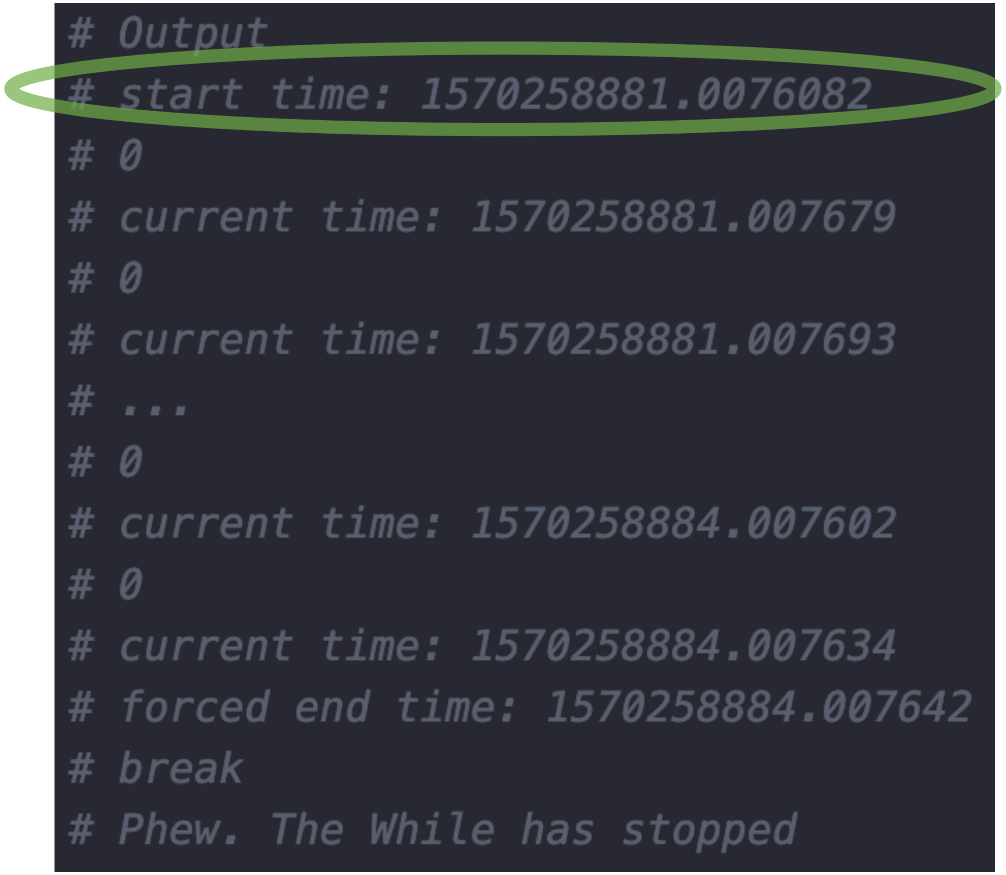

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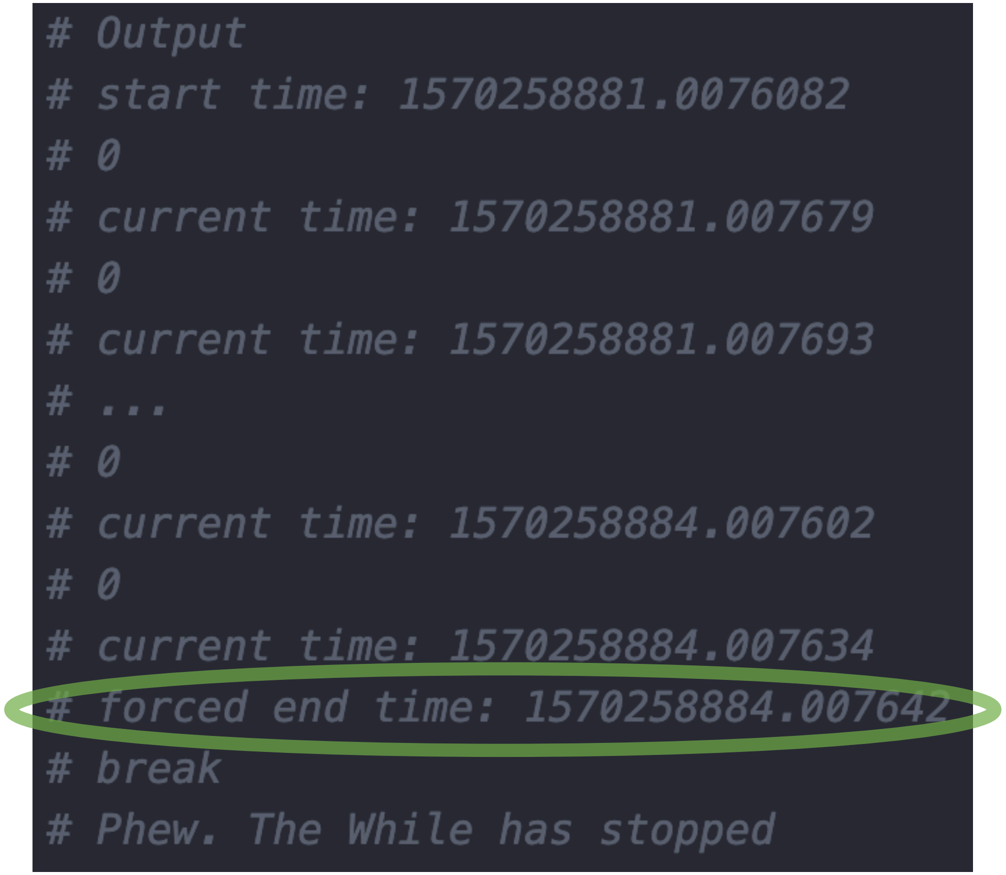

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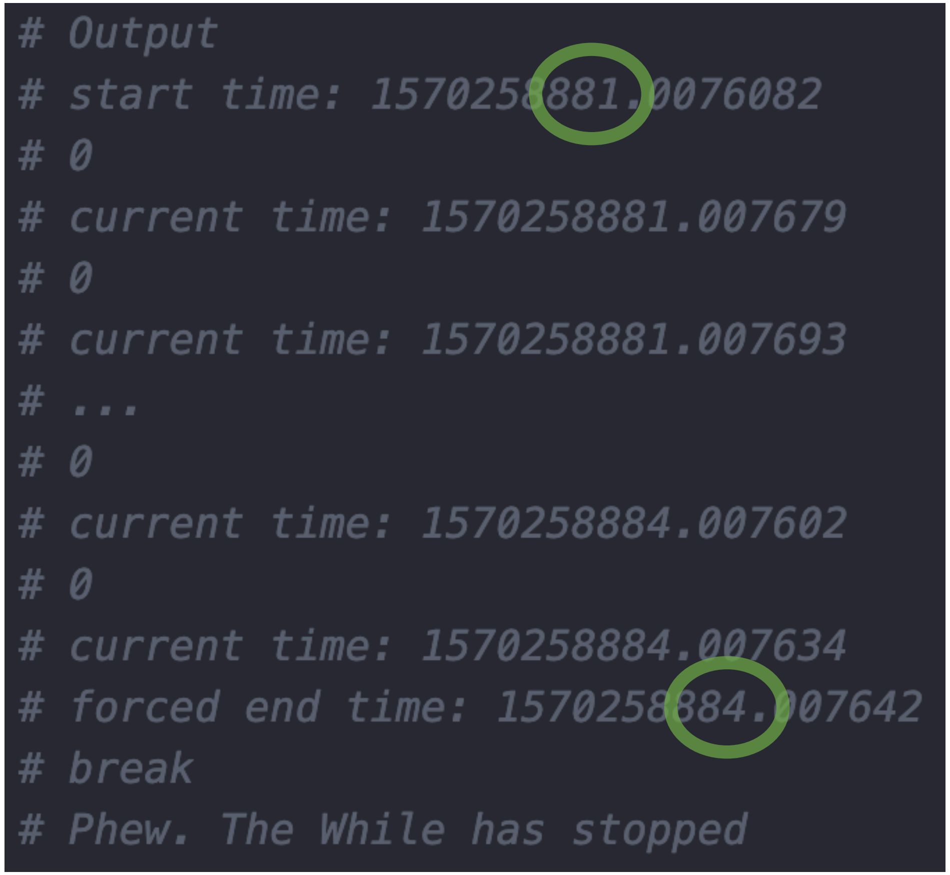

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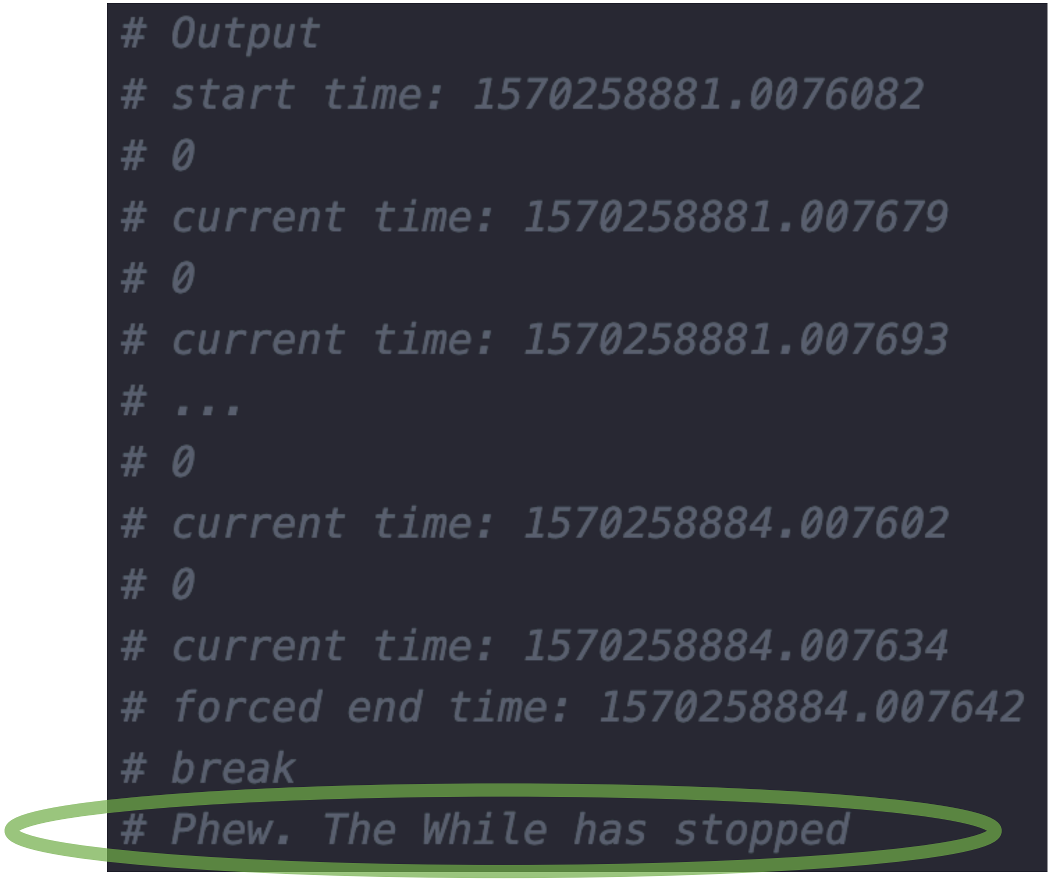

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While

We also have a mechanism for ignoring specific runs through the loops

While

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continue

While

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continue tells Python to ignore the rest of code in the statement block for the current loop

While

We also have a mechanism for ignoring

specific runs through the loops

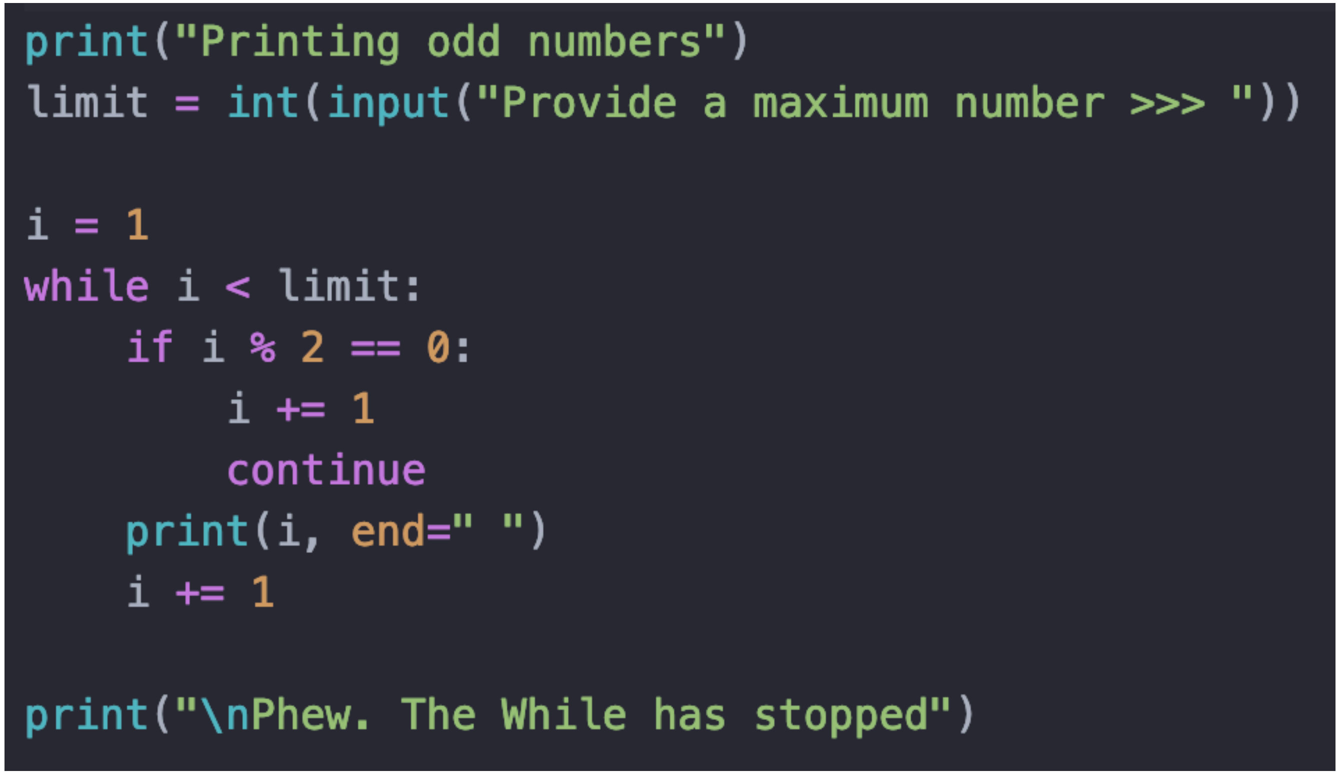
continue

continue tells Python to ignore the rest of code in the statement block for the current loop

And move to the next loop (iteration)

While

continue example



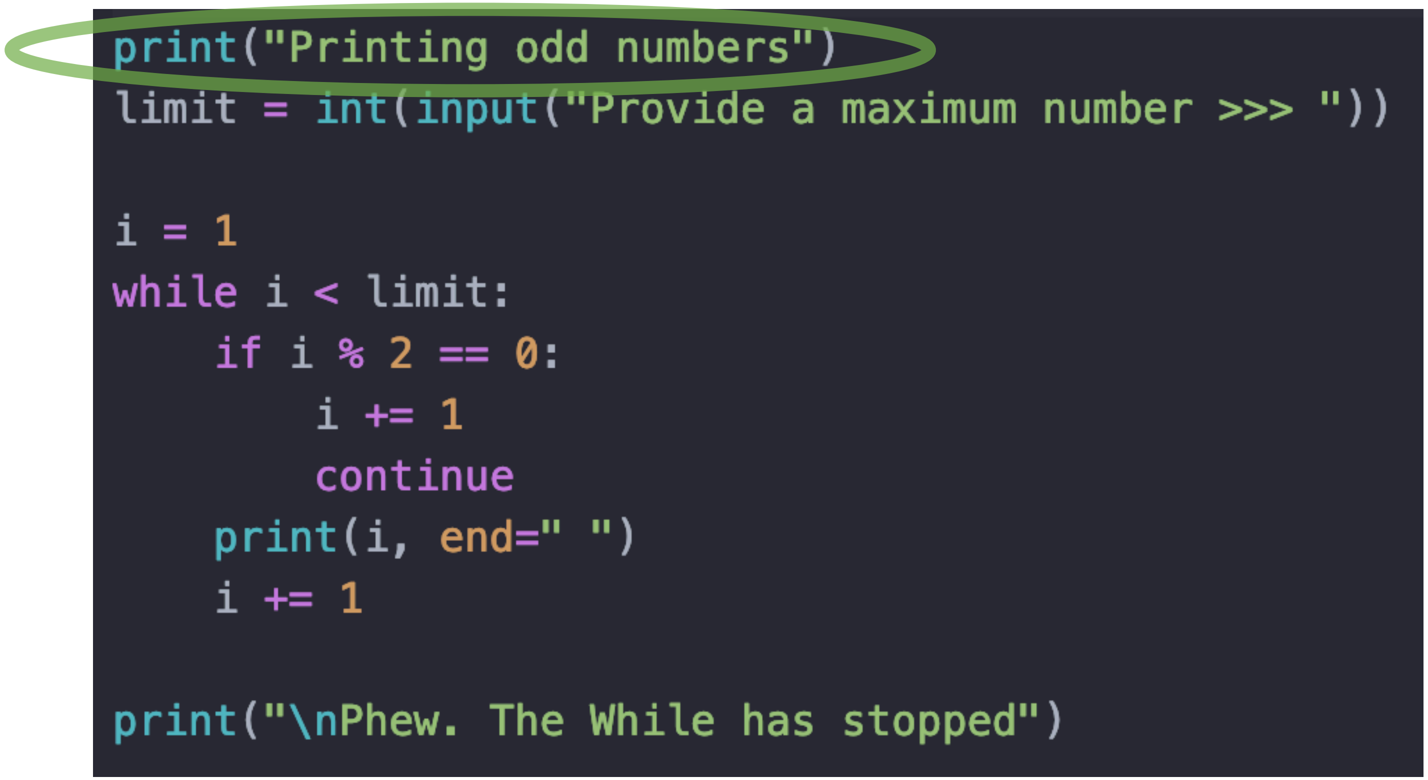
```python
print("Printing odd numbers")
limit = int(input("Provide a maximum number >>> "))

i = 1
while i < limit:
    if i % 2 == 0:
        i += 1
        continue
    print(i, end=" ")
    i += 1

print("\nPhew. The While has stopped")
```

While

continue example



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While

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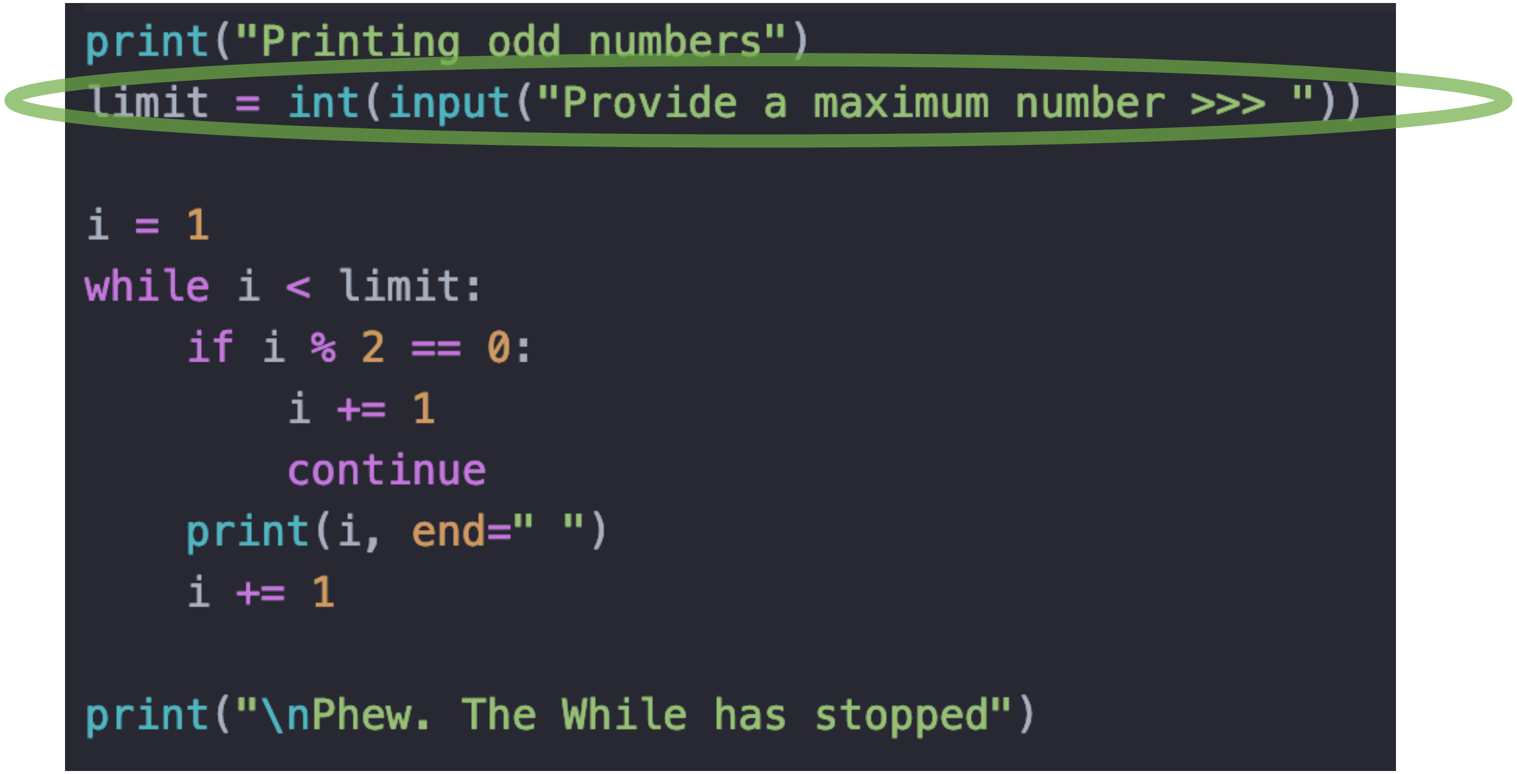

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While

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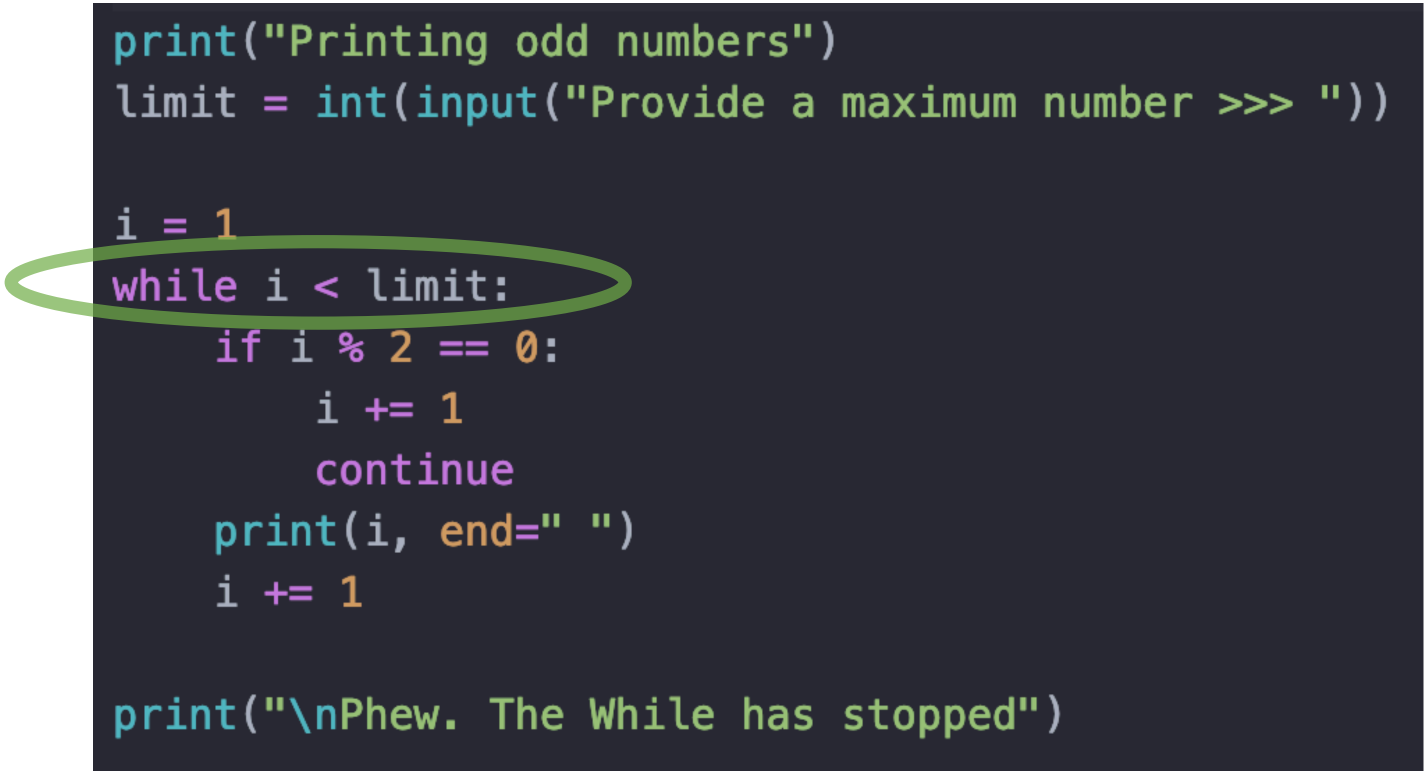

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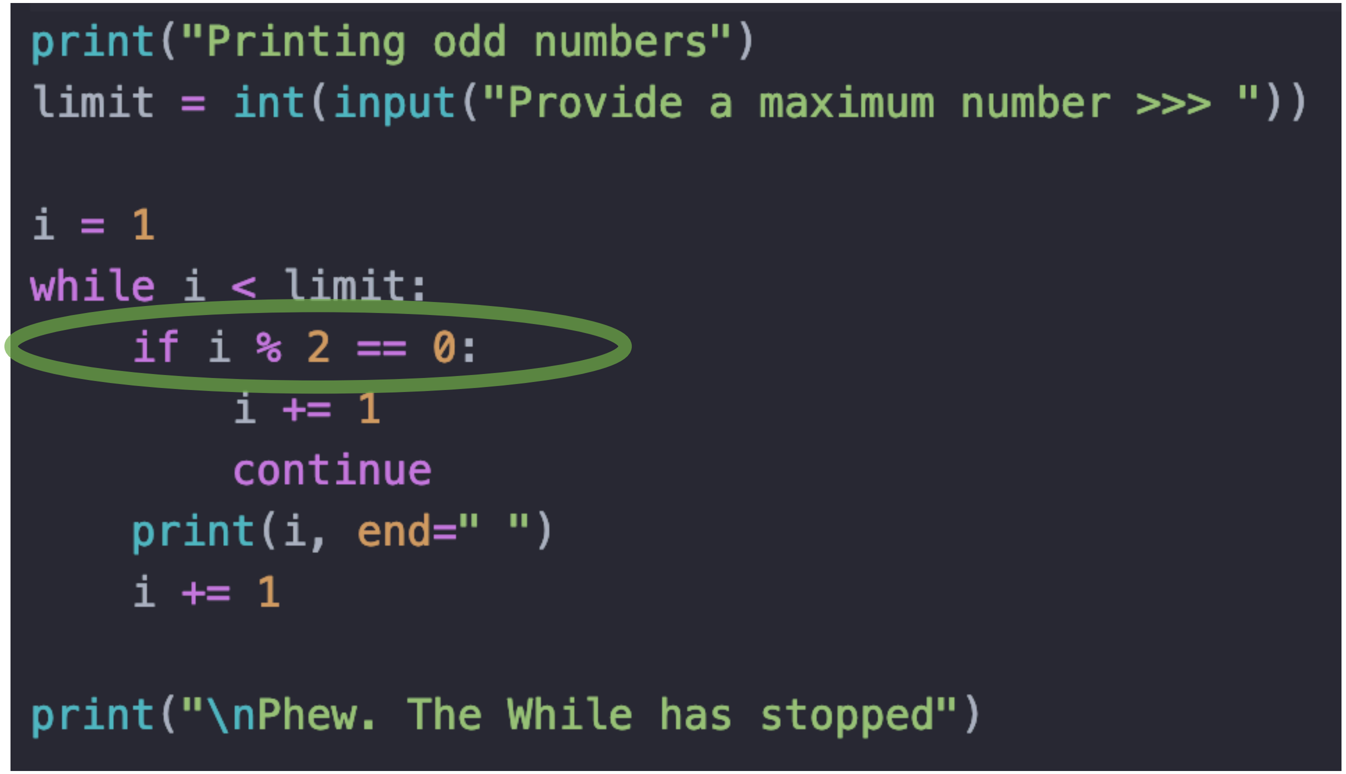

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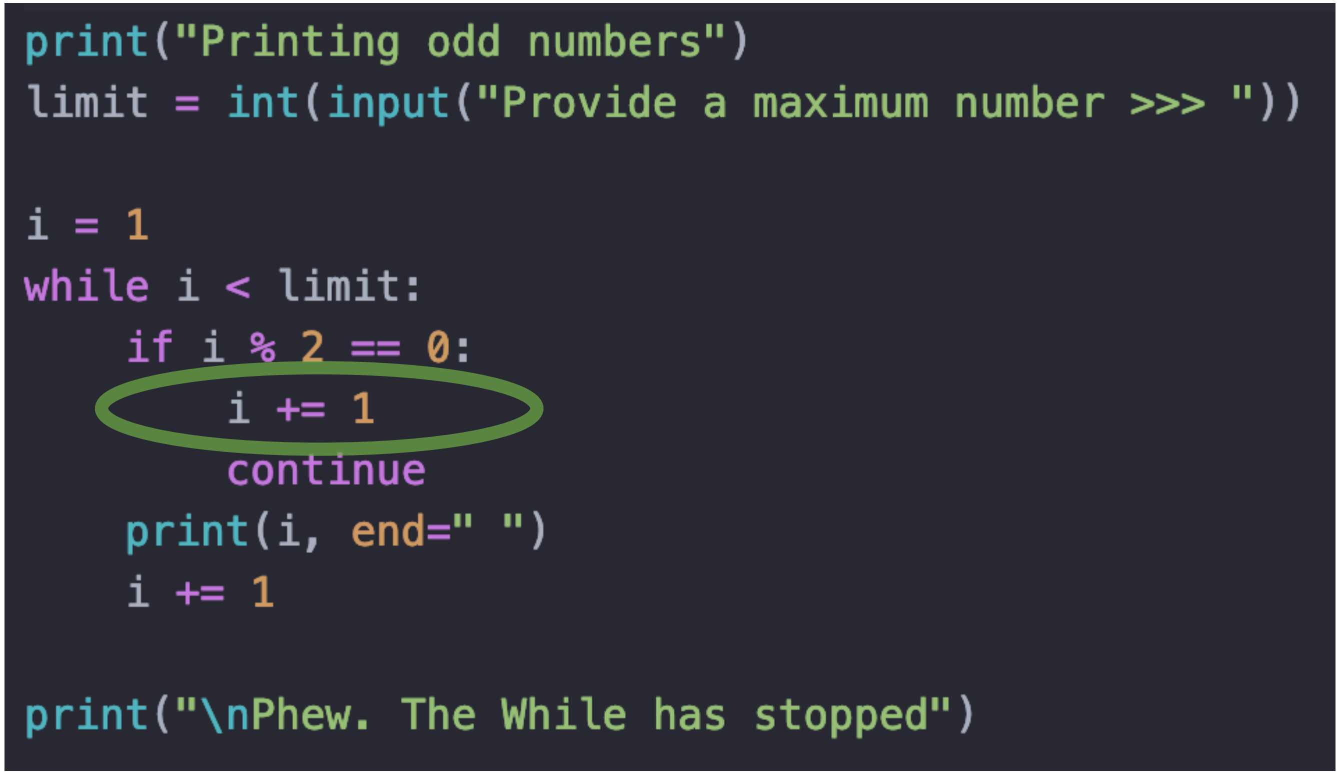

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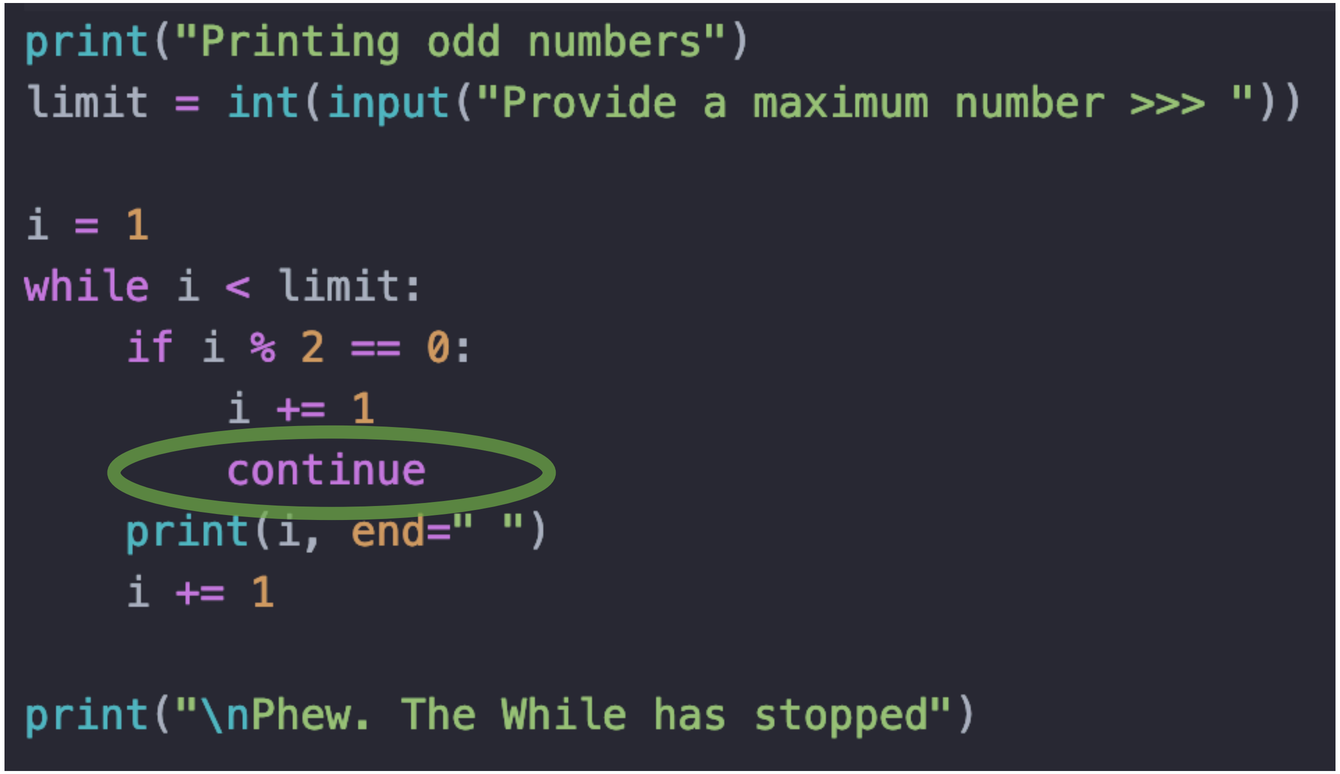

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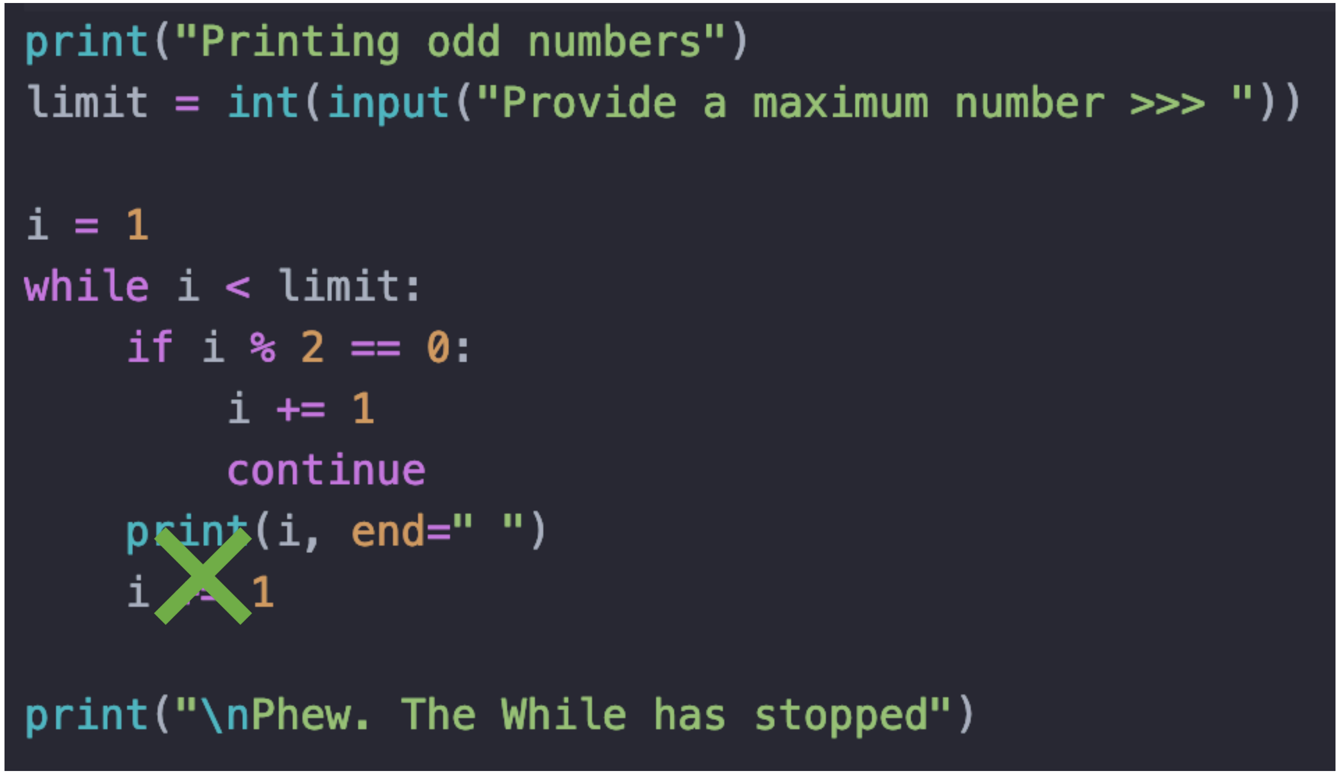

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While

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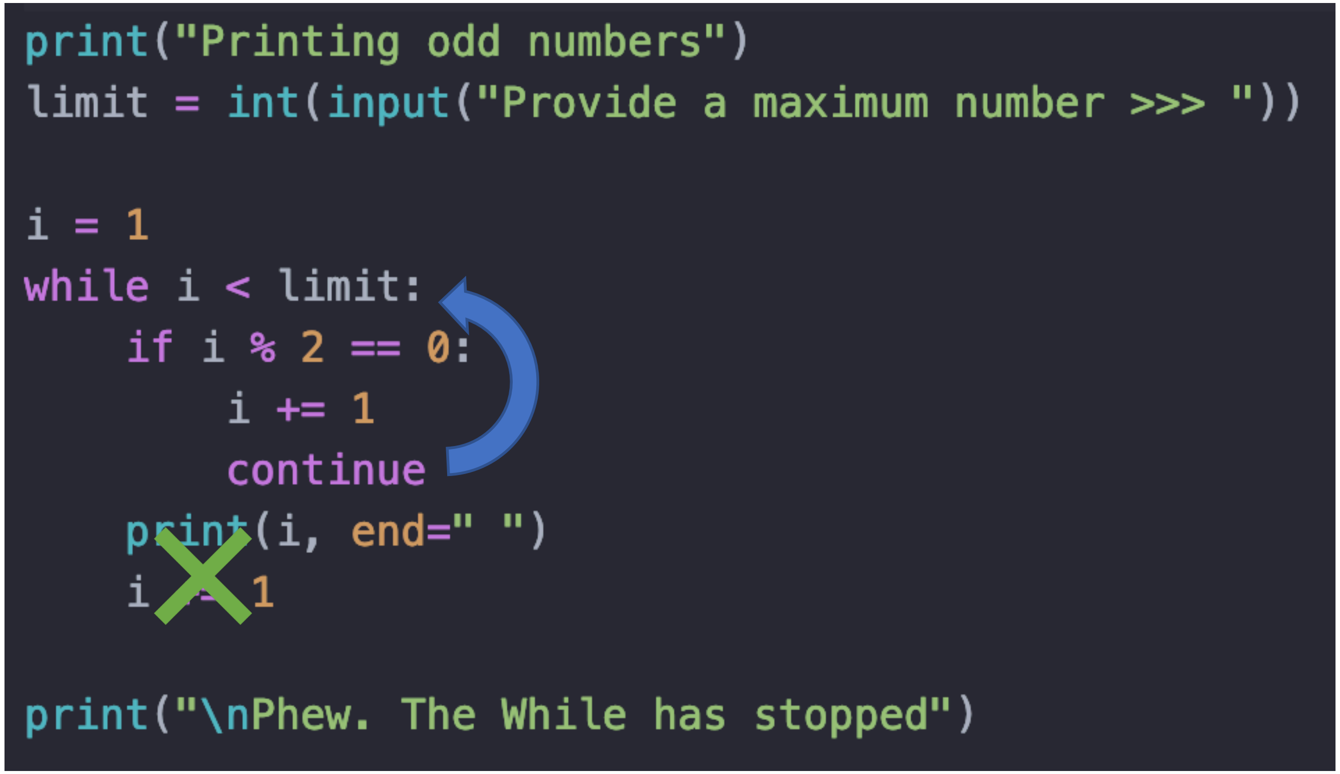

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While

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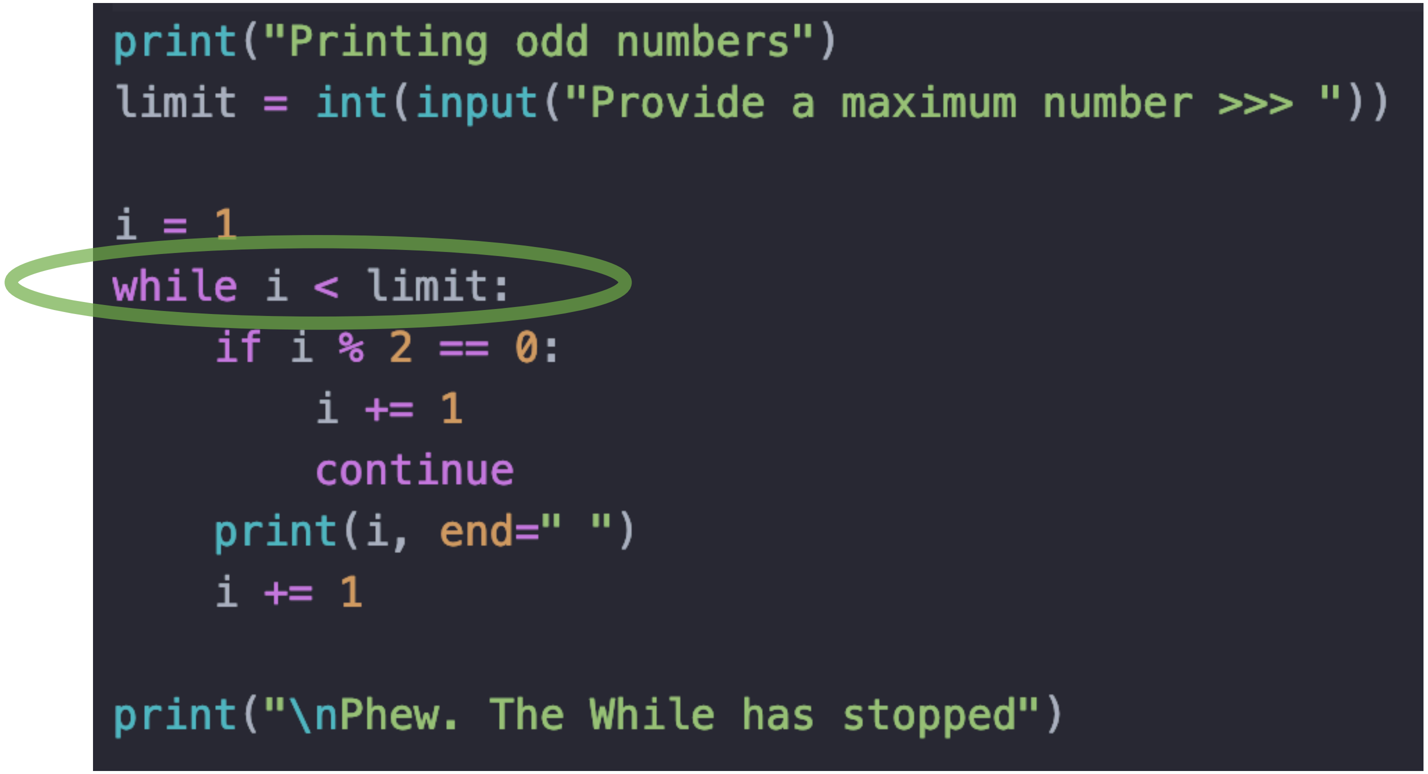

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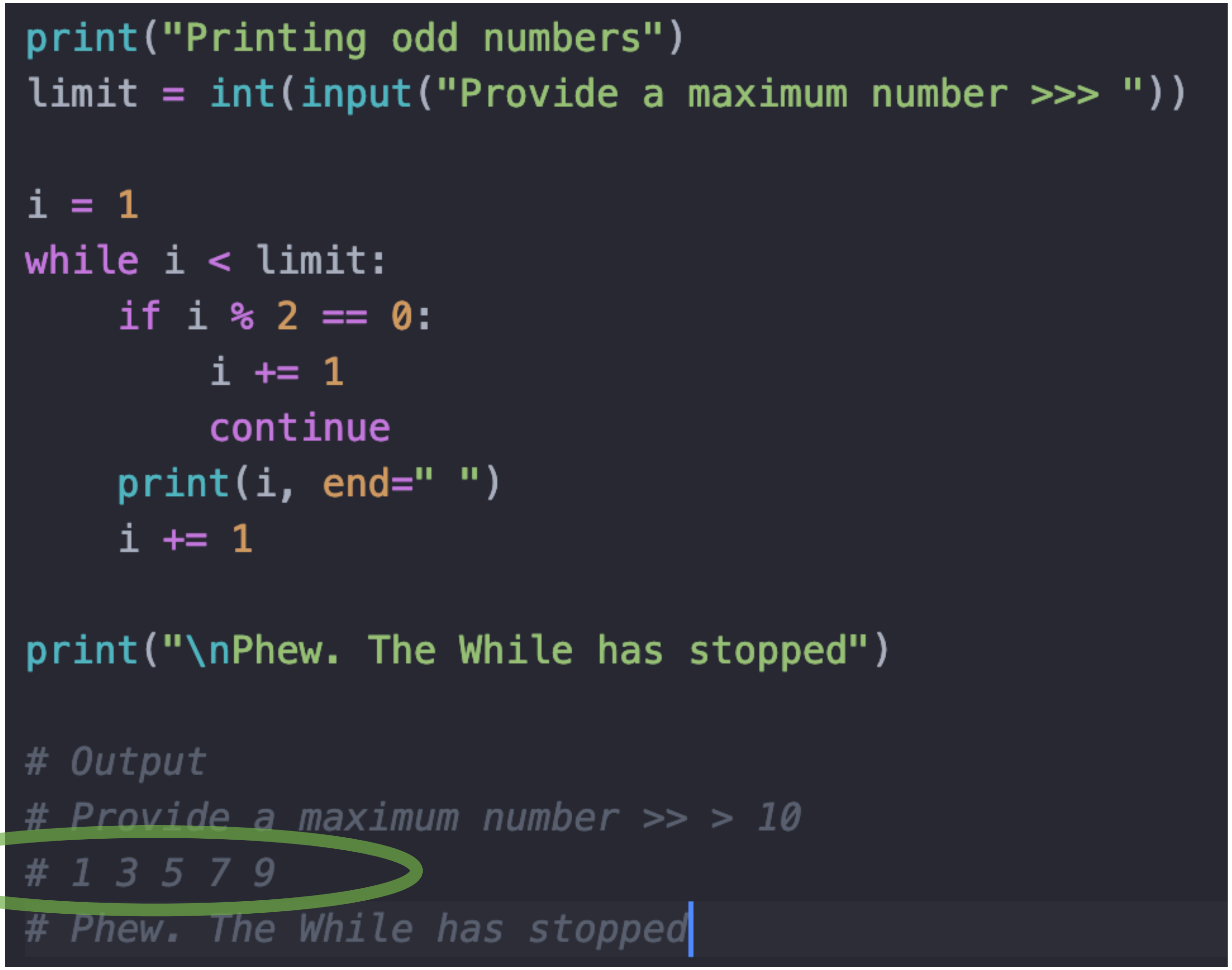
While

continue example - output



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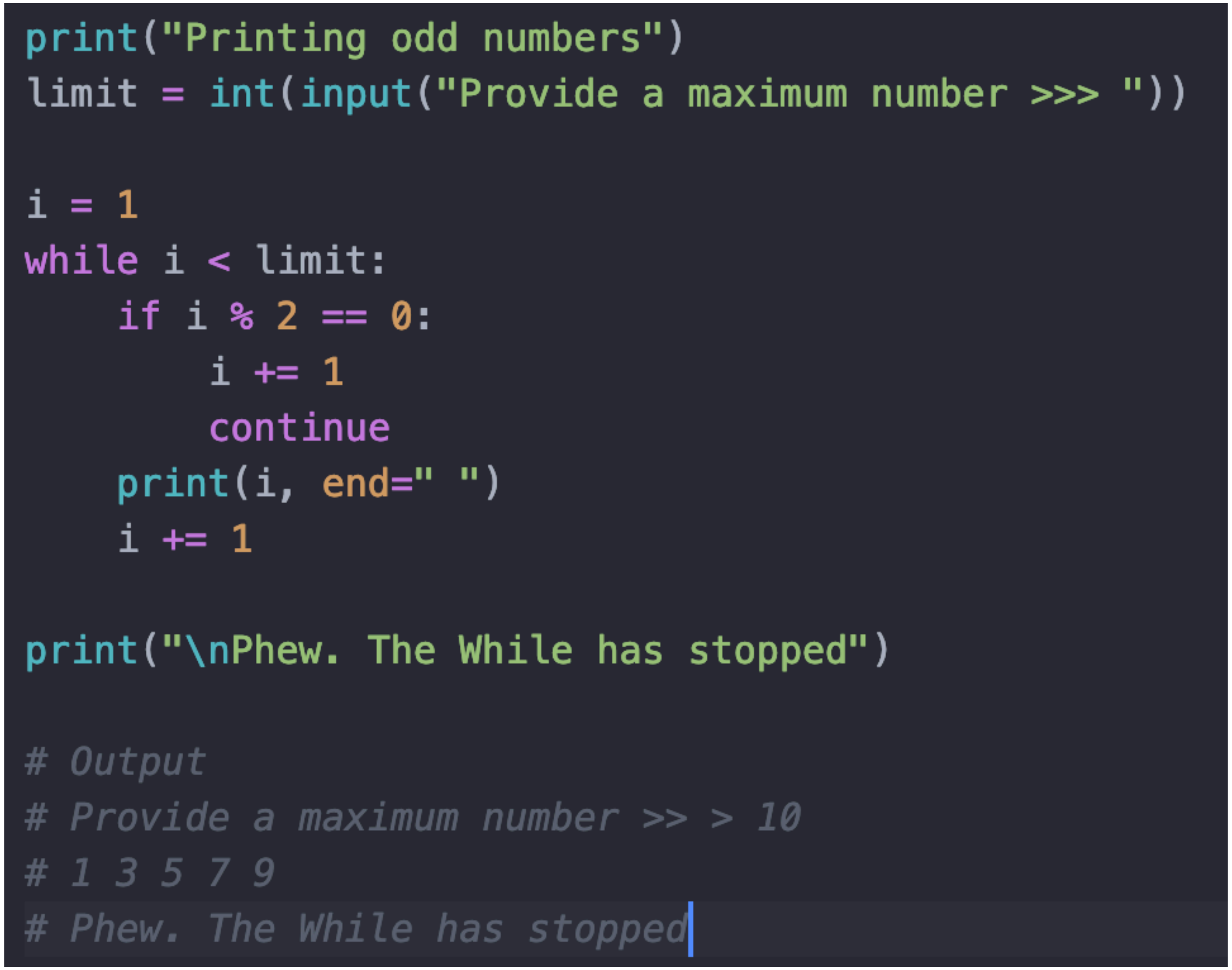
i = 1
while i < limit:
    if i % 2 == 0:
        i += 1
        continue
    print(i, end=" ")
    i += 1

print("\nPhew. The While has stopped")

# Output
# Provide a maximum number >> > 10
# 1 3 5 7 9
# Phew. The While has stopped
```

While

Let’s look at that “Phew”… one last time



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i = 1
while i < limit:
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        continue
    print(i, end=" ")
    i += 1

print("\nPhew. The While has stopped")

# Output
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# 1 3 5 7 9
# Phew. The While has stopped
```
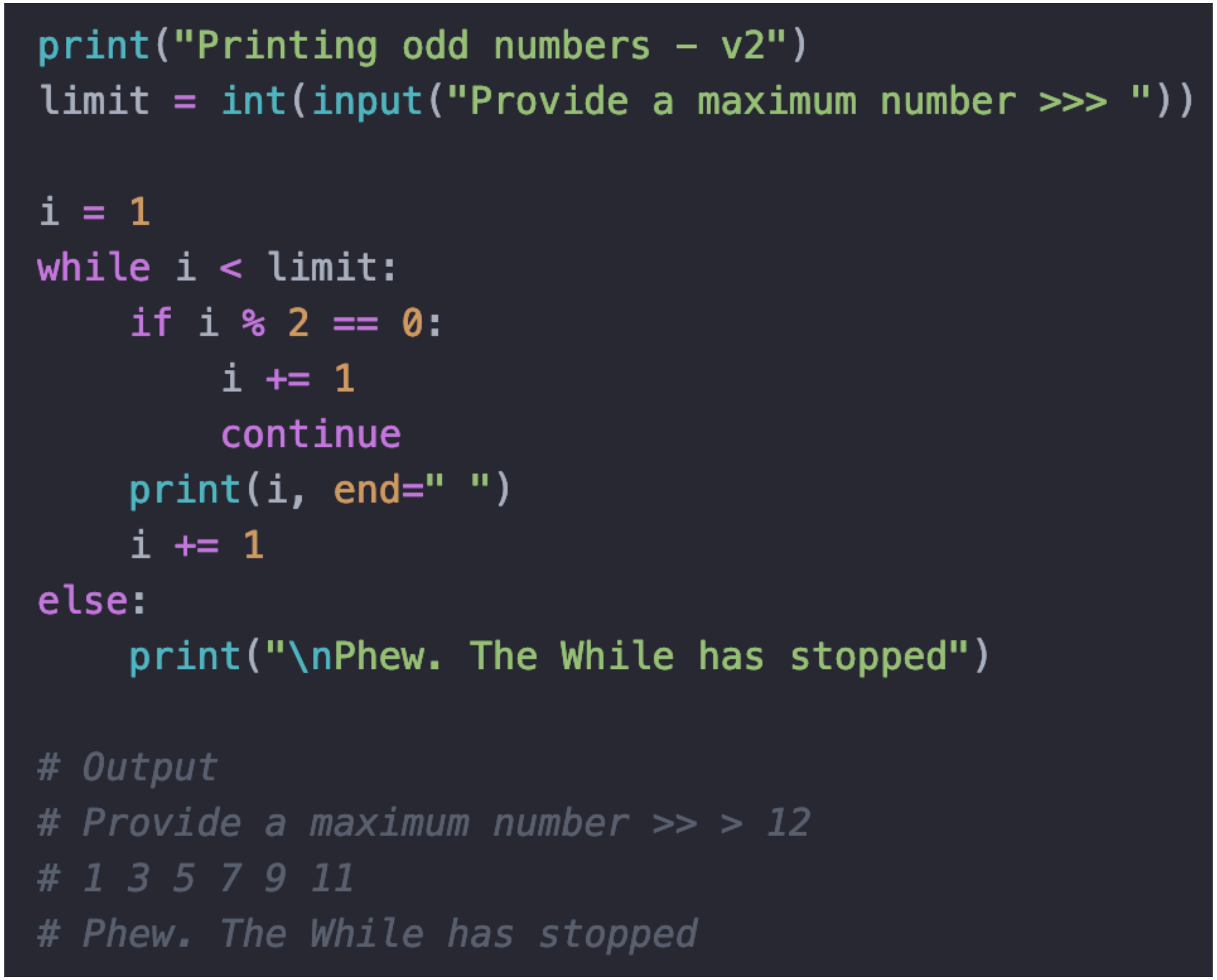

While

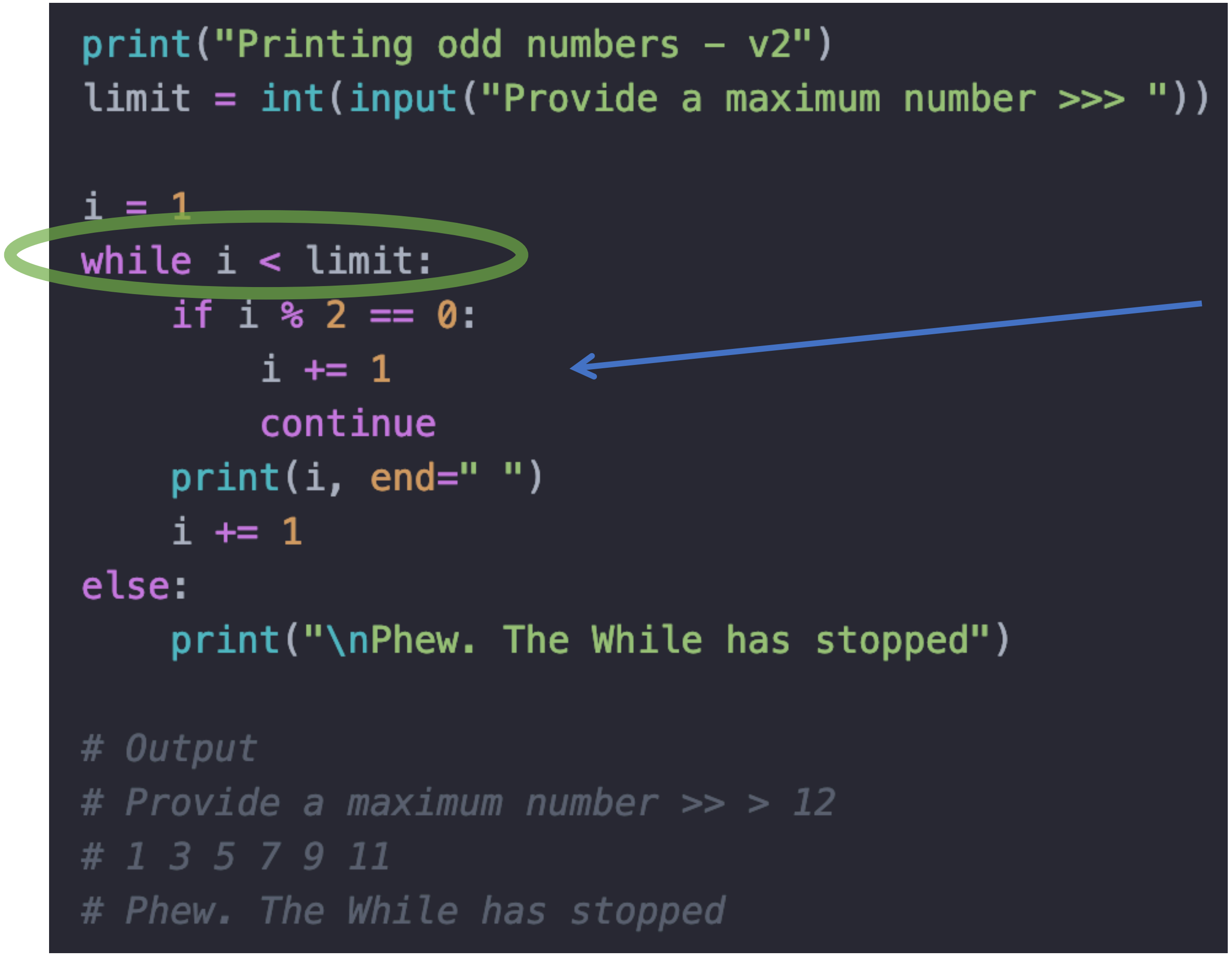
As while is so like if, we can actually use else ☺



```
print("Printing odd numbers - v2")
limit = int(input("Provide a maximum number >>> "))

i = 1
while i < limit:
    if i % 2 == 0:
        i += 1
        continue
    print(i, end=" ")
    i += 1
else:
    print("\nPhew. The While has stopped")

# Output
# Provide a maximum number >> > 12
# 1 3 5 7 9 11
# Phew. The While has stopped
```

While

As while is so like if, we can actually use else ☺



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# Output
# Provide a maximum number >> > 12
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```

So while
True
Repeat the
statement
block

While

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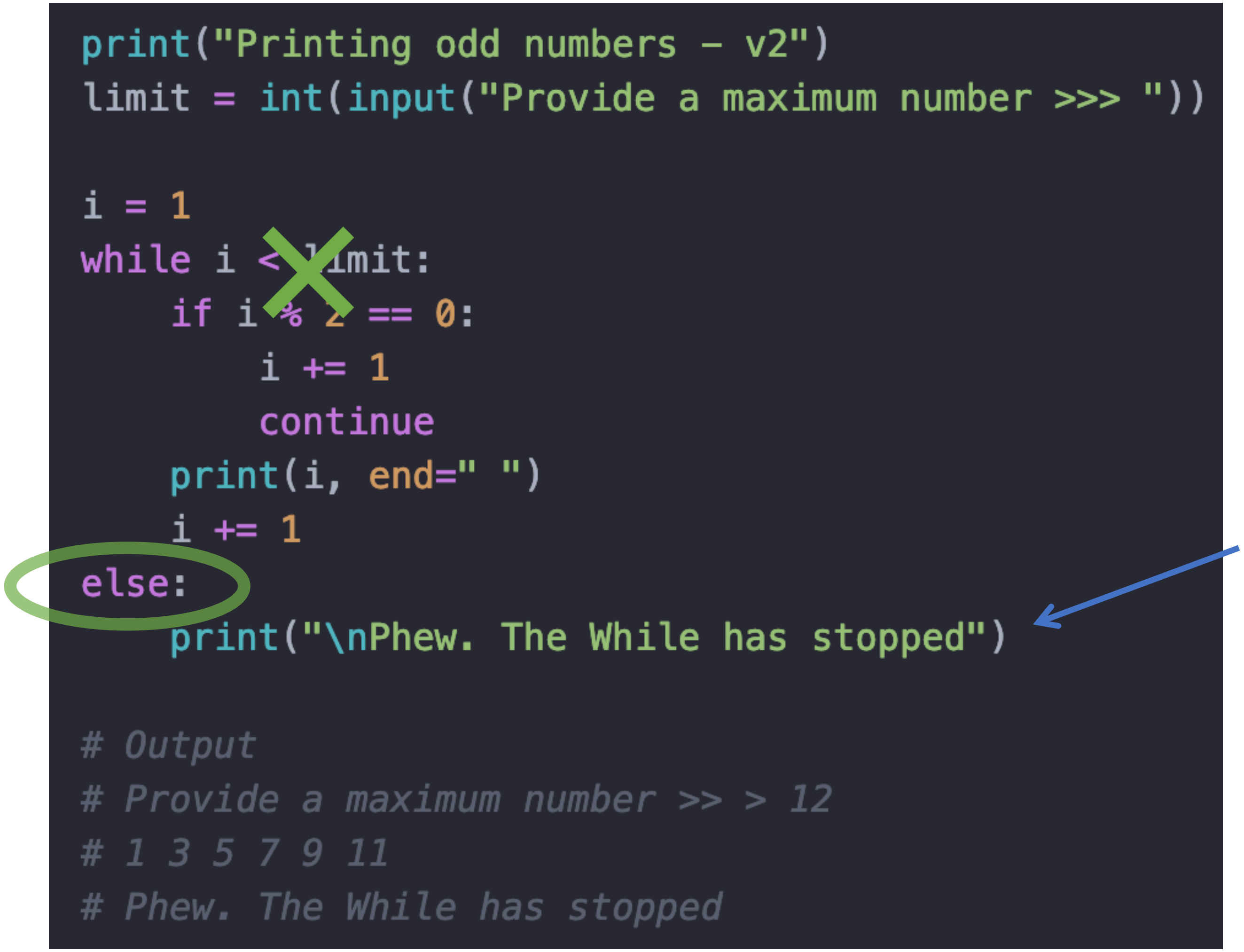

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```
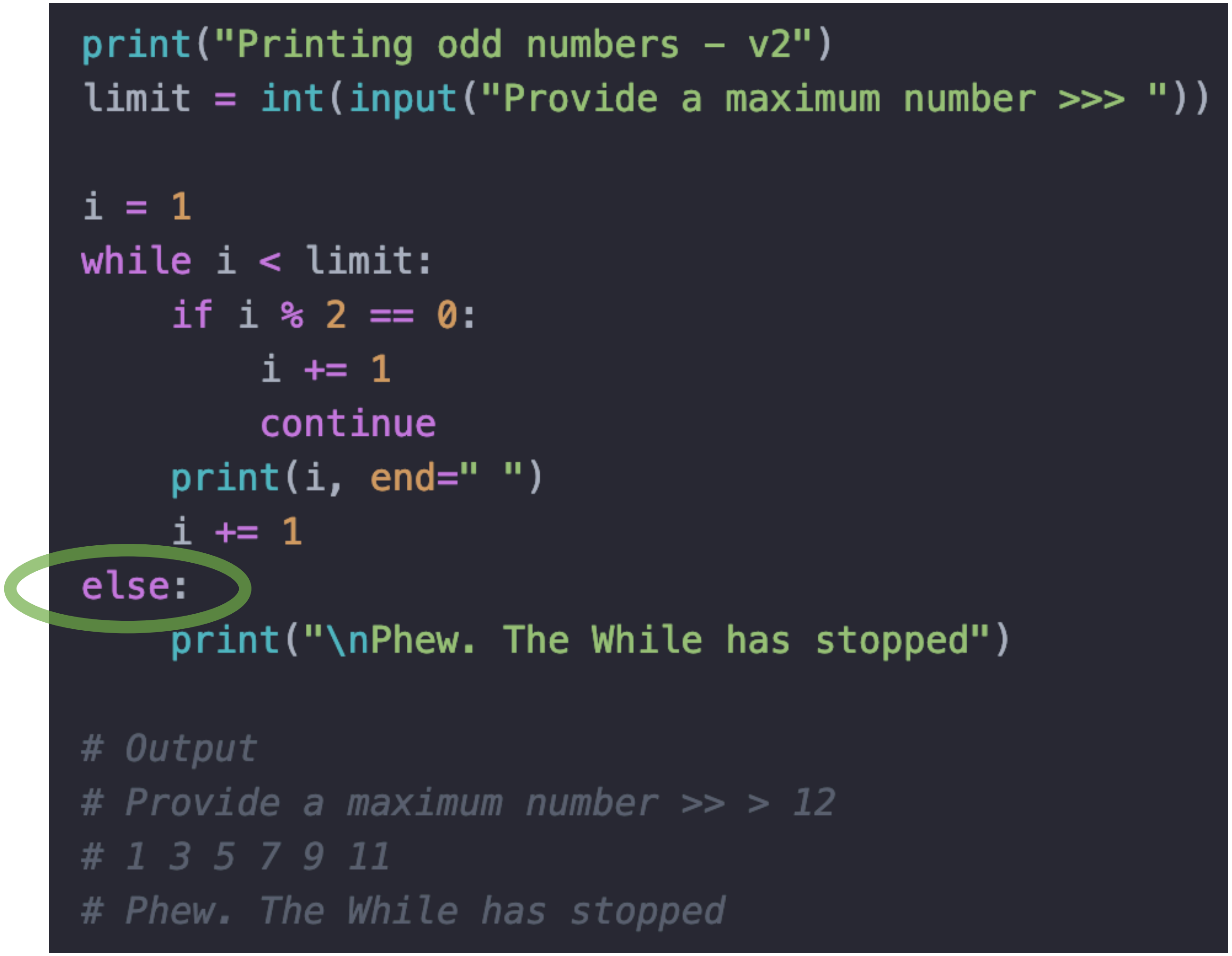

But when while is False execute the else code

While

As while is so like if, we can actually use else ☺



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# Output
# Provide a maximum number >> > 12
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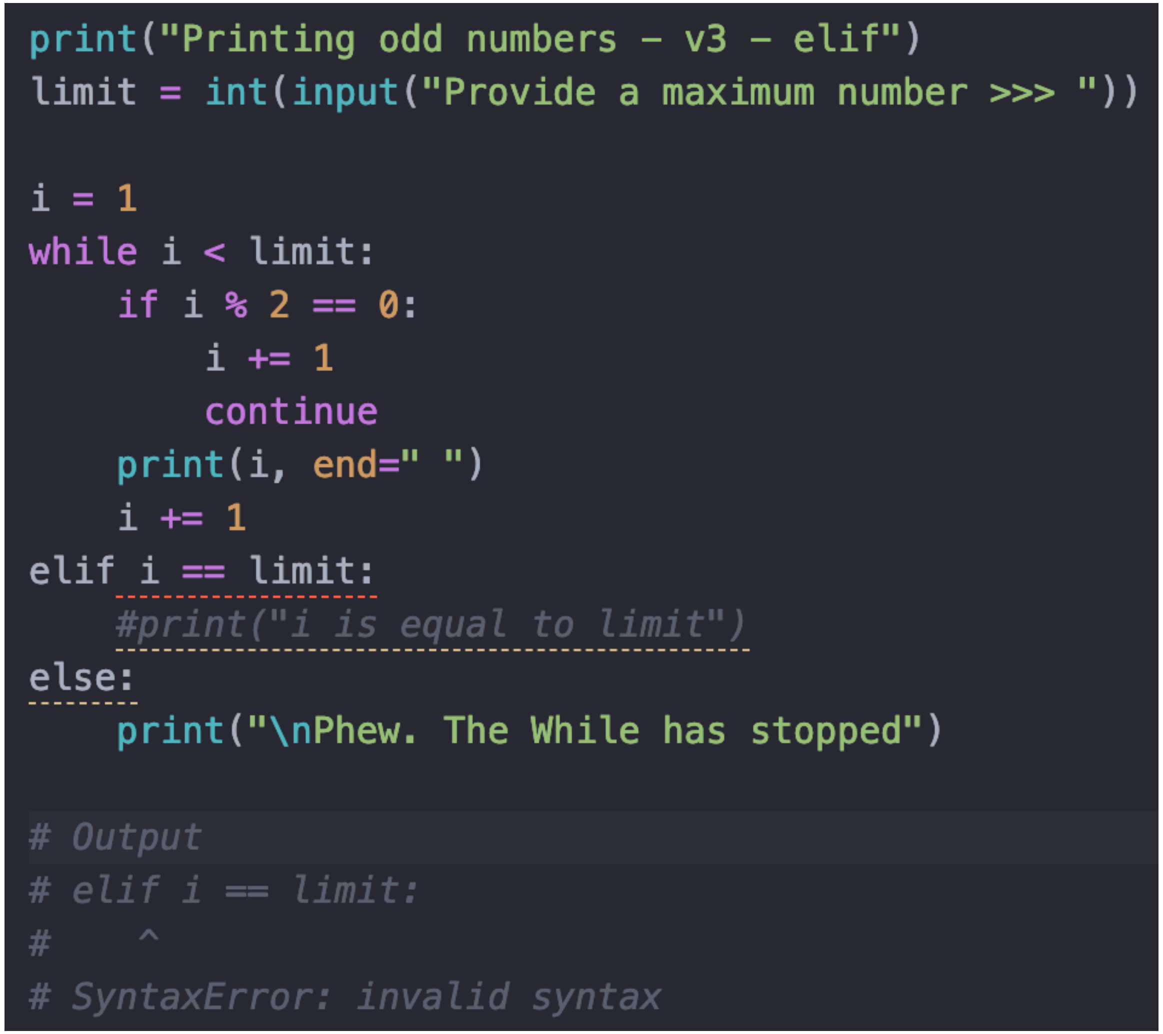
```

Else is a form of “do this when the loop ends”

While

If we can use else, can we use elif ☹



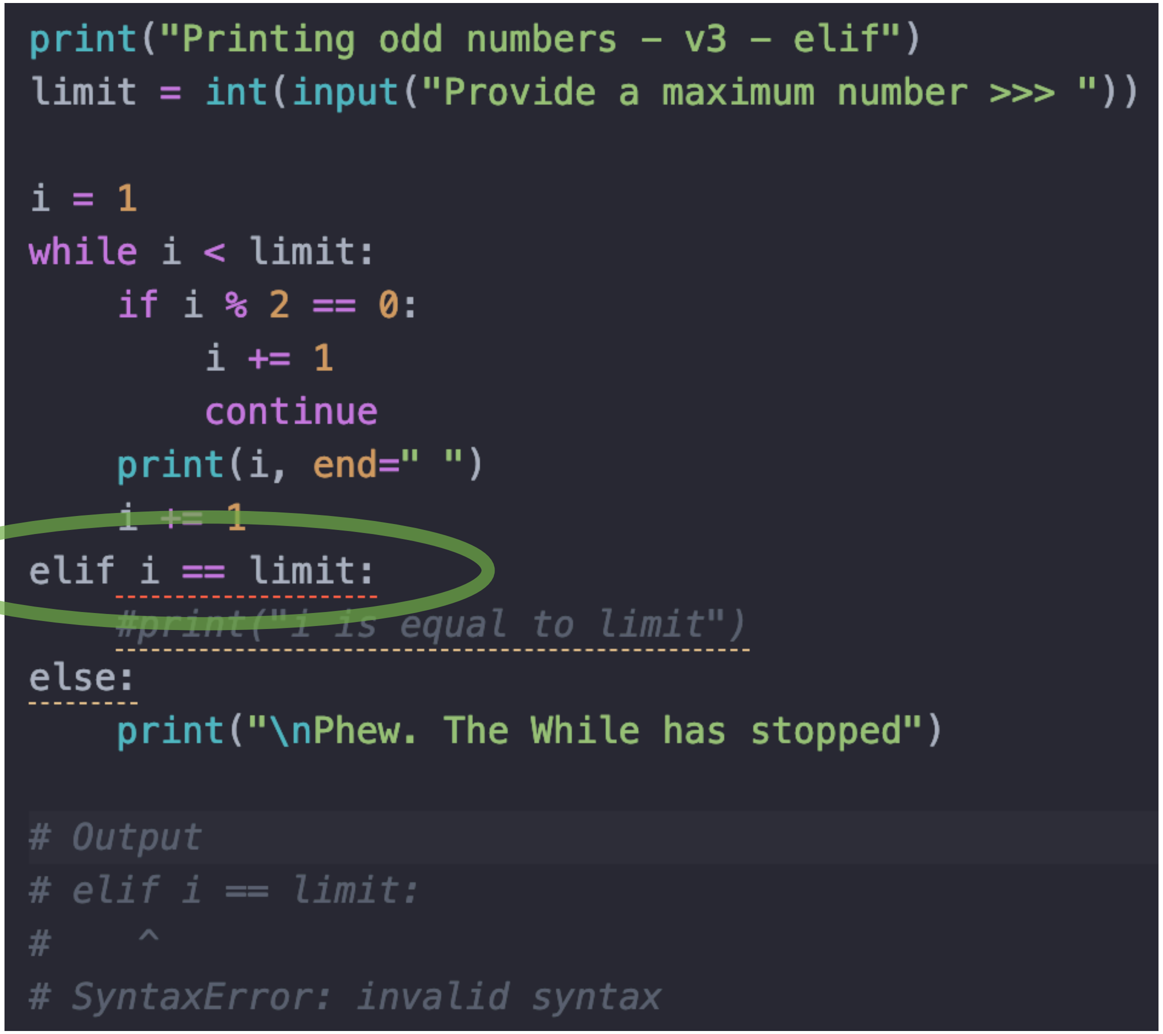
```
print("Printing odd numbers - v3 - elif")
limit = int(input("Provide a maximum number >>> "))

i = 1
while i < limit:
    if i % 2 == 0:
        i += 1
        continue
    print(i, end=" ")
    i += 1
elif i == limit:
    #print("i is equal to limit")
else:
    print("\nPhew. The While has stopped")

# Output
# elif i == limit:
#    ^
# SyntaxError: invalid syntax
```

While

If we can use else, can we use elif ☹



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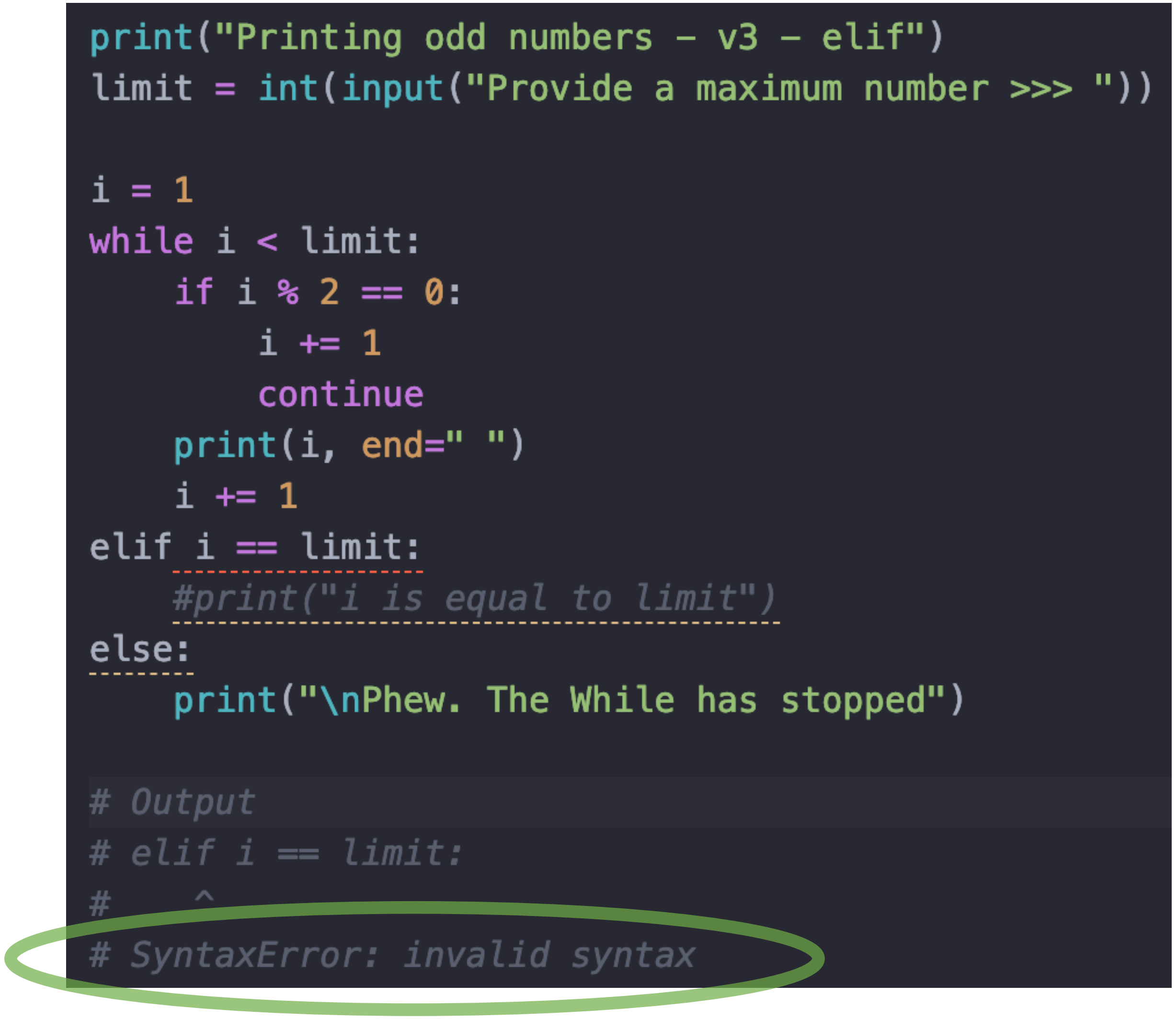

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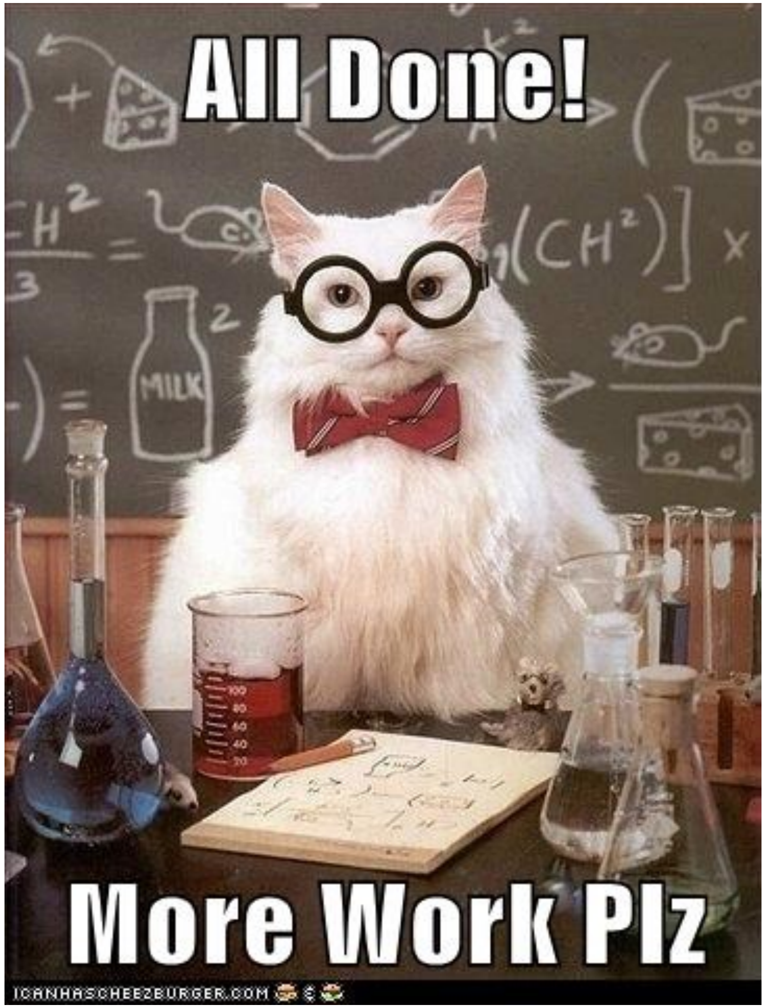
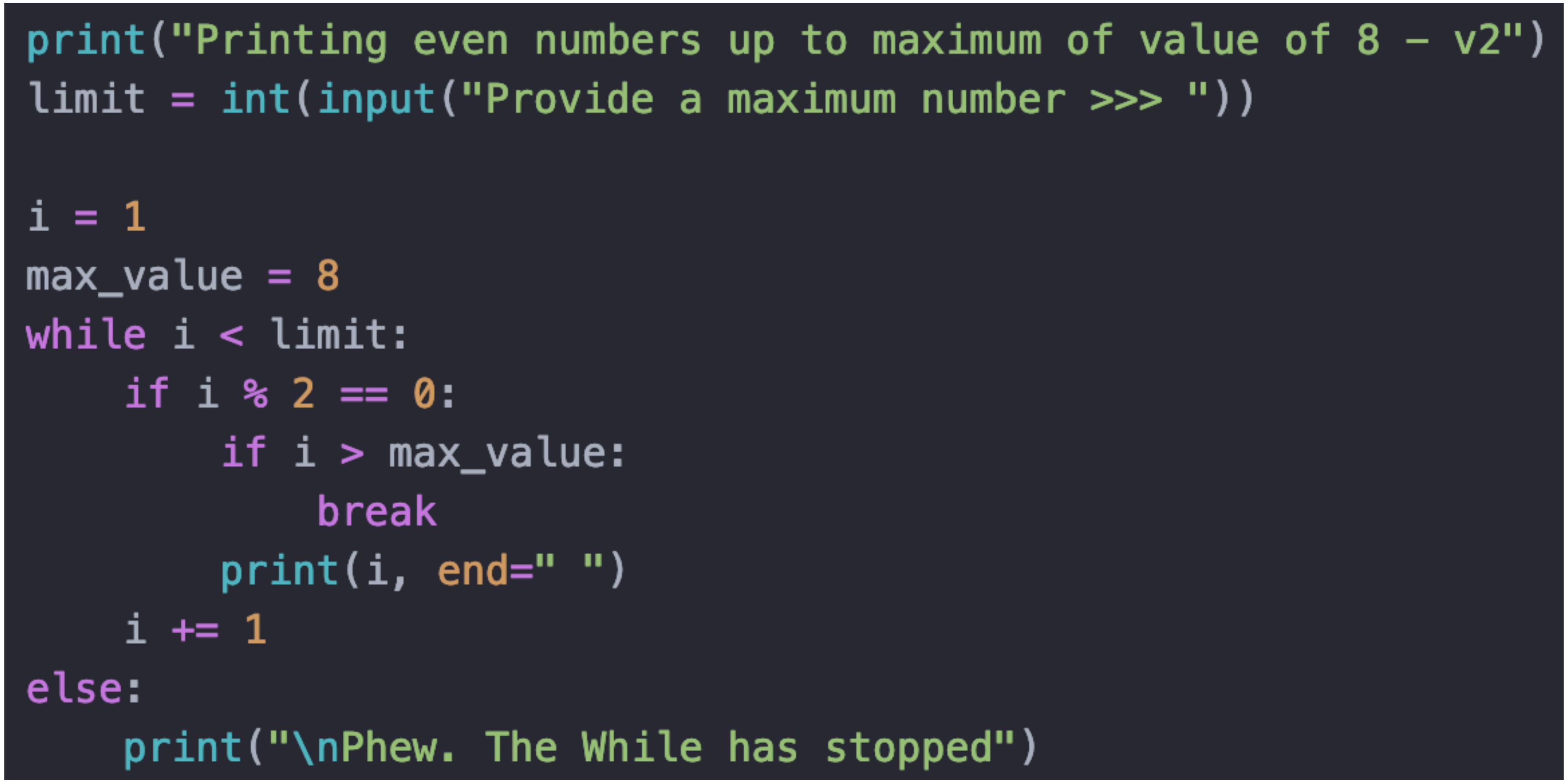
Canvas Student App

Let’s Sign into this lecture now



While

Does break influence else?



```
print("Printing even numbers up to maximum of value of 8 – v2")
limit = int(input("Provide a maximum number >>> "))

i = 1
max_value = 8
while i < limit:
    if i % 2 == 0:
        if i > max_value:
            break
        print(i, end=" ")
    i += 1
else:
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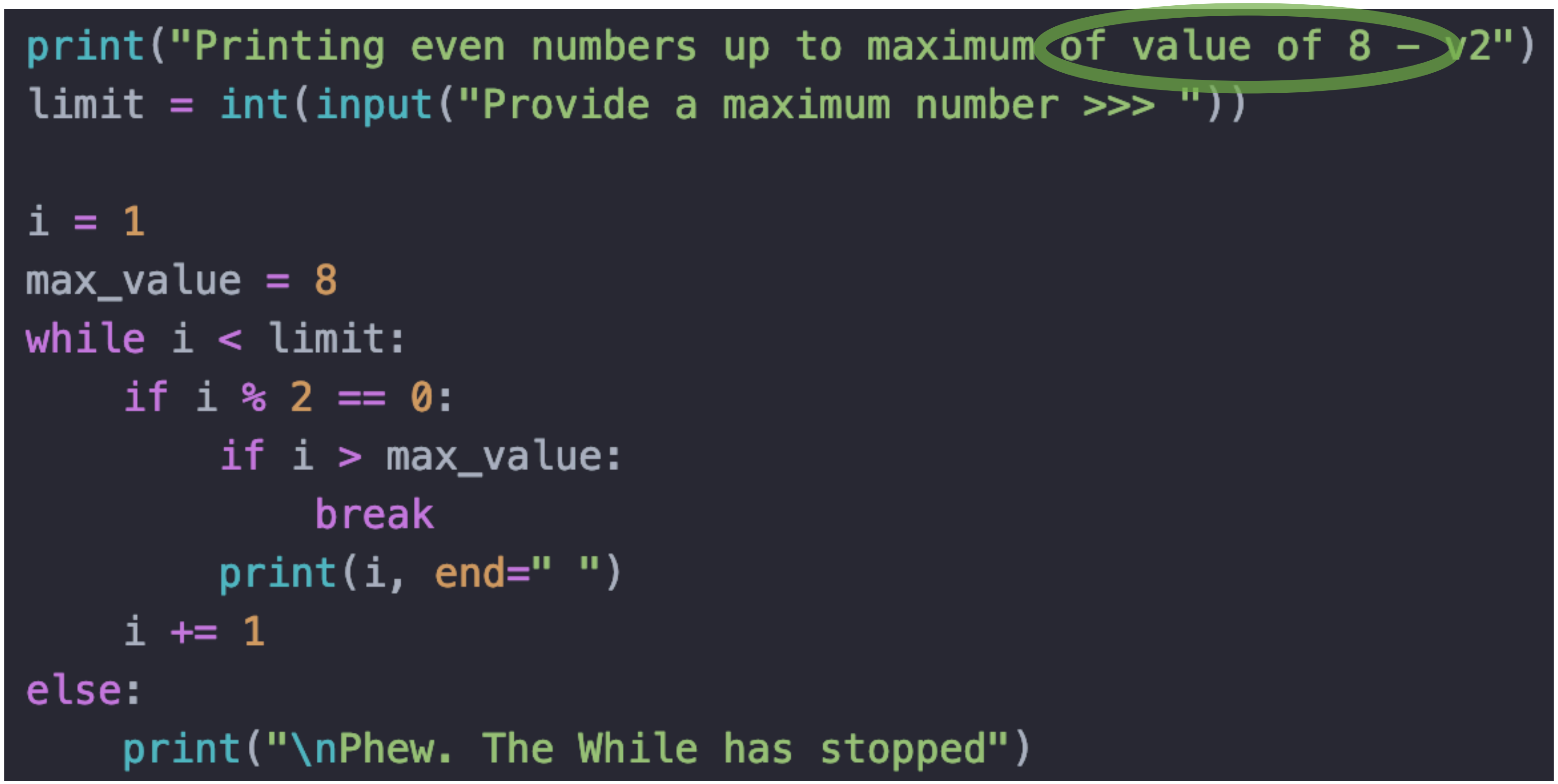

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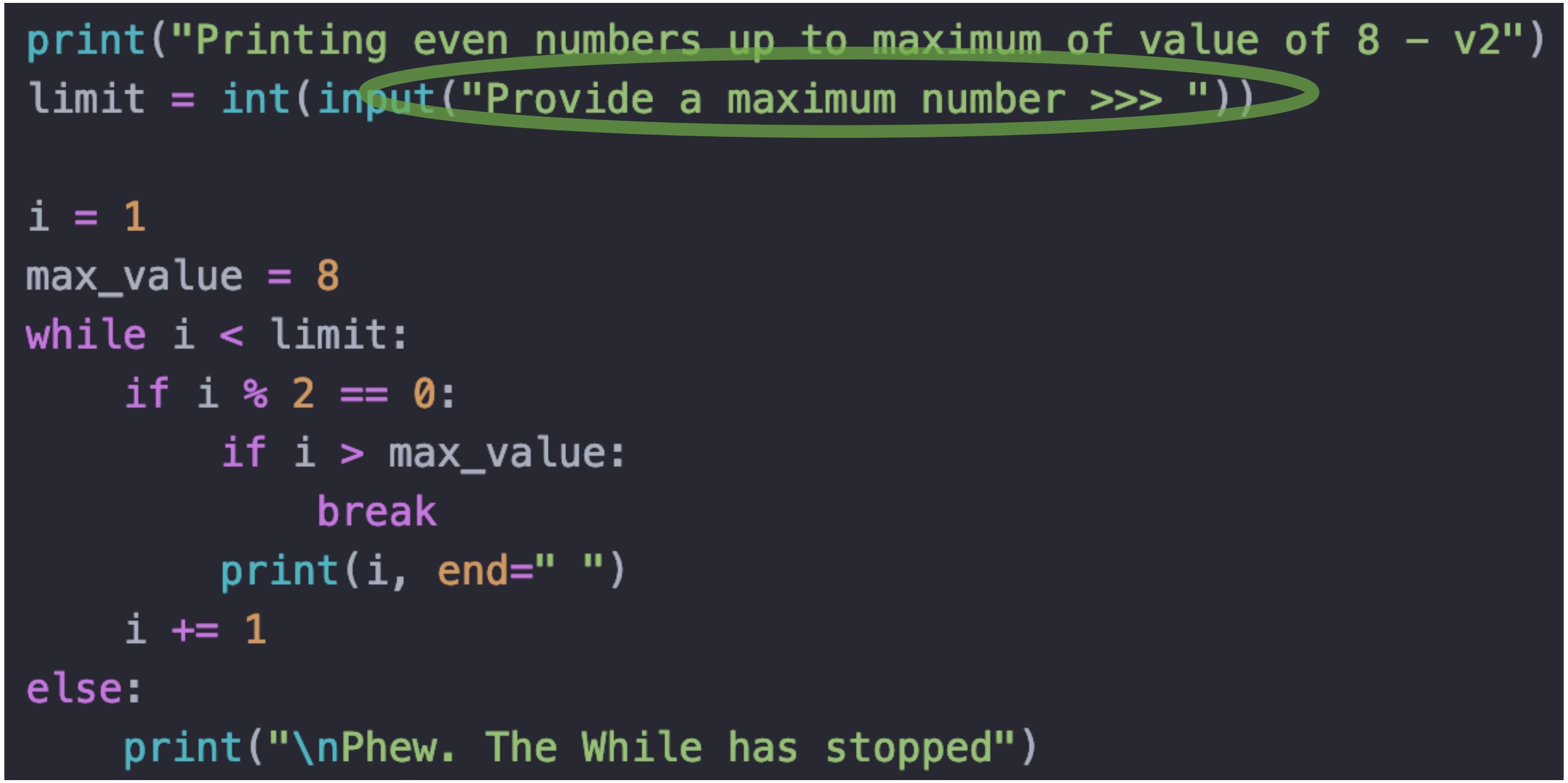

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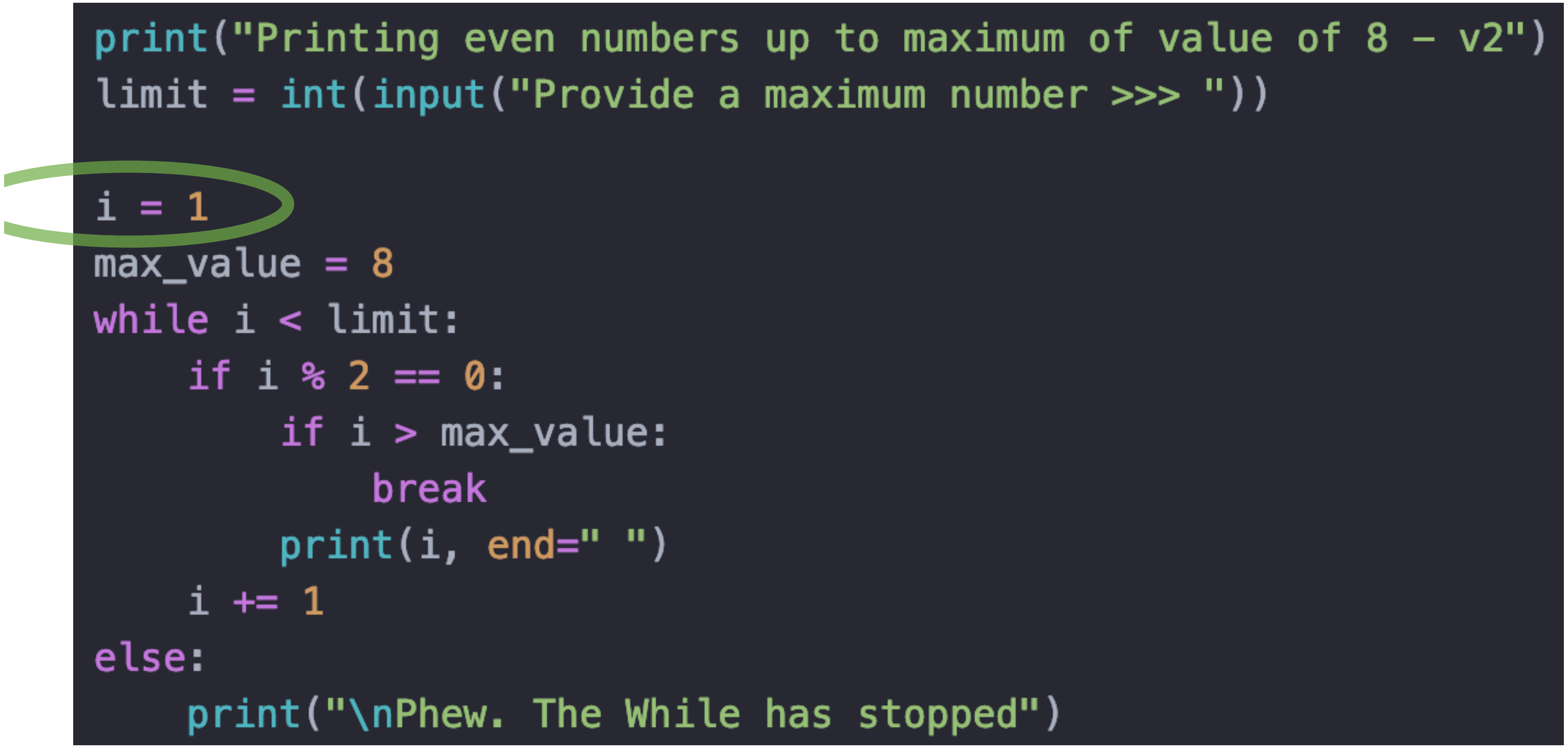

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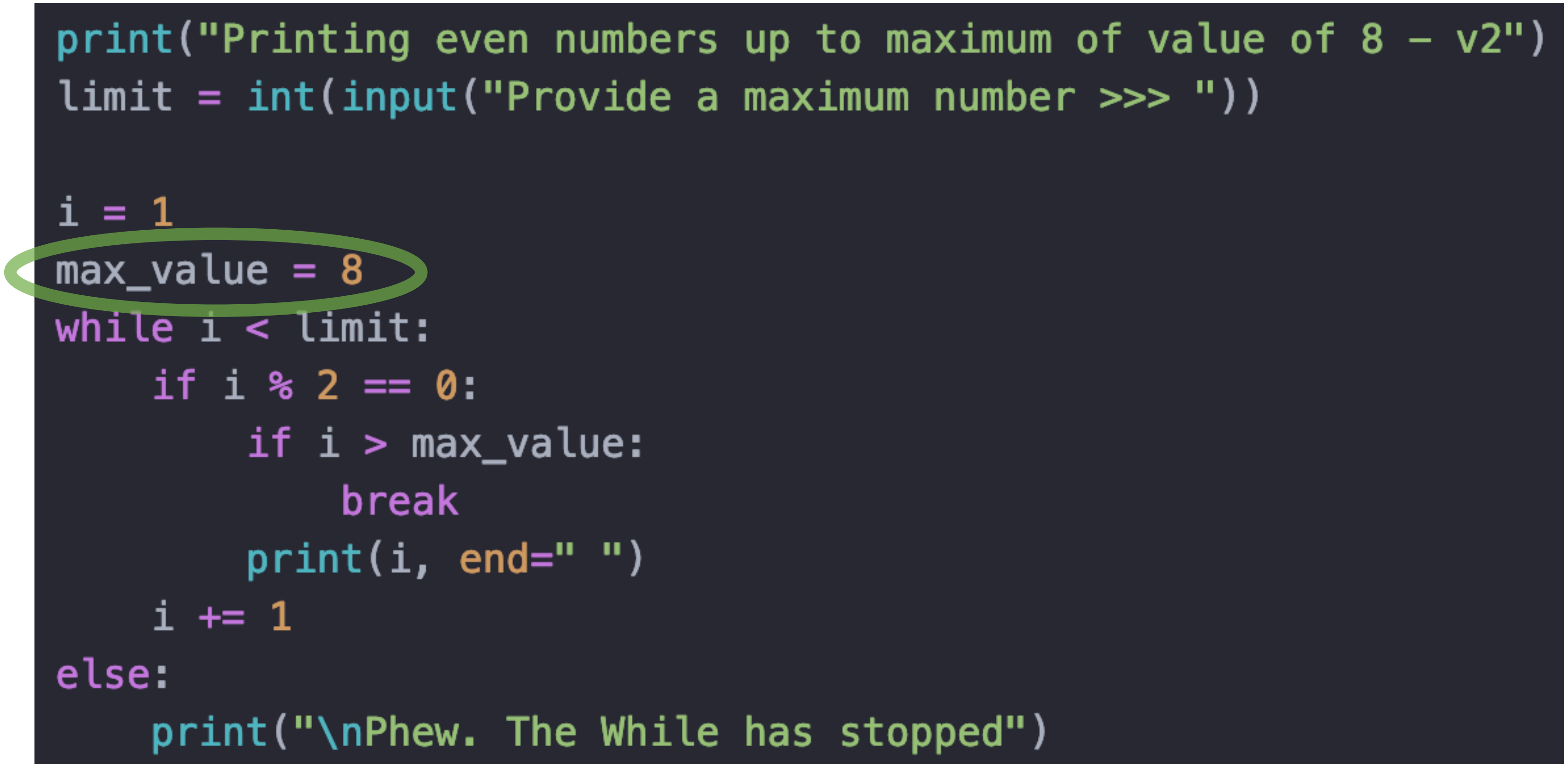

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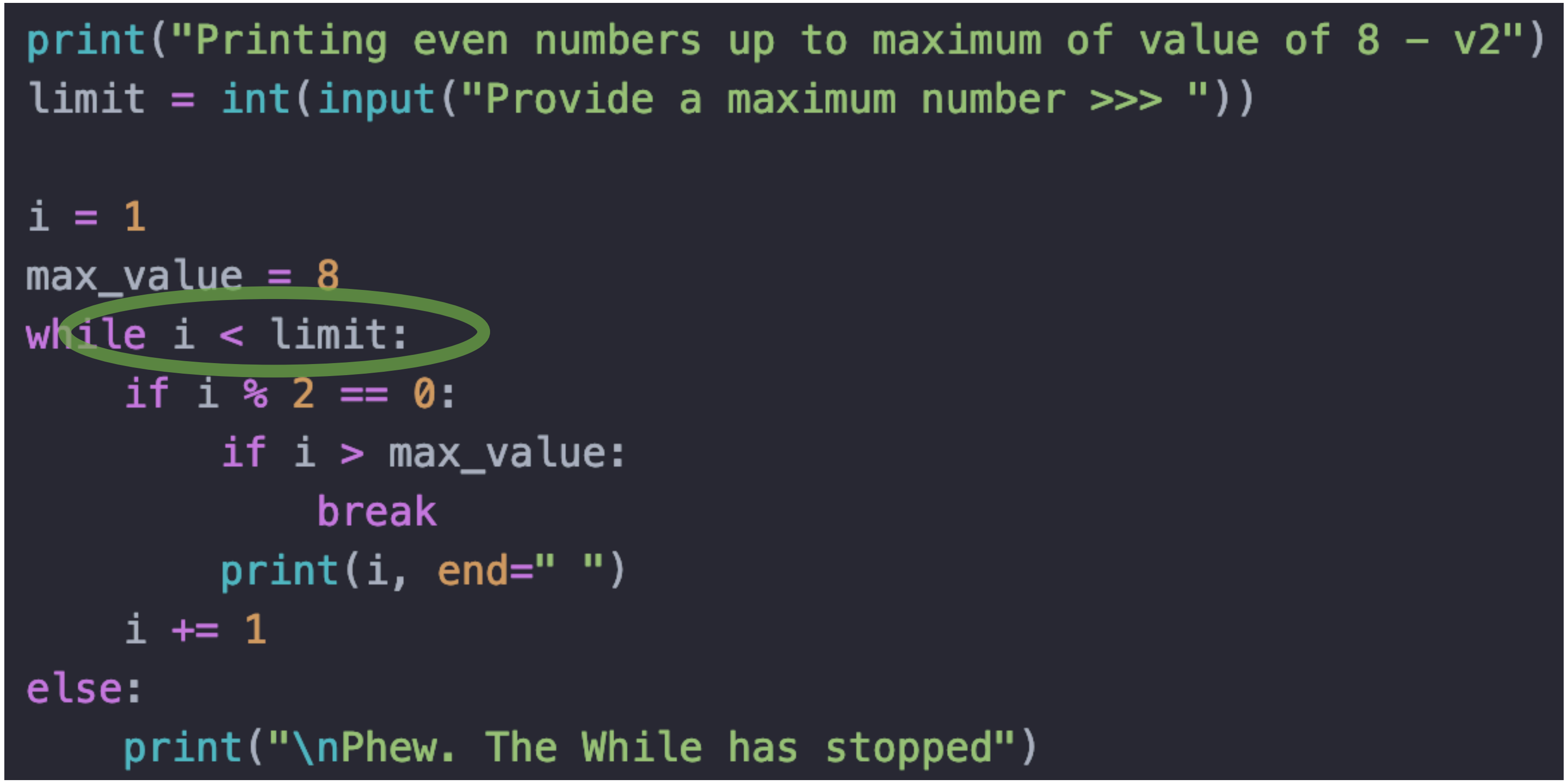

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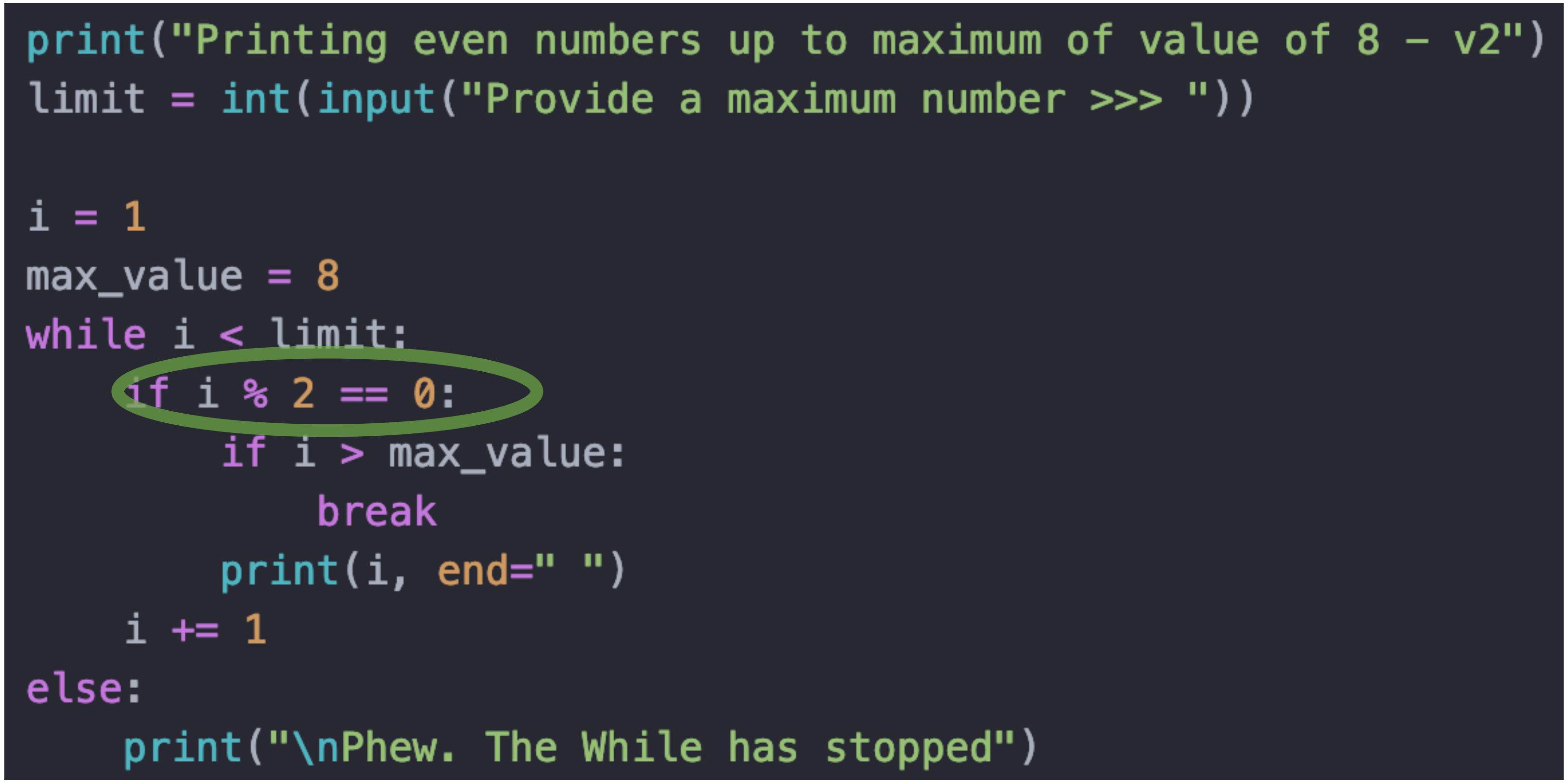

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            break
        print(i, end=" ")
    i += 1
else:
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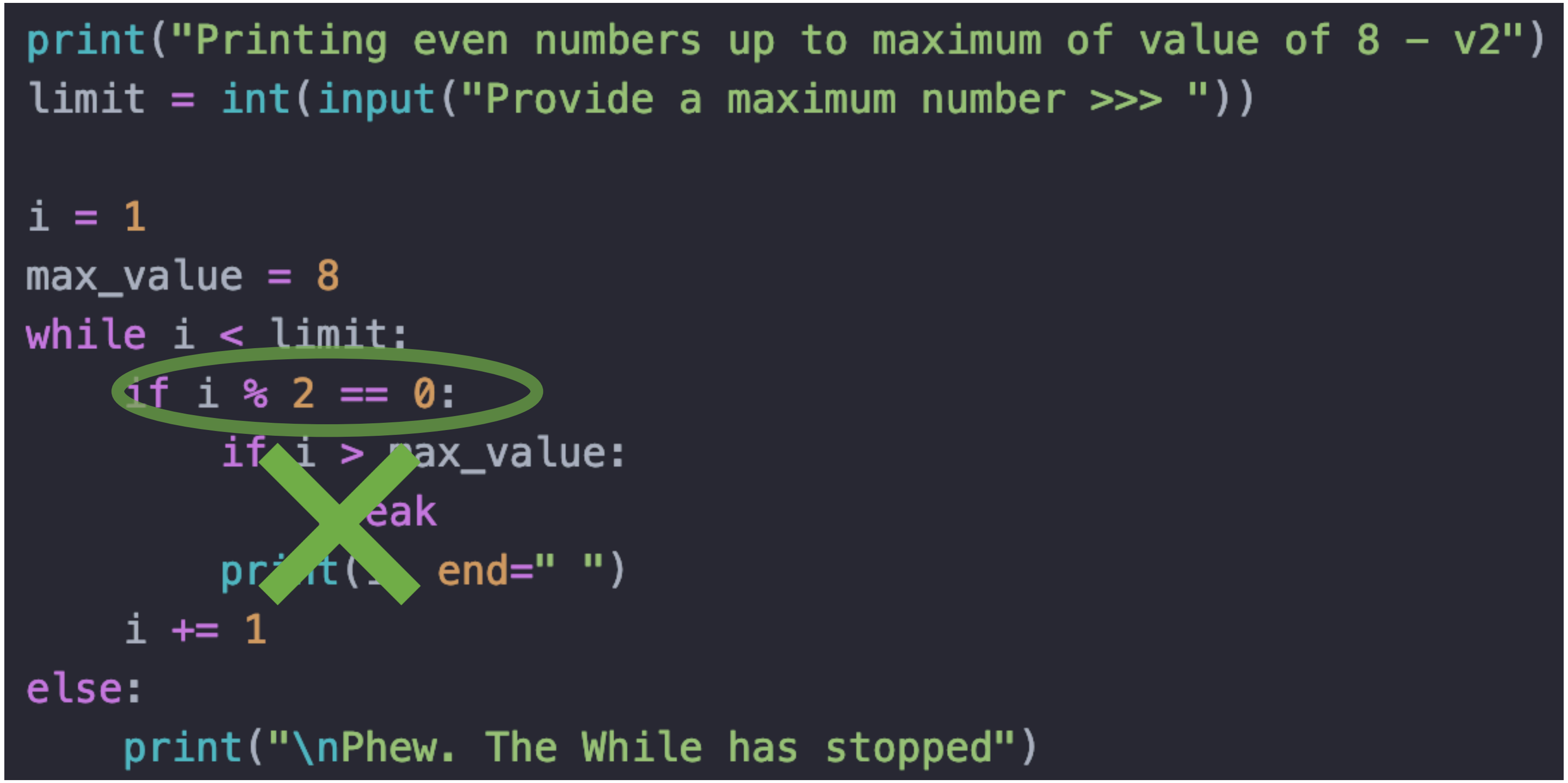
```

While

Does break influence else?



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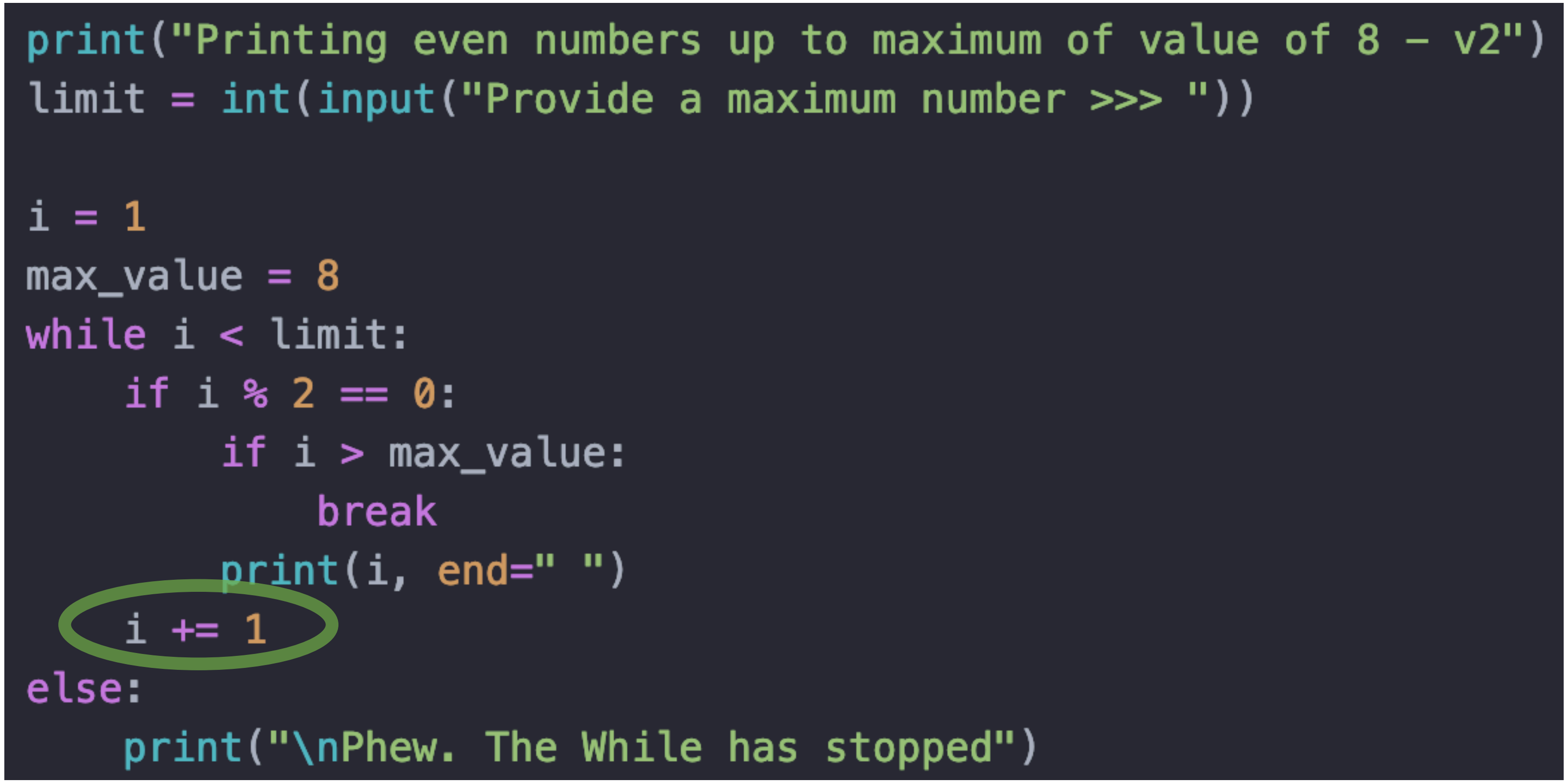

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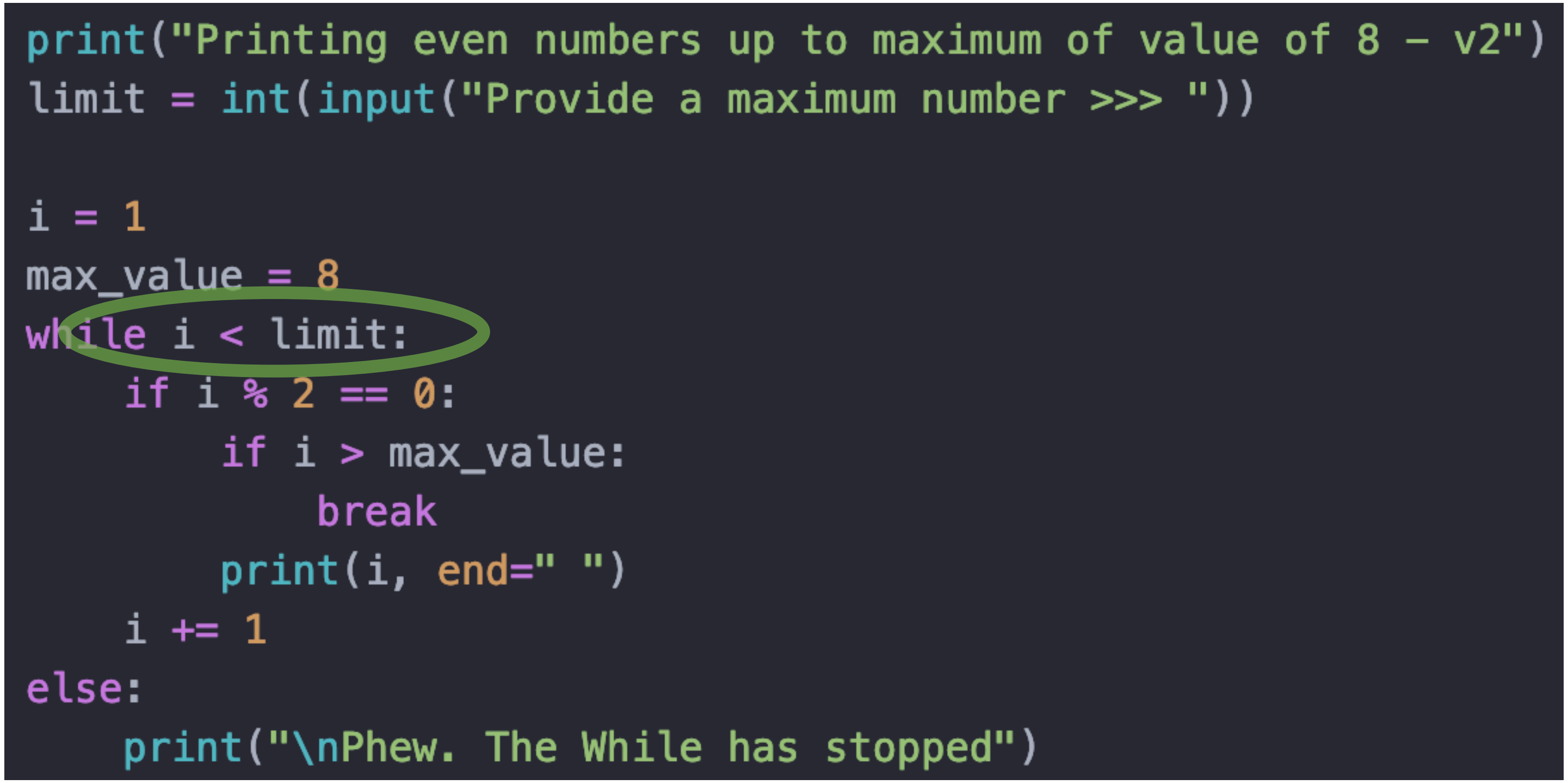

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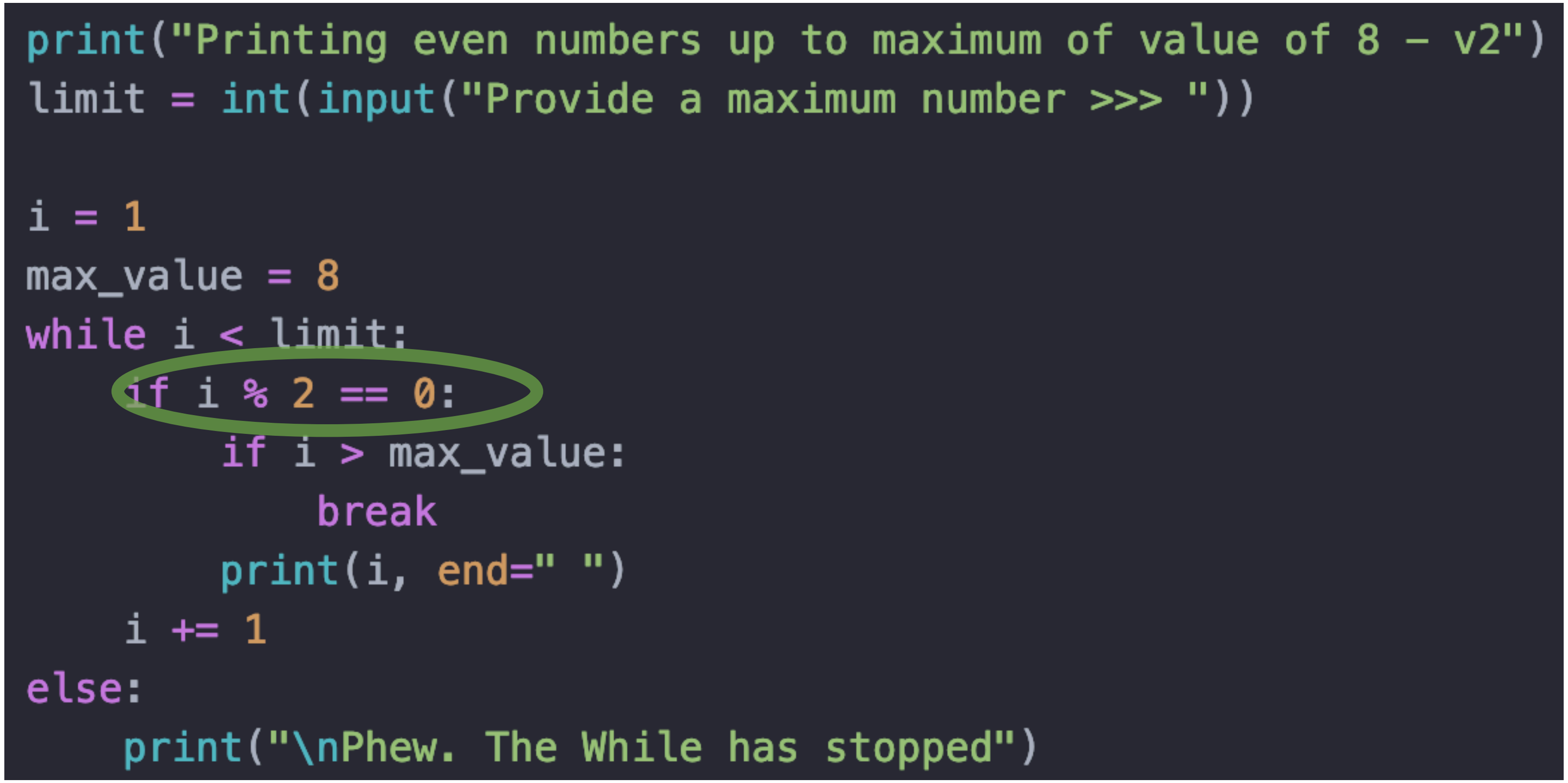

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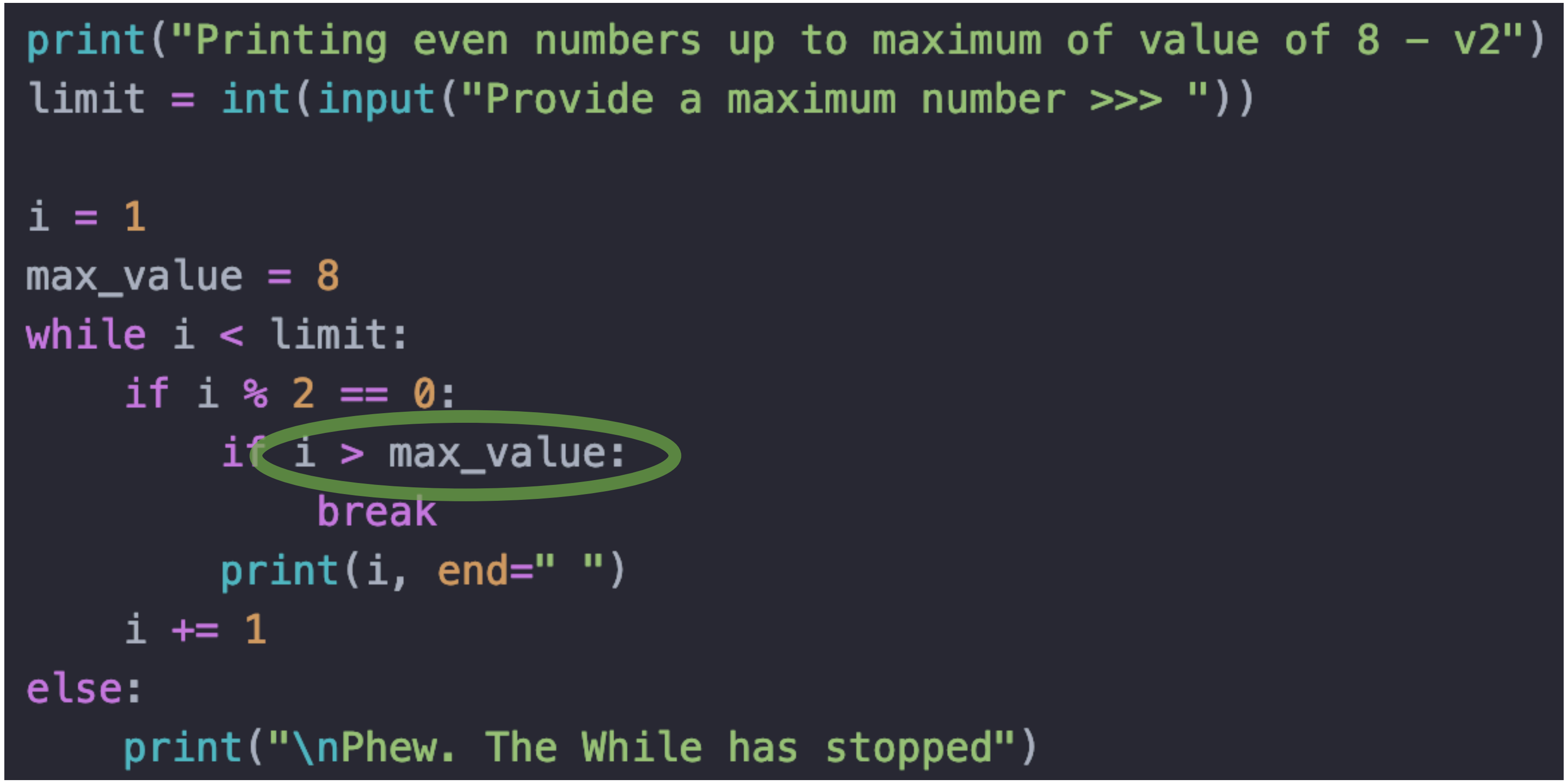

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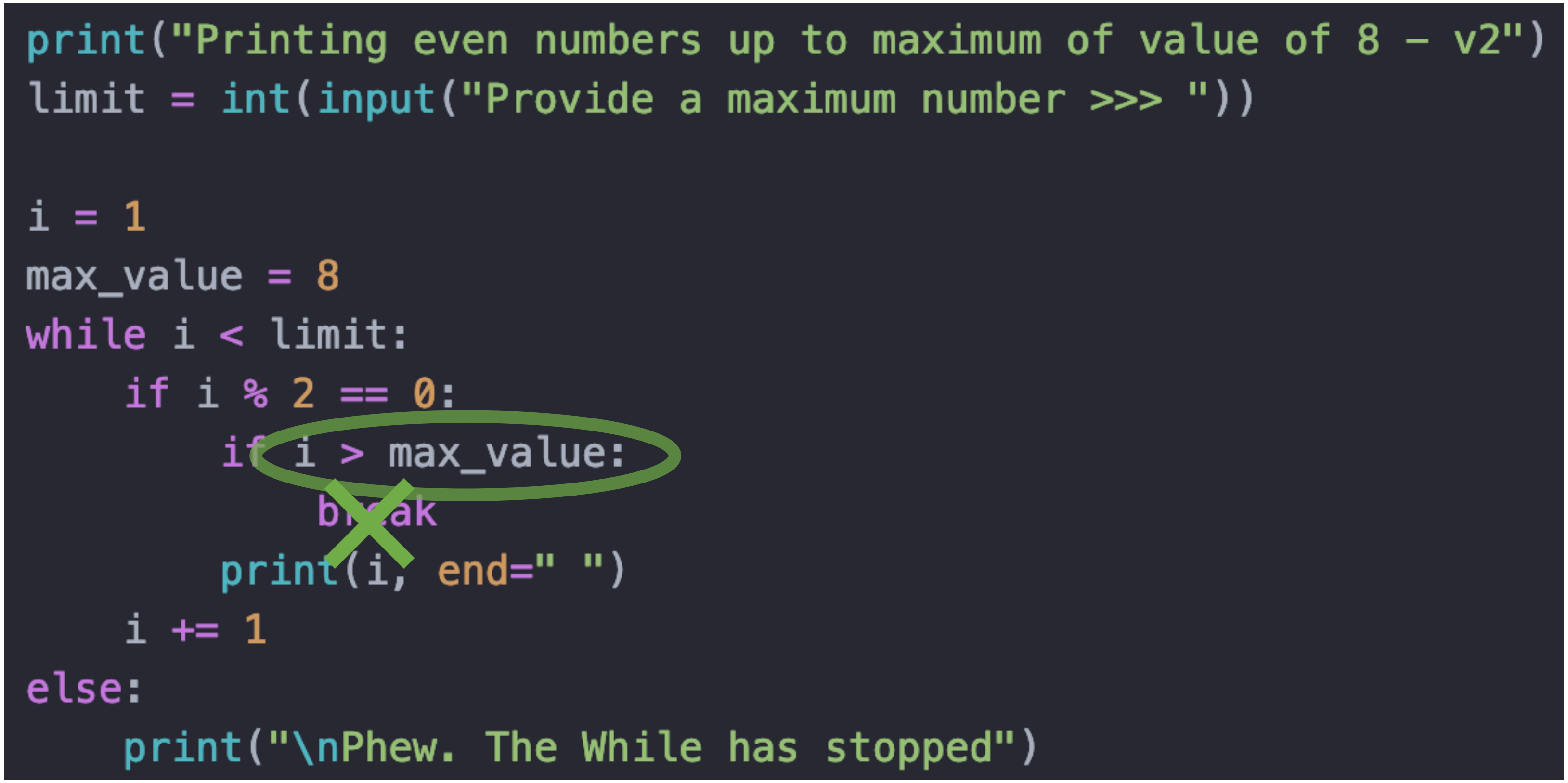

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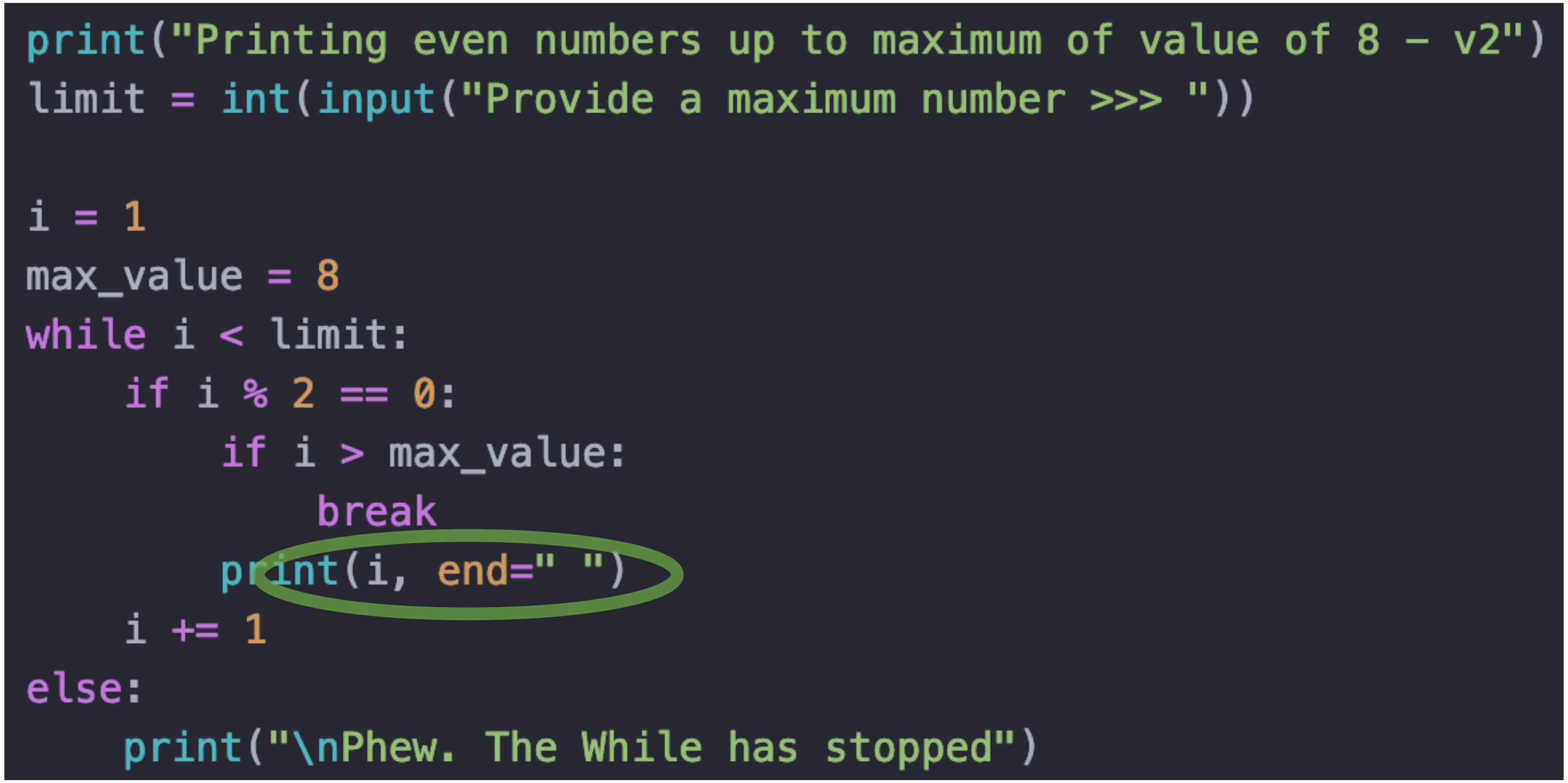

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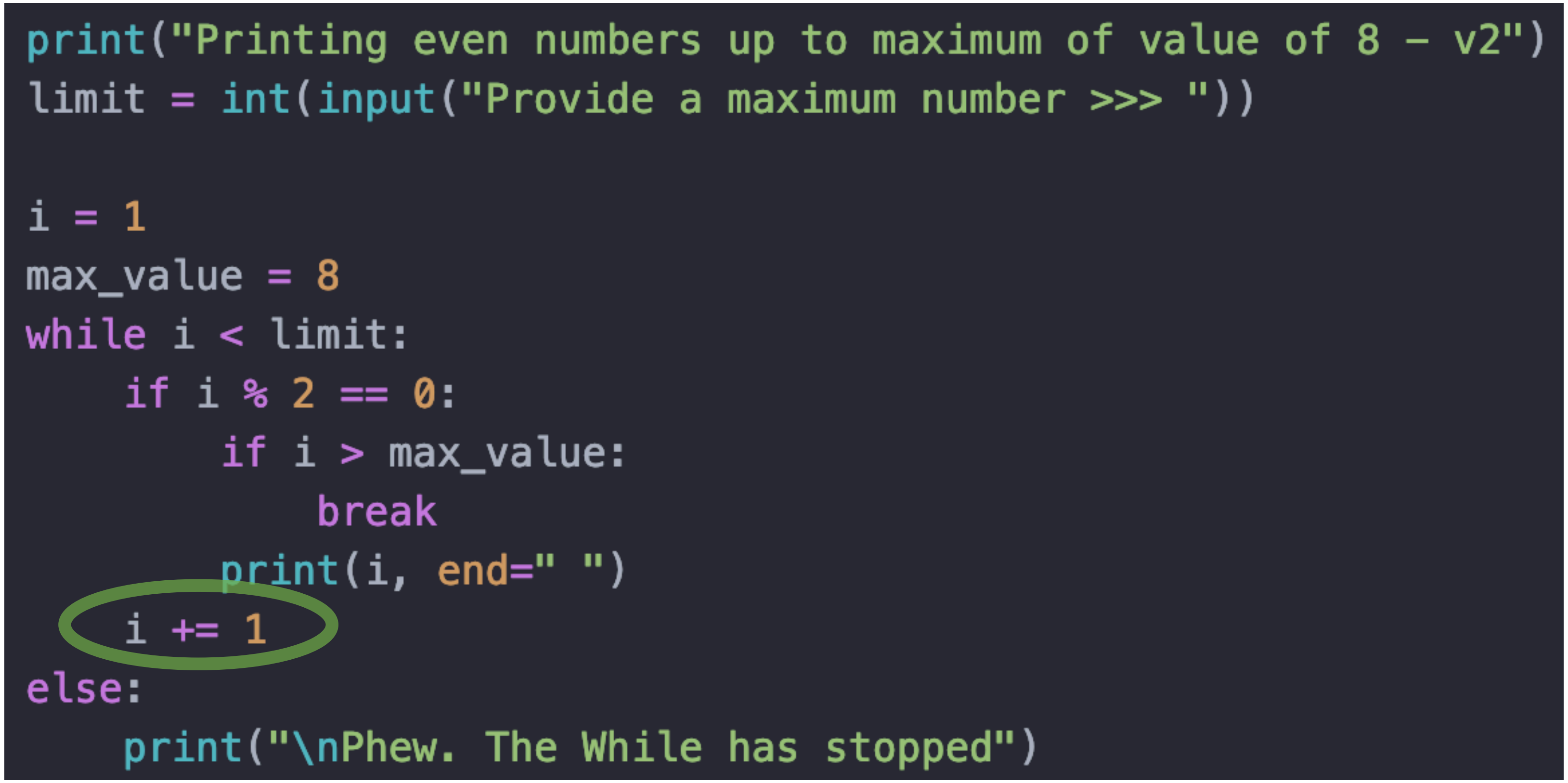

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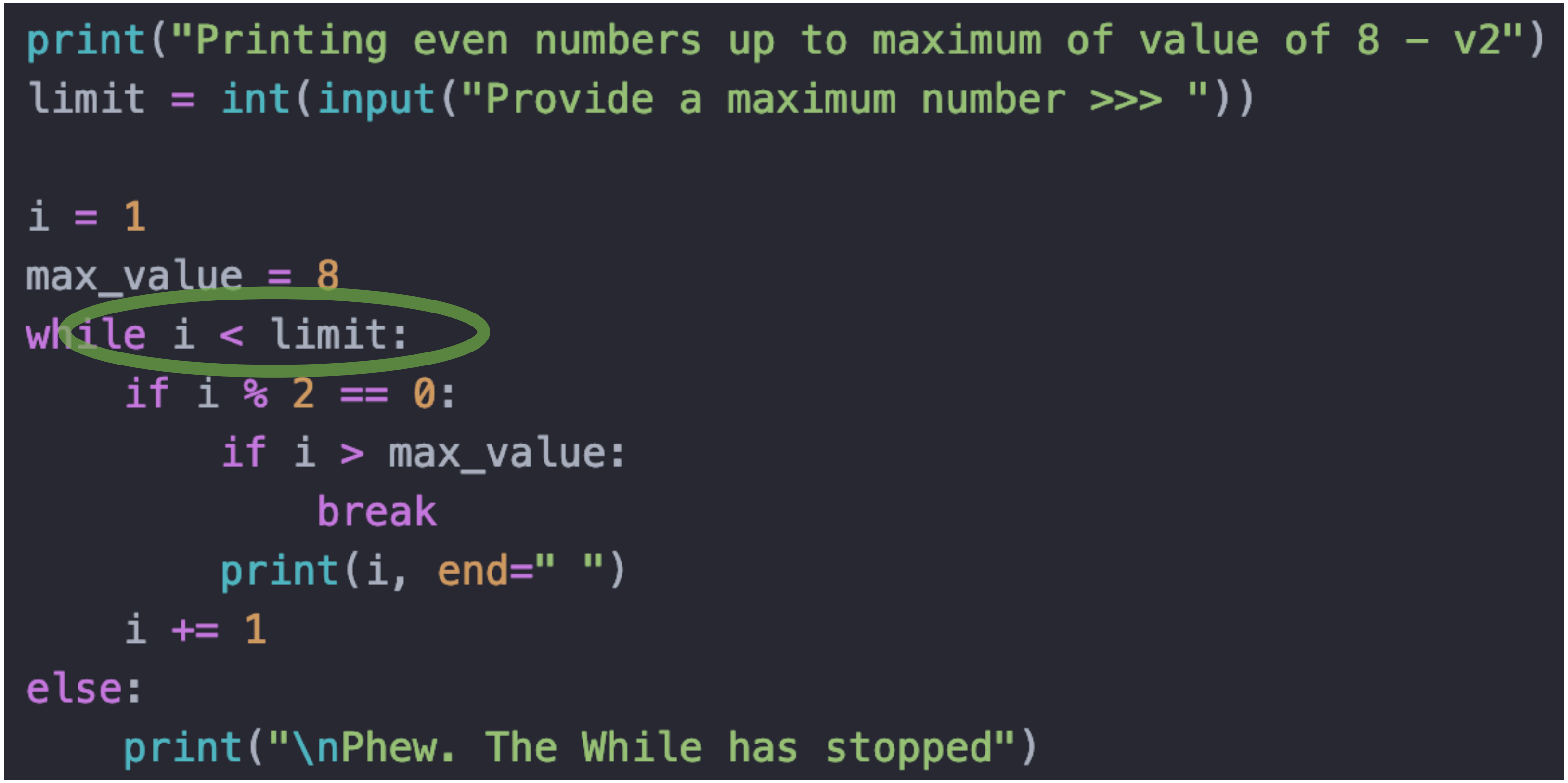

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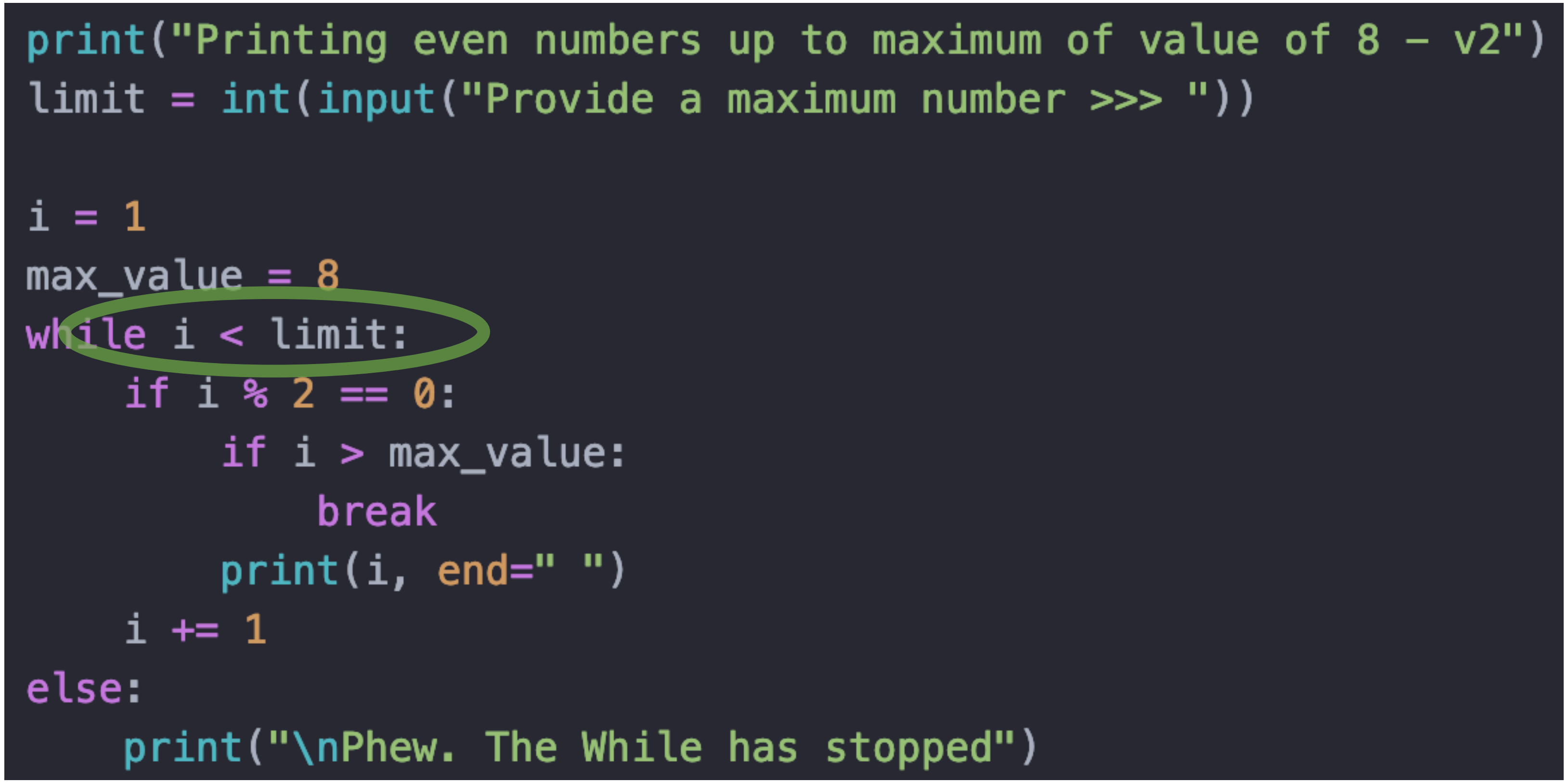

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    i += 1
else:
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```

‘i’ is now 10

While

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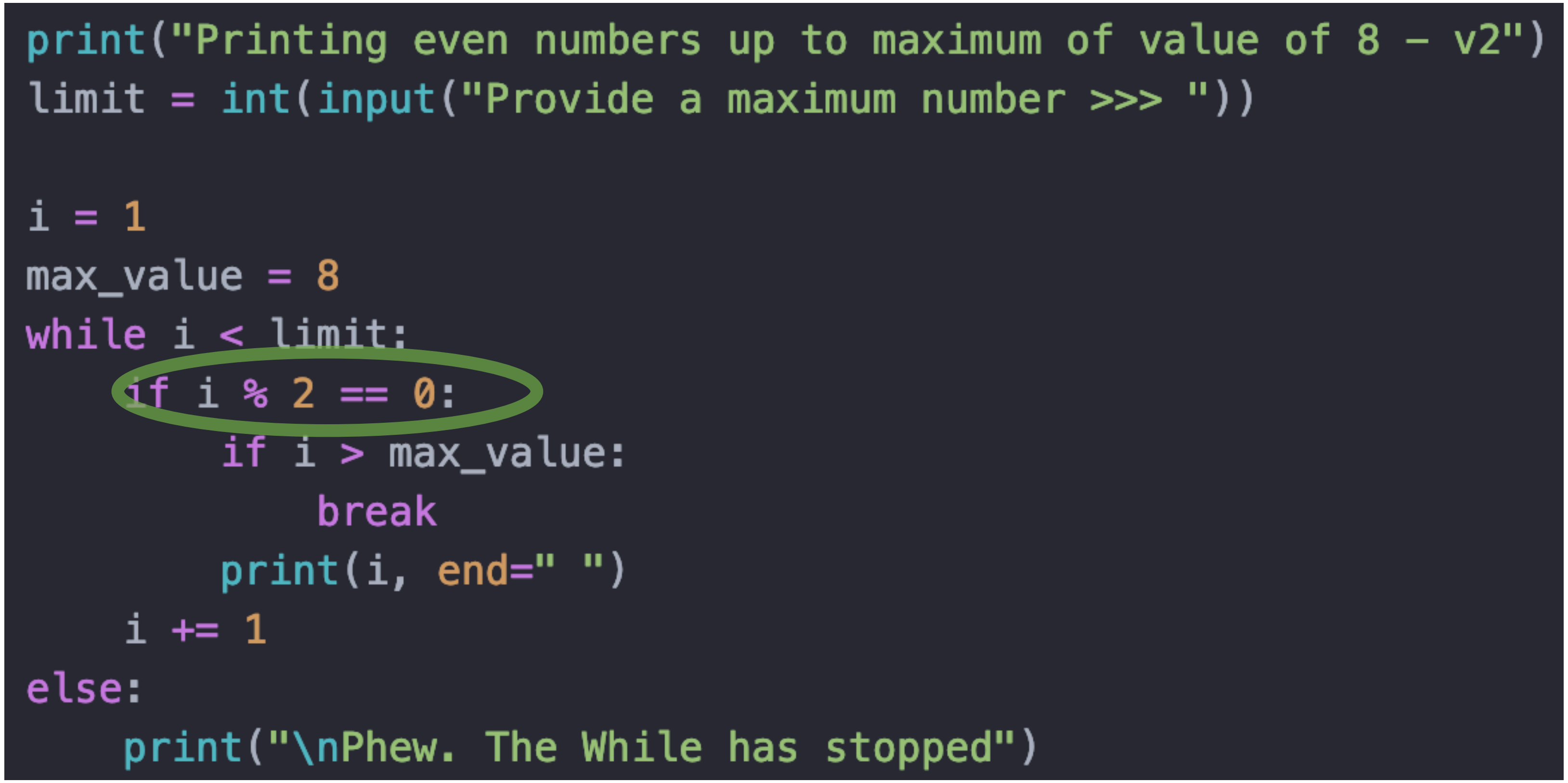

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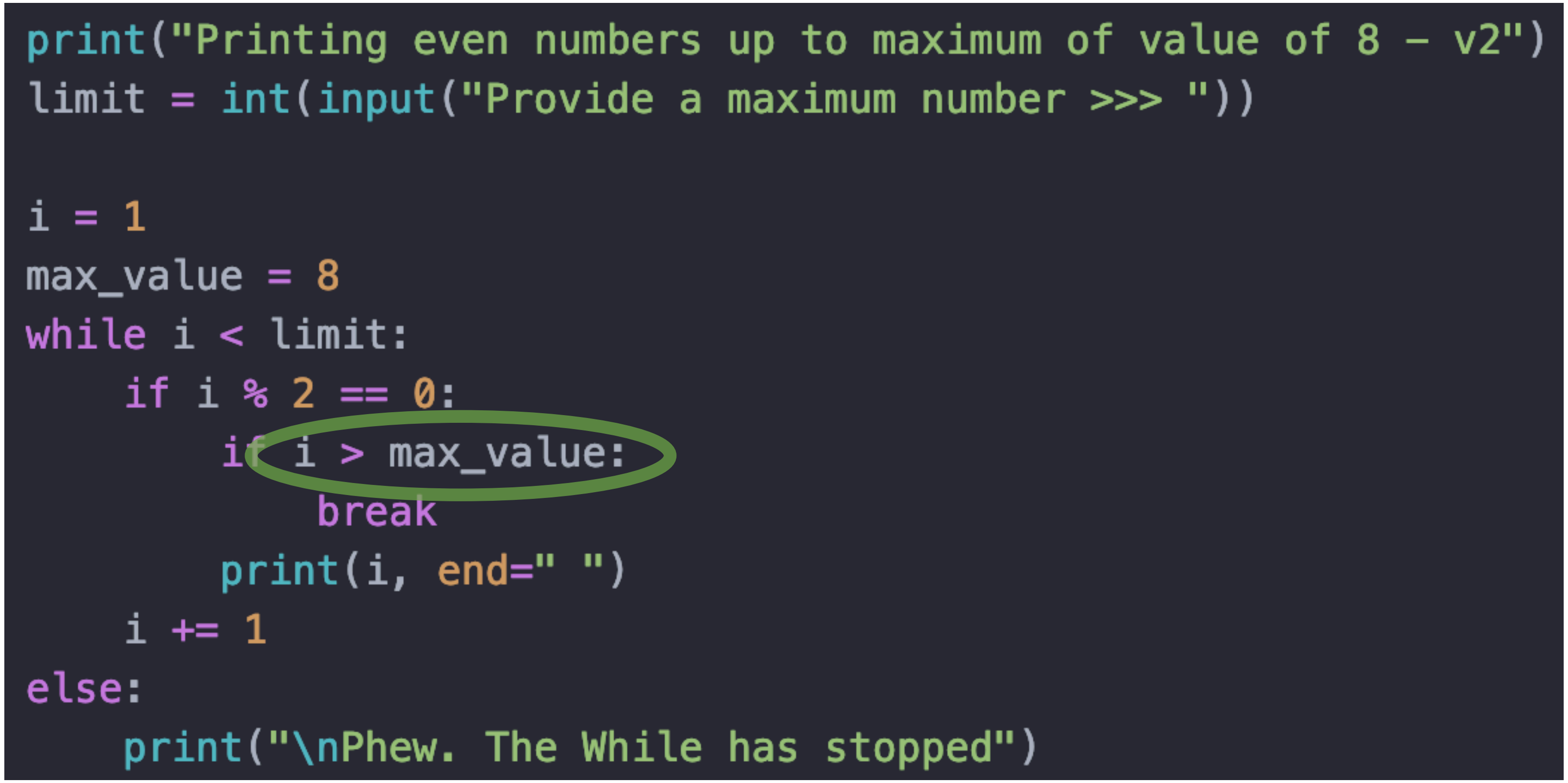

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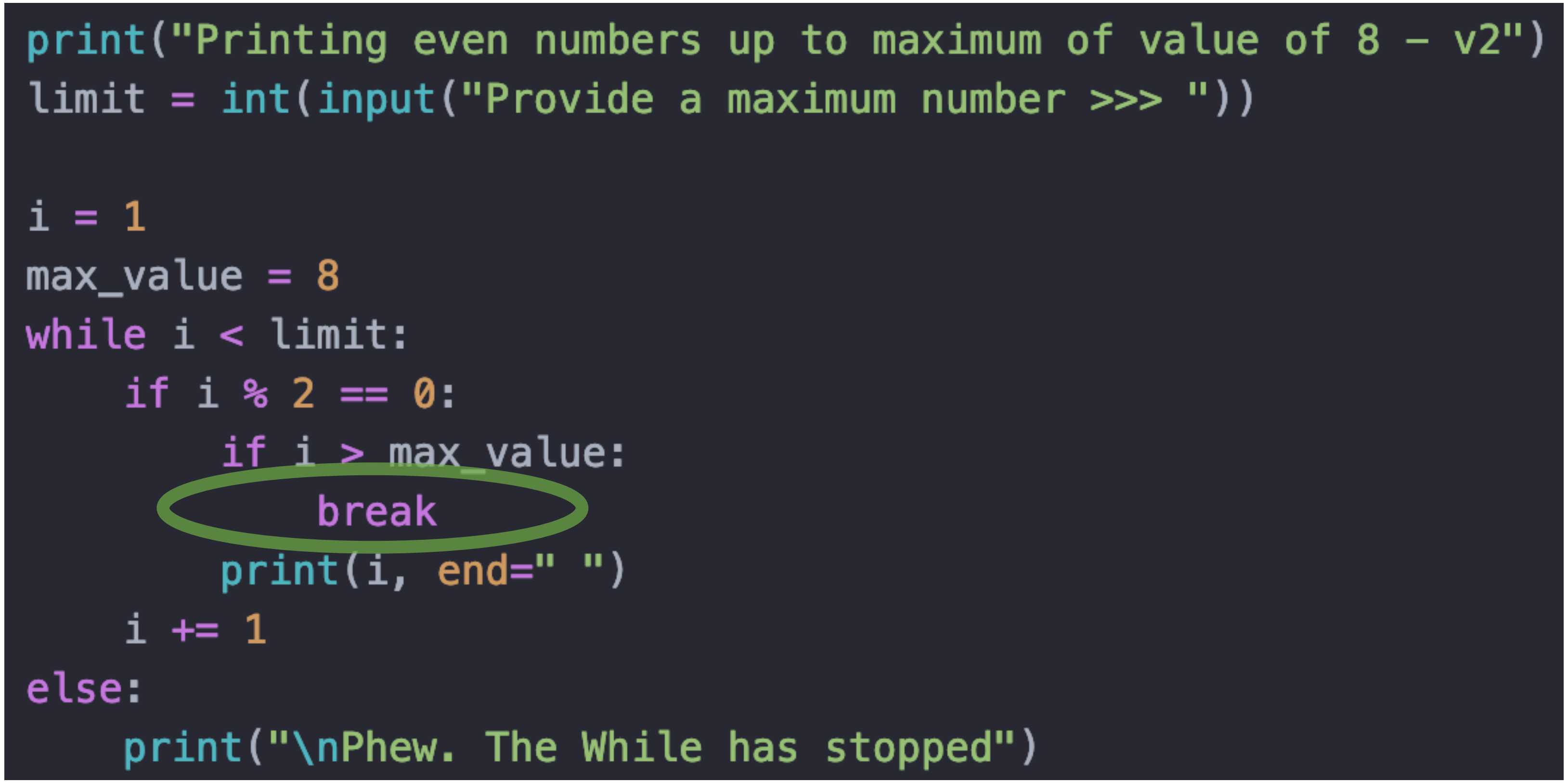

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else:
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```

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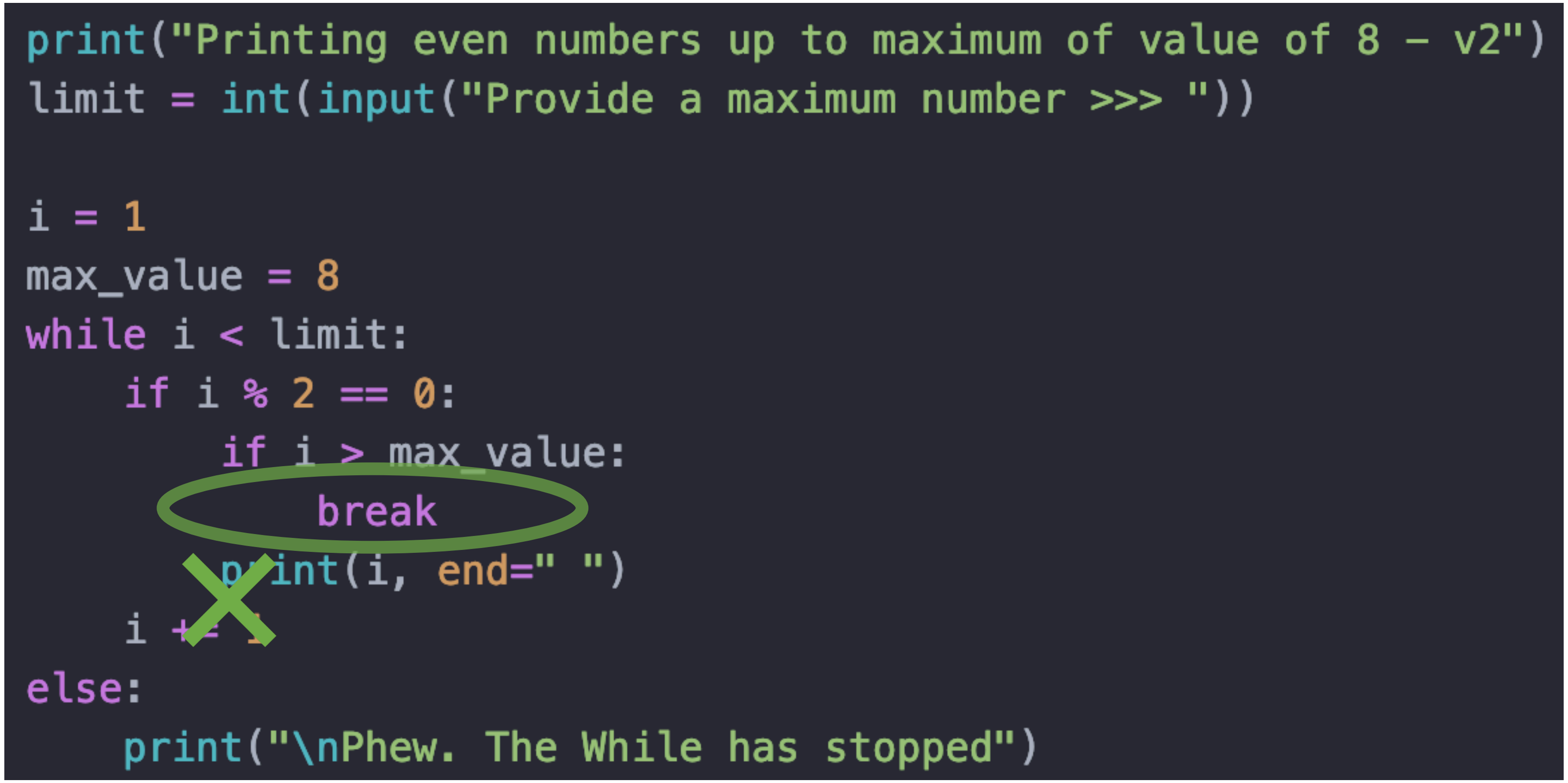

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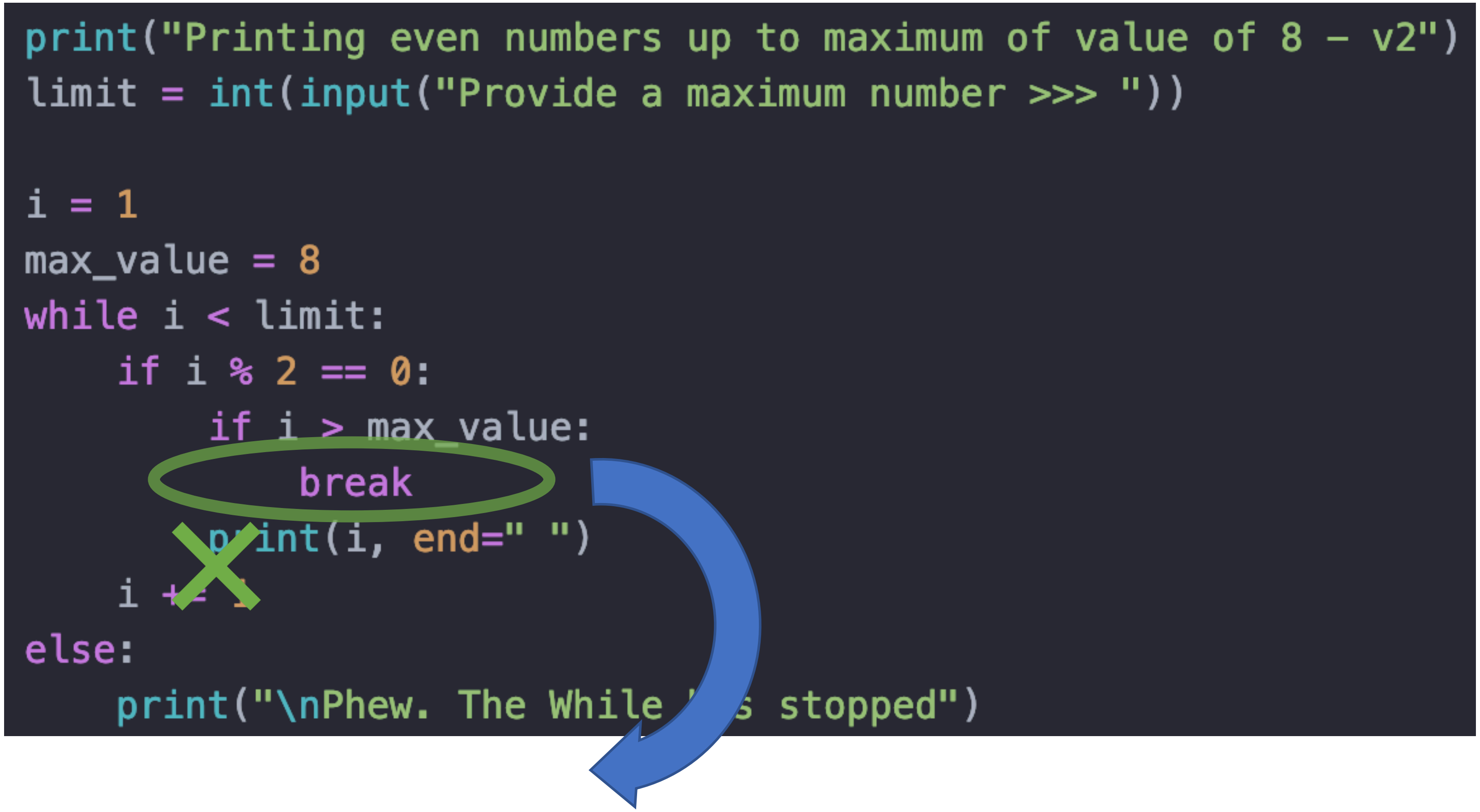

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While

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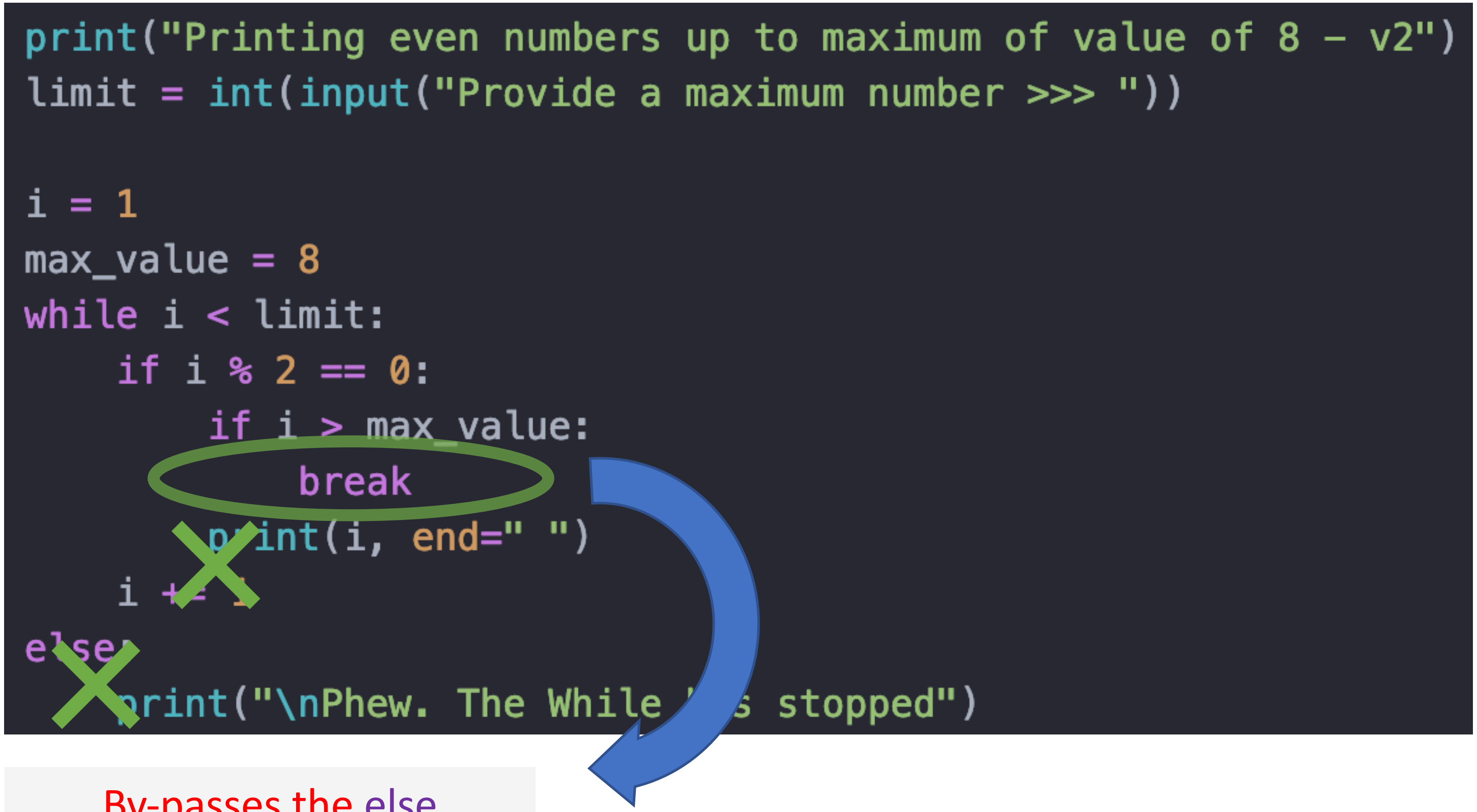

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max_value = 8
while i < limit:
    if i % 2 == 0:
        if i > max_value:
            break
        print(i, end=" ")
    i += 1
else:
    print("\nPhew. The While loop is stopped")
```
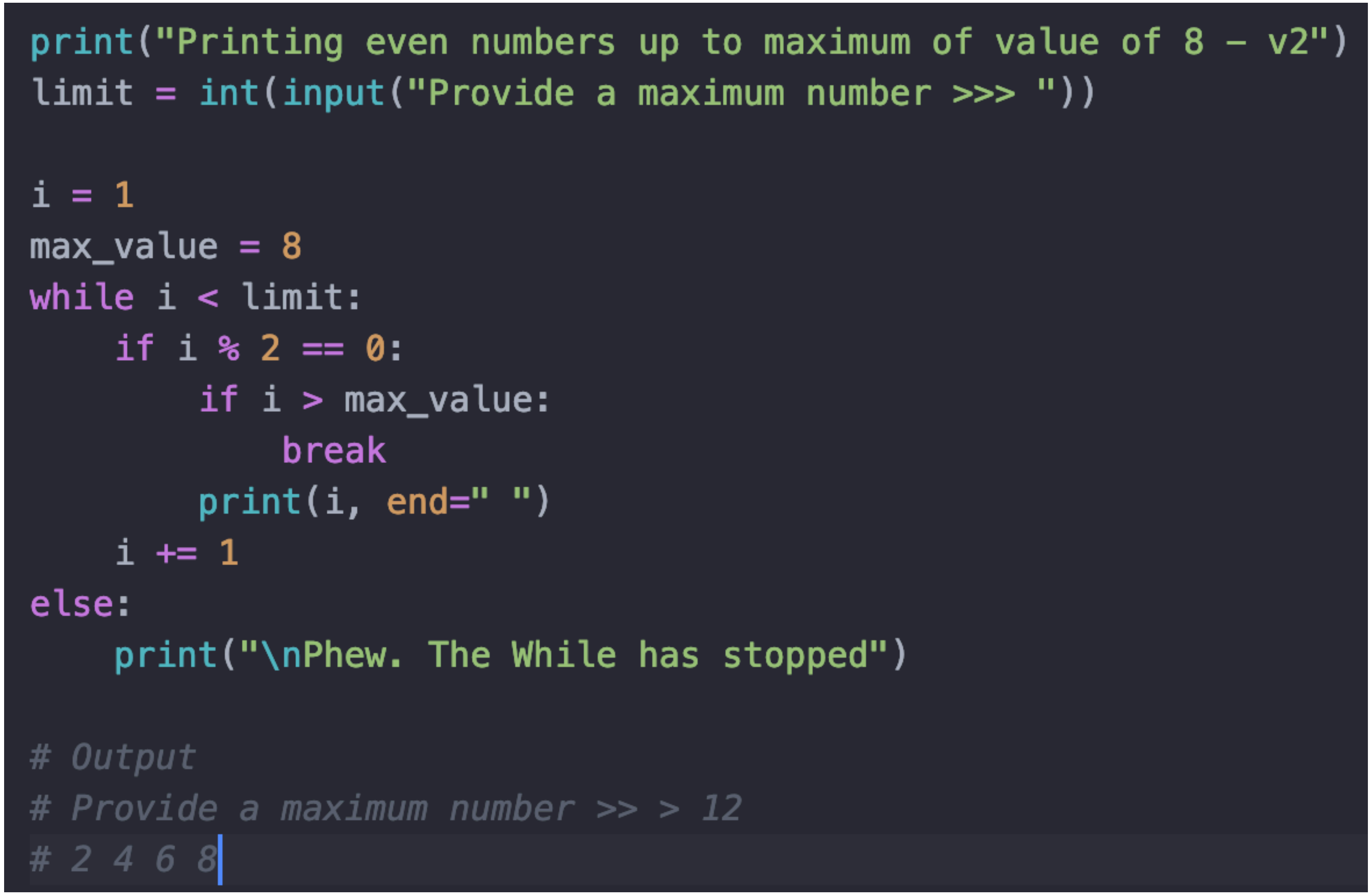

By-passes the else

While

Does break influence else?



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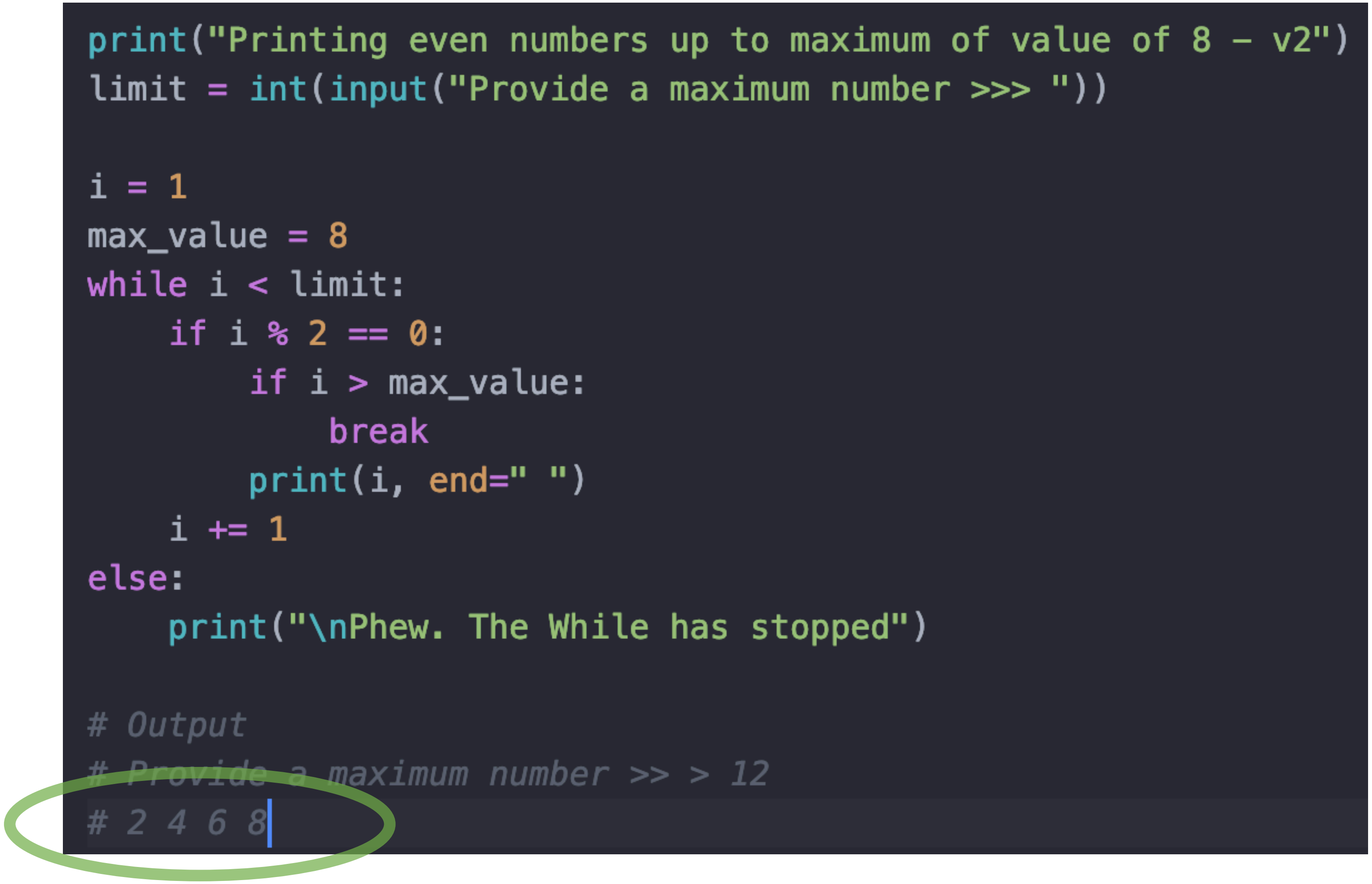
        print(i, end=" ")
    i += 1
else:
    print("\nPhew. The While has stopped")

# Output
# Provide a maximum number >> > 12
# 2 4 6 8
```

While

Does break influence else?



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While

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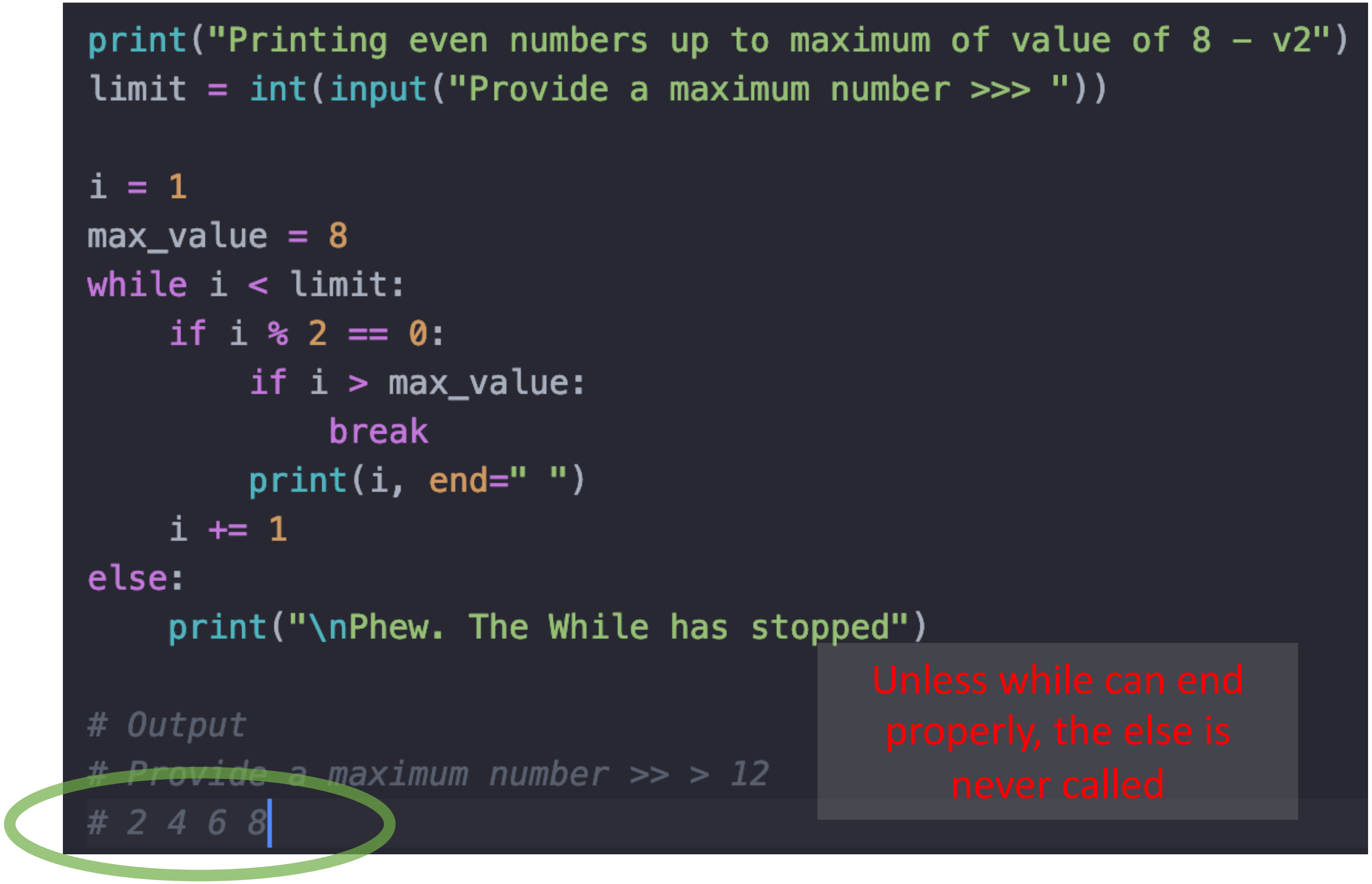

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else:
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# Output
# Provide a maximum number >> > 12
# 2 4 6 8
```

Unless while can end properly, the else is never called

While Recap

We saw how to use break, continue and else

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To influence the flow of the loops

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While Recap

We saw how to use break, continue and else

To influence the flow of the loops

break – terminates the loop

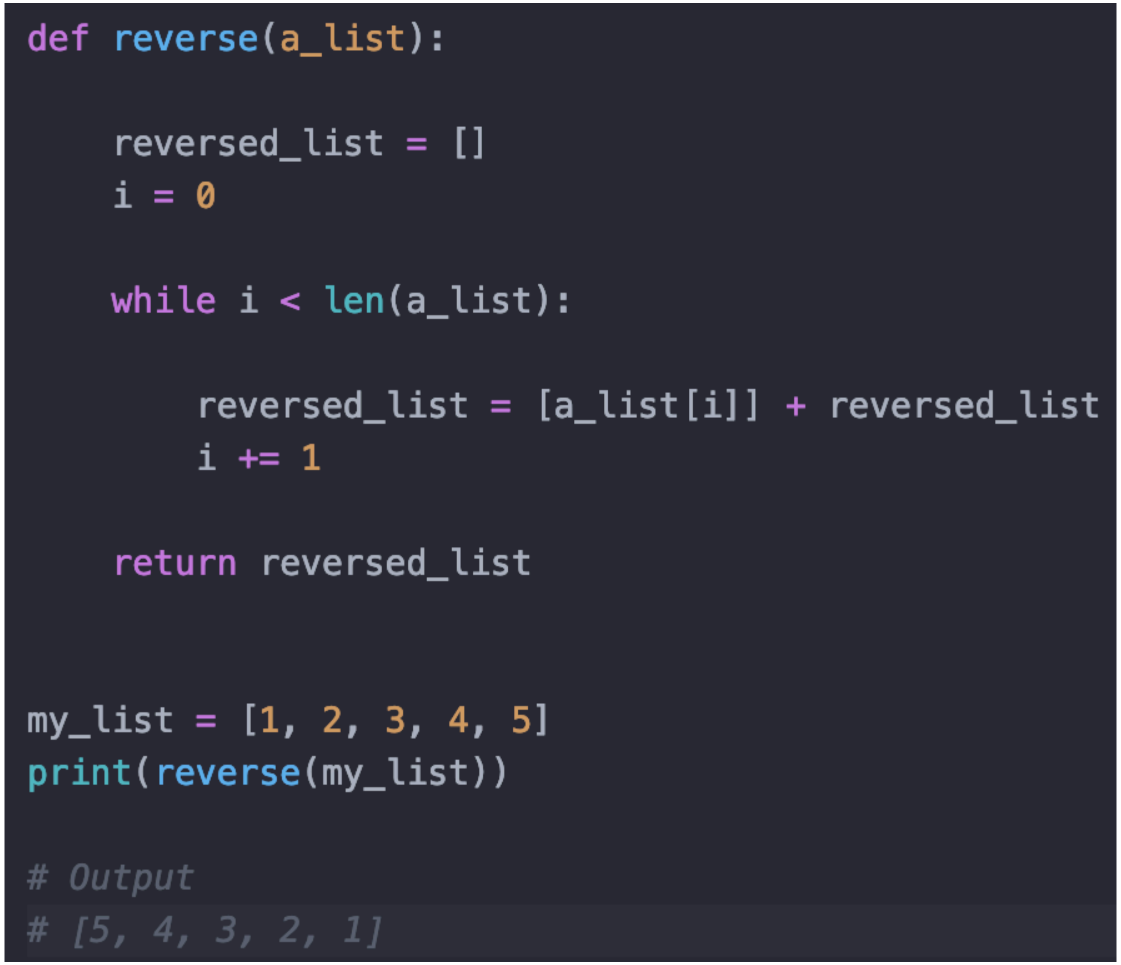
continue – ignore code within a specific loop and moves to the next loop

else – runs code when the loop ends properly (break can cause else not to be called)

While

One last example of while and lists…

How to reverse a list

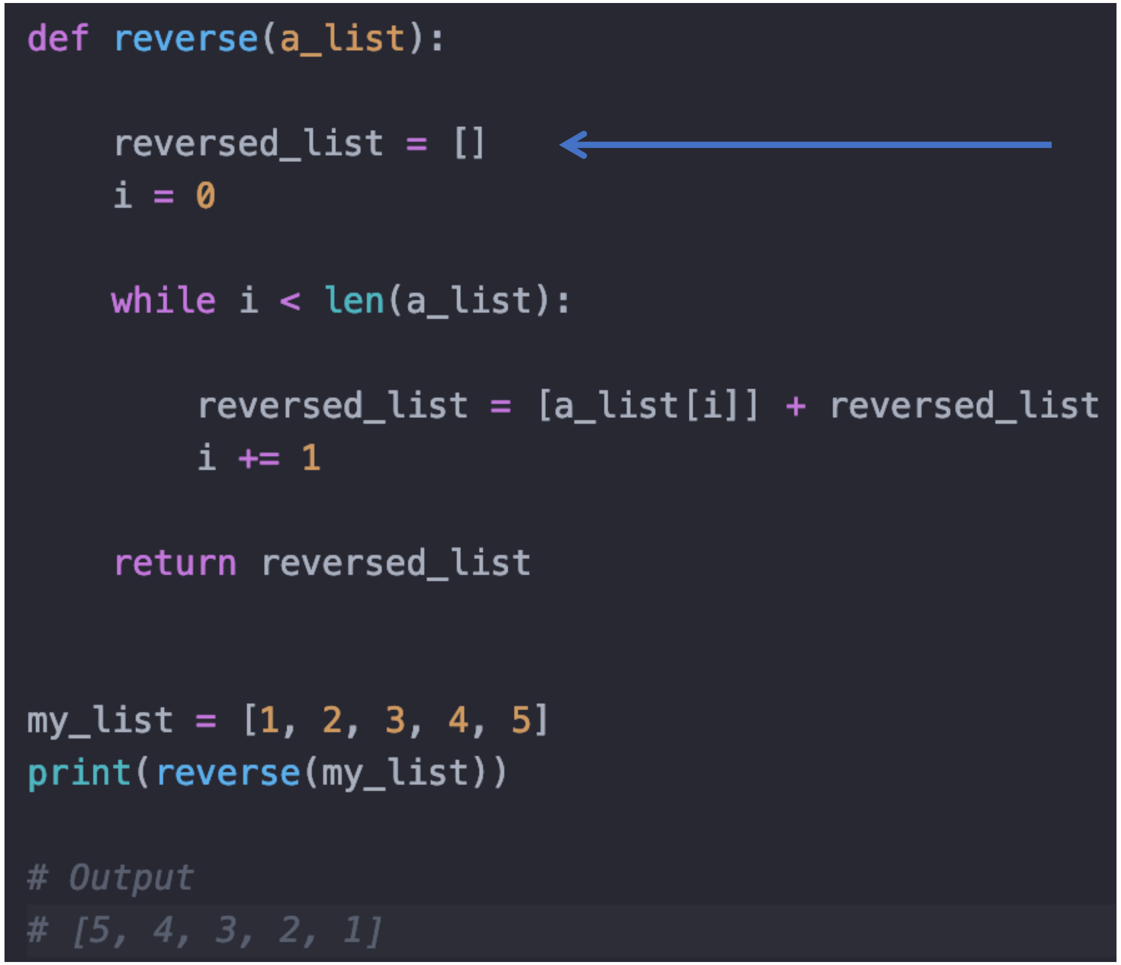


```
def reverse(a_list):

    reversed_list = []
    i = 0

    while i < len(a_list):

        reversed_list = [a_list[i]] + reversed_list
        i += 1

    return reversed_list


my_list = [1, 2, 3, 4, 5]
print(reverse(my_list))

# Output
# [5, 4, 3, 2, 1]
```

While

One last example of while and lists…

How to reverse a list



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my_list = [1, 2, 3, 4, 5]
print(reverse(my_list))

# Output
# [5, 4, 3, 2, 1]
```

Start with an empty list

While

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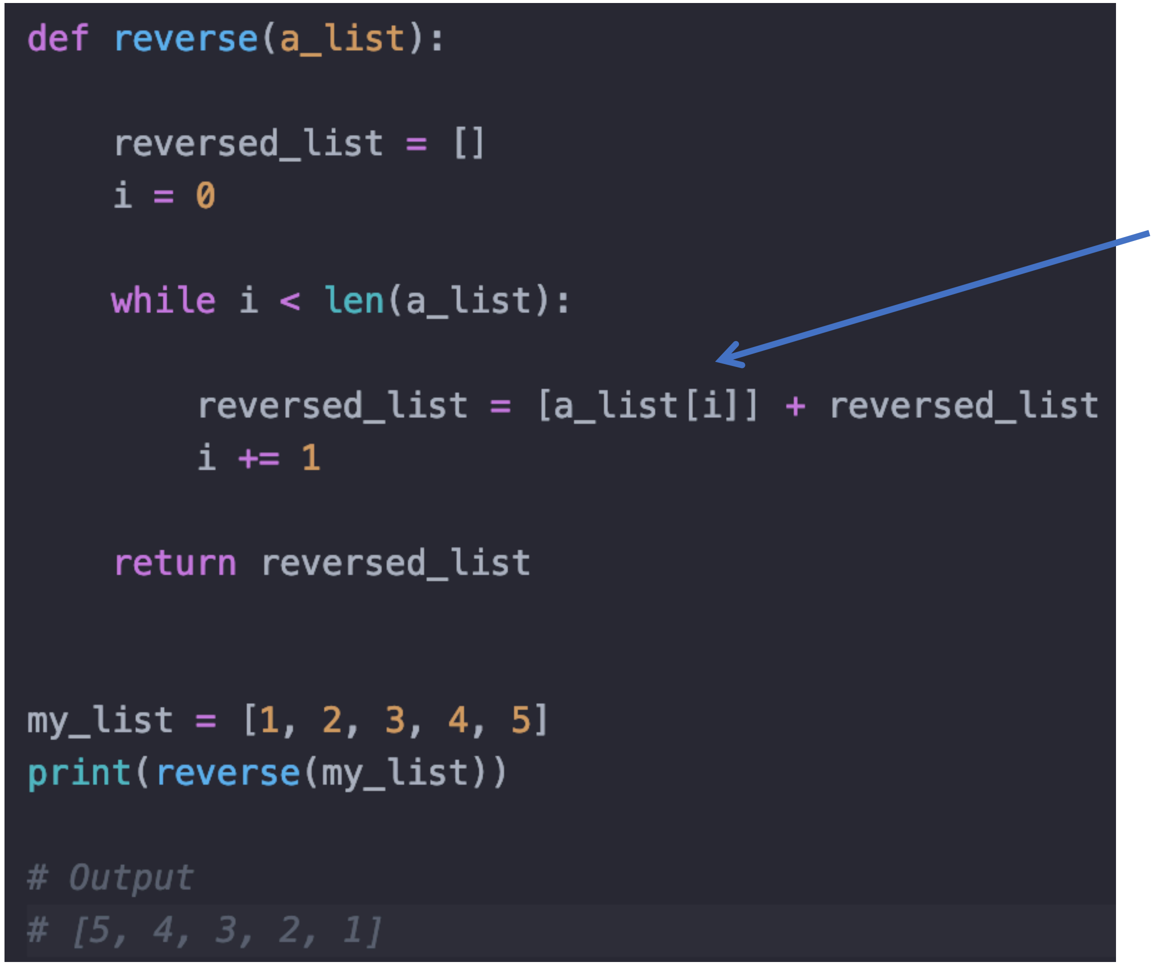

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    return reversed_list


my_list = [1, 2, 3, 4, 5]
print(reverse(my_list))

# Output
# [5, 4, 3, 2, 1]
```

Create a single element list containing the current value from the parameter a_list

While

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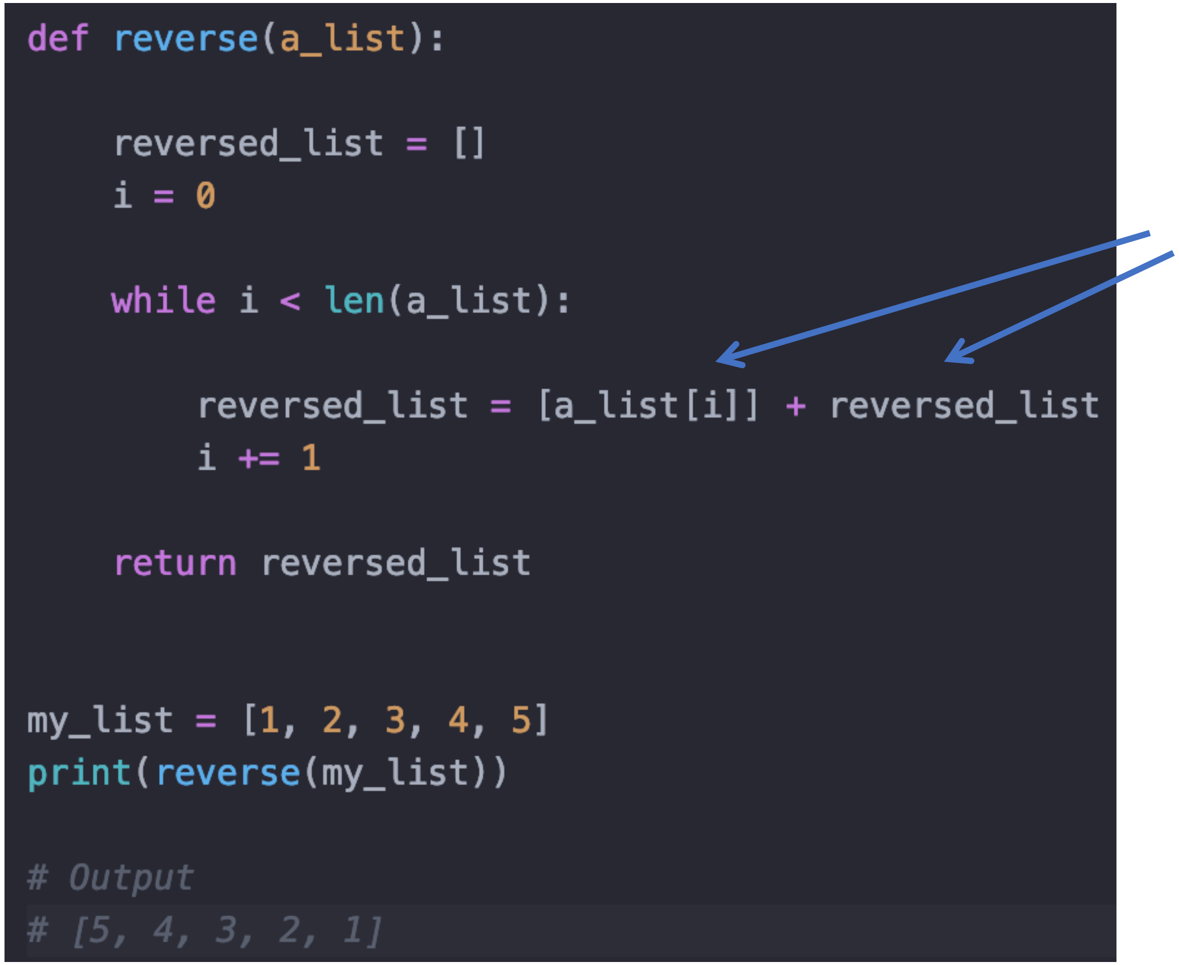

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my_list = [1, 2, 3, 4, 5]
print(reverse(my_list))

# Output
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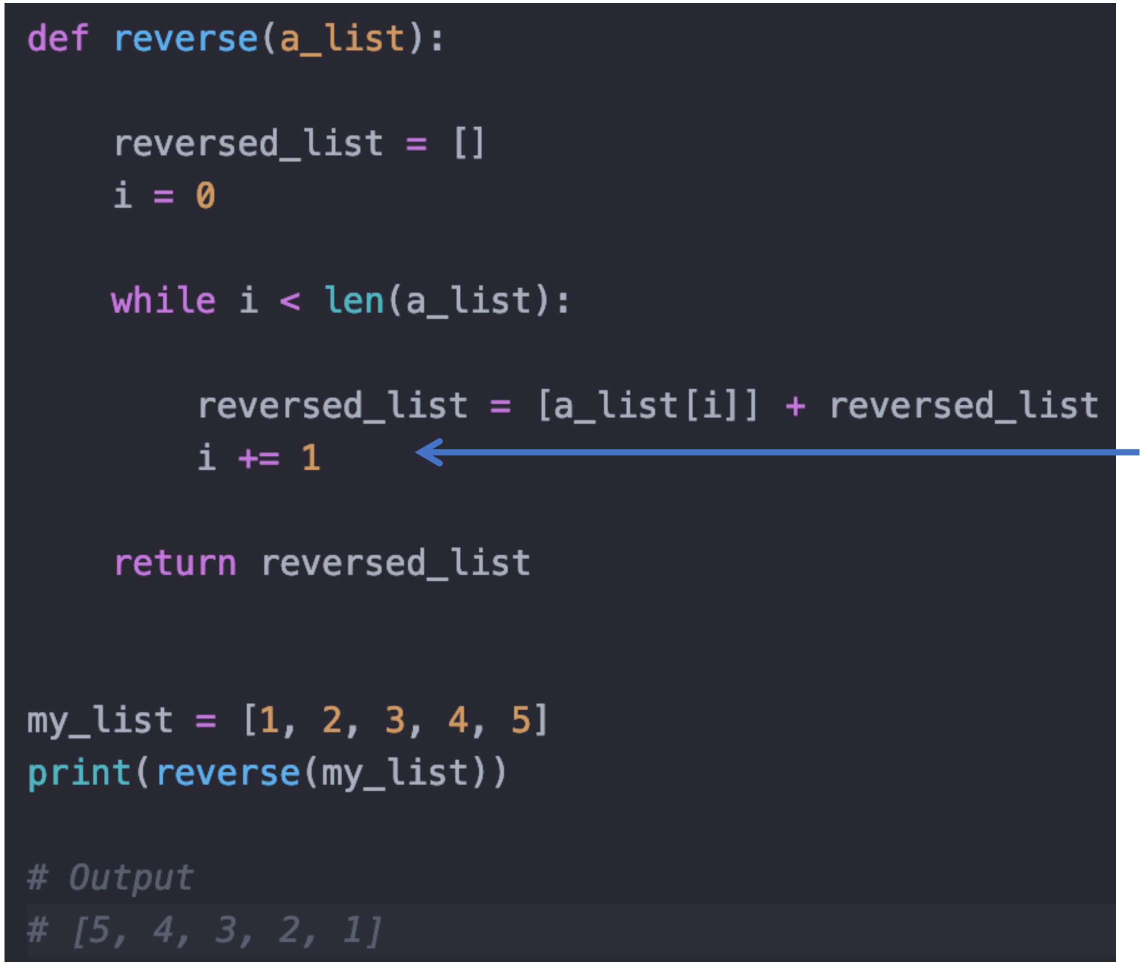
```

Reverse the order in which we add them

While

One last example of while and lists…

How to reverse a list



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my_list = [1, 2, 3, 4, 5]
print(reverse(my_list))

# Output
# [5, 4, 3, 2, 1]
```

Don’t forget to increment the counter

Live Coding Time…

UCC

University College Cork, Ireland

Coláiste na hOllscoile Corcaigh