The while Loop

With the `while` loop we can execute a set of statements as long as a condition is true.

Example

Print i as long as i is less than 6:

```
i = 1
while i < 6:
  print(i)
  i += 1
```

```
1
2
3
4
5
```

The break Statement

With the `break` statement we can stop the loop even if the while condition is true:

Example

Exit the loop when i is 3:

```
i = 1
while i < 6:
  print(i)
  if i == 3:
    break
  i += 1
```

```
1
2
3
```

The continue Statement

With the `continue` statement we can stop the current iteration, and continue with the next:

Example

Continue to the next iteration if i is 3:

```
i = 0
while i < 6:
  i += 1
  if i == 3:
    continue
  print(i)
```

```
1
2
3
4
5
6
```

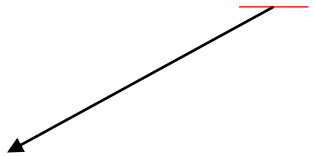
Python New Line

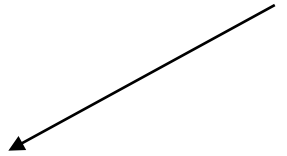
\n

It is made of two characters:

- A backslash.
- The letter n.

```
>>> print('Hello World!')
...
Hello World!
>>> print(f"Hello World")
...
Hello World
>>> print('Hello\nWorld!')
...
Hello
World!
>>> print(f"Hello\nWorld")
...
Hello
World
>>>
```





How To Python Print Without A Newline

```
print('Hello')
print('World')
```

```
Hello
World
```

```
print('Hello', end=" ")
print('World')
```

```
Hello World
```

```
for i in range (15):
    if i<14:
        print (i)
    else:
            print(i)
```

```
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
```

```
for i in range (15):
    if i<14:
        print (i, end=",")
    else:
            print(i)
```

end = “ , ”

0,1,2,3,4,5,6,7,8,9,10,11,12,13,14

While else

The else Statement

With the `else` statement we can run a block of code once when the condition no longer is true:

Example

Print a message once the condition is false:

```
i = 1
while i < 6:
  print(i)
  i += 1
else:
  print("i is no longer less than 6")
```

```
1
2
3
4
5
i is no longer less than 6
```

1. Write a Python program using the while loop that will produce the computational output as below:

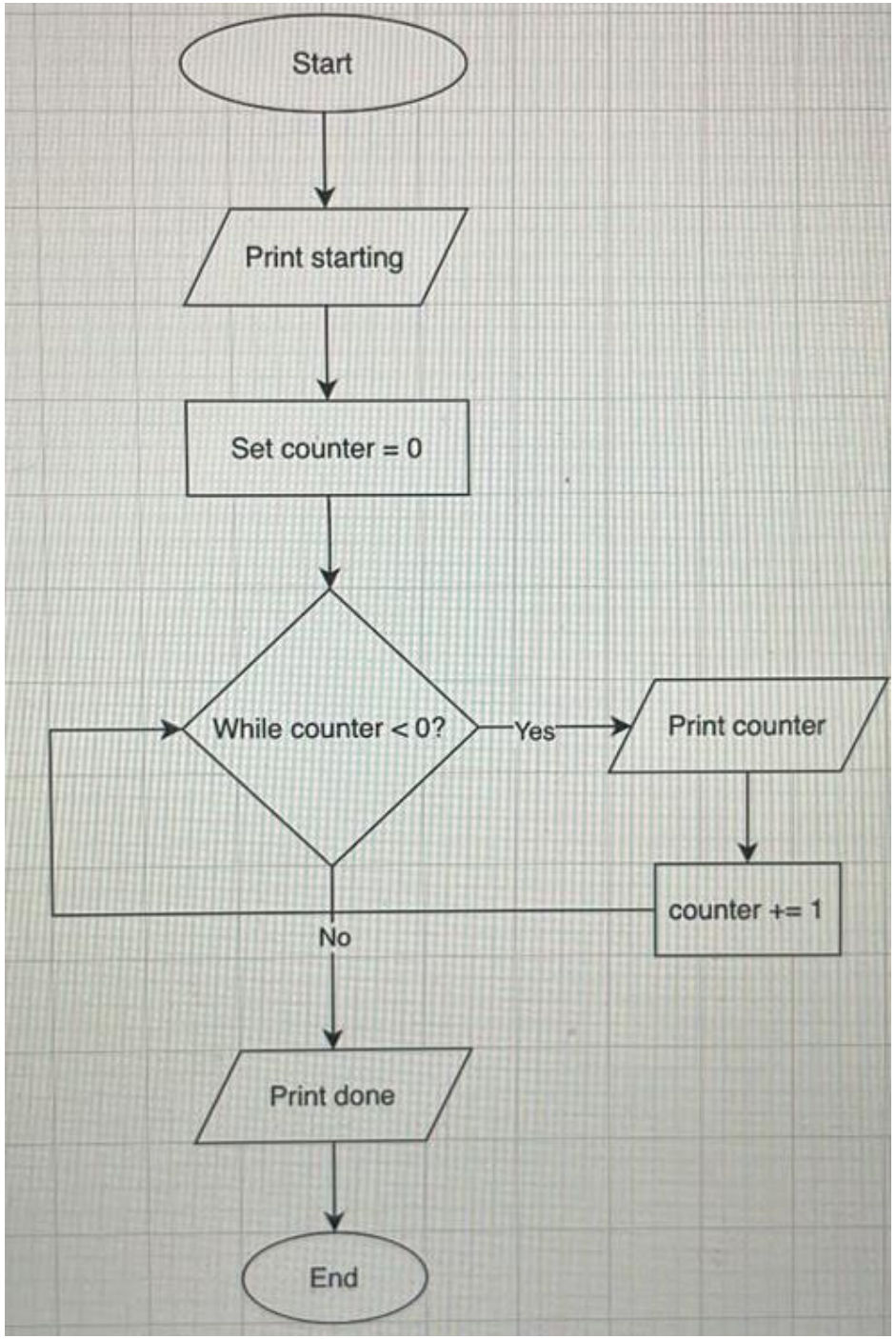
```
Starting
0 1 2 3 4 5 6 7 8 9
Done
```

Descriptions:

- Set a counter to 0
- Print “Starting”
- While counter is less than 10
- Print counter
- Increment counter to 1
- End the loop

Flowchart

- Start
- Print "Starting“
- Set counter = 0
- While counter < 10
- Print counter
- Increment counter by 1
- End While
- Print "Done“
- End



1. Write a Python program using the while loop that will produce the computational output as below:

```
Starting
0 1 2 3 4 5 6 7 8 9
Done
```

```
count=0
print('Starting')
while count<10:
    print(count, '', end='')
    count +=1
print ('\nDone')
```

```
>>>
= RESTART: C:\Users\warhlaingn\
Starting
0 1 2 3 4 5 6 7 8 9
Done
>>>
```

2. Write a Python program using the while loop that will produce the computational output as below:

```
Starting
-20 -18 -16 -14 -12 -10 -8 -6 -4 -2
Done
```

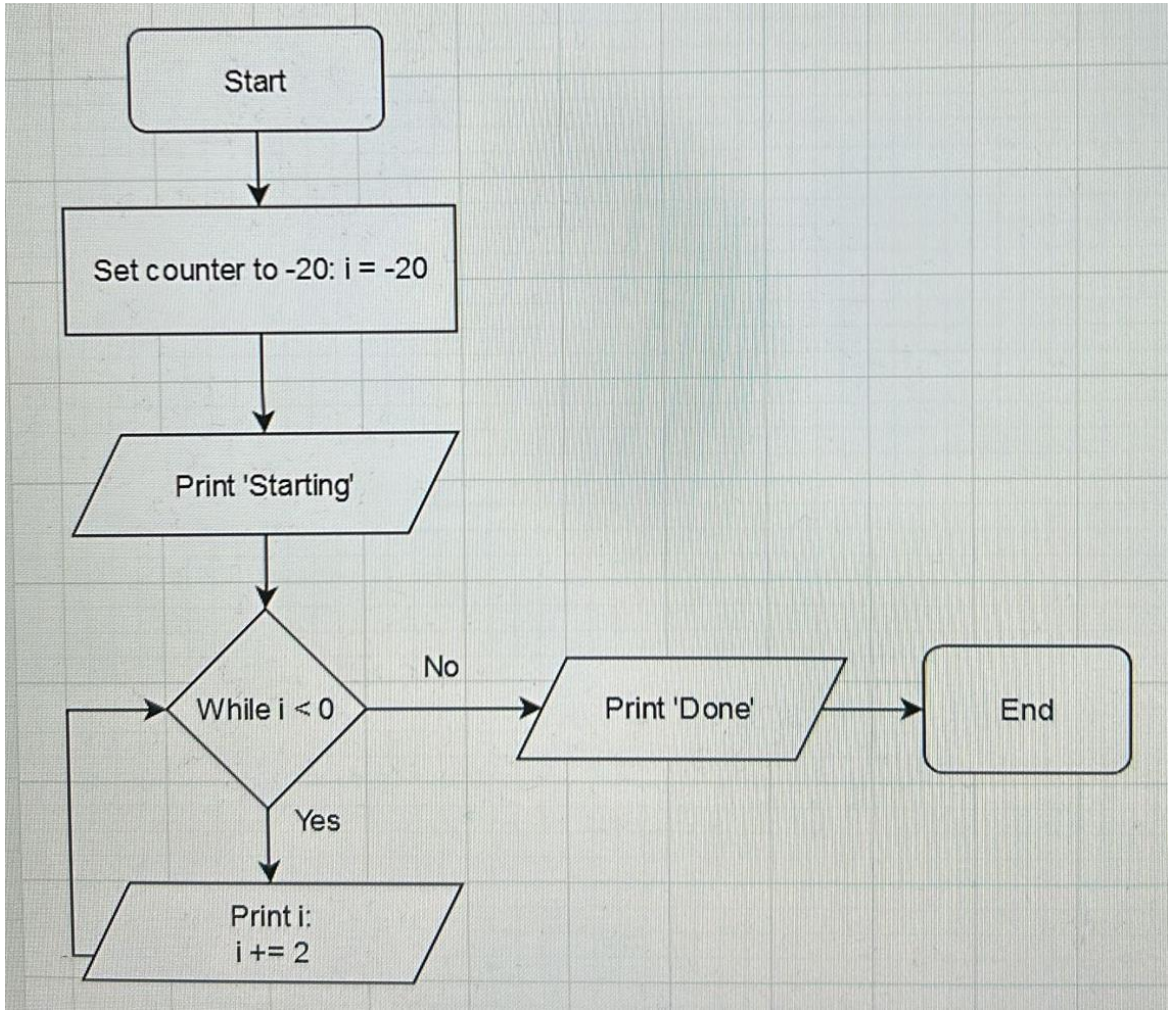
Descriptions:

- Set a counter to ???
- Print “Starting”
- While counter is less than 0
- Print counter
- Increment counter to ???
- End the loop

Flowchart

- Start
- Print "Starting"
- Set counter = -20
- While counter < 0
- Print counter
- Increment counter by 2
- End While
- Print "Done"
- End

```
Starting
-20 -18 -16 -14 -12 -10 -8 -6 -4 -2
Done
```



2. Write a Python program using the while loop that will produce the computational output as below:

```
Starting
-20 -18 -16 -14 -12 -10 -8 -6 -4 -2
Done
```

```
count=-20
print('Starting')
while count<0:
    print(count, '', end='')
    count +=2
print ('\nDone')
```

```
>>>
= RESTART: C:\Users\warhlaingn\AppData\Local\Progr
Starting
-20 -18 -16 -14 -12 -10 -8 -6 -4 -2
Done
>>>
```

3. Write a Python program using the while loop that prompts the user to enter two numbers 'a' and 'b' and **calculate 'a' to the power of 'b'.**

$$a^b = \overbrace{a \times a \times a}^{b}$$

- Initialize result to 1 (to multiple with a for b times)
- Initialize counter to 1

if $b = 1$

$a^1 = a$

if $b = 2$

$a^2 = a^1 \times a^1$

if $b = 3$

$a^3 = a^1 \times a^1 \times a^1$

$= a^{1+1+1}$

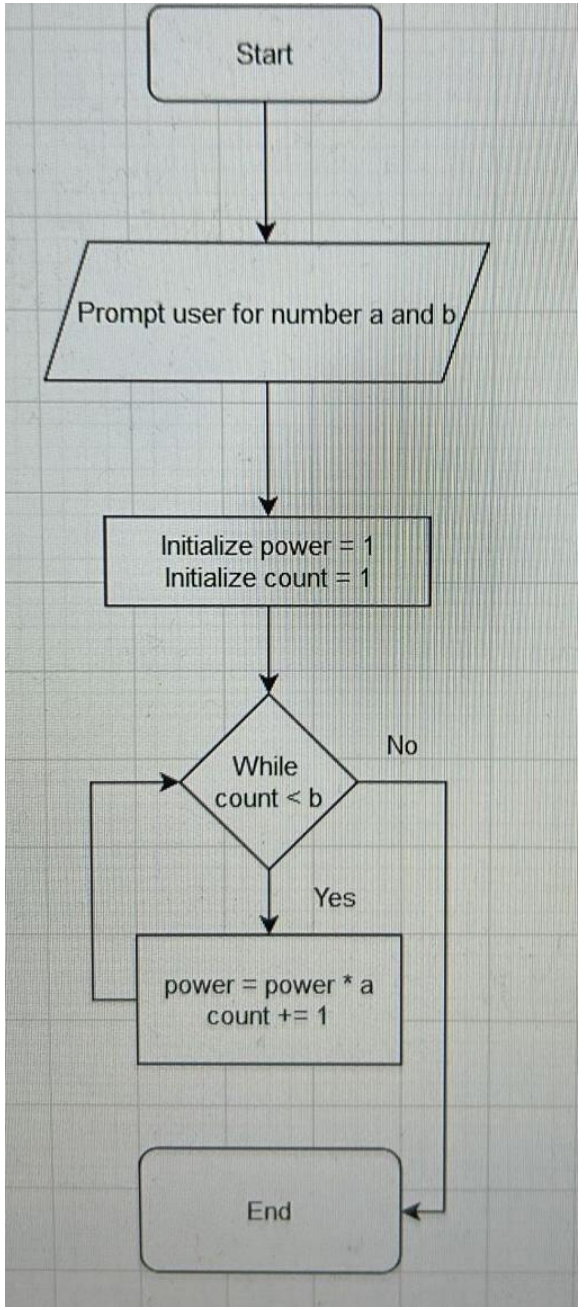
$= a^3$

3. Write a Python program using the while loop that prompts the user to enter two numbers 'a' and 'b' and **calculate 'a' to the power of 'b'.**

Descriptions:

- Prompt user for input of 'a' and Prompt user for input of 'b'
- Initialize result to 1 (to multiple with a for b times)
- Initialize counter to 1
- While counter < b: Multiply result by a
- Increment counter
- End of Loop
- Print result

Flowchart



3. Write a Python program using the **while loop** that prompts the user to enter two numbers 'a' and 'b' and calculate 'a' to the power of 'b'.

```
a = int(input('Enter the first number [a]:'))
b = int(input('Enter the second number [b]:'))

power = 1
i = 1
while i<=b:
    power = power*a
    i +=1
print(str(a) + ' to the power of ' + str (b) + ' is ' + str (power))
```

```
Enter the first number [a]:3
Enter the second number [b]:2
3 to the power of 2 is 9
```

Python String upper() Method

upper() Converts a string into upper case

Example

Upper case the string:

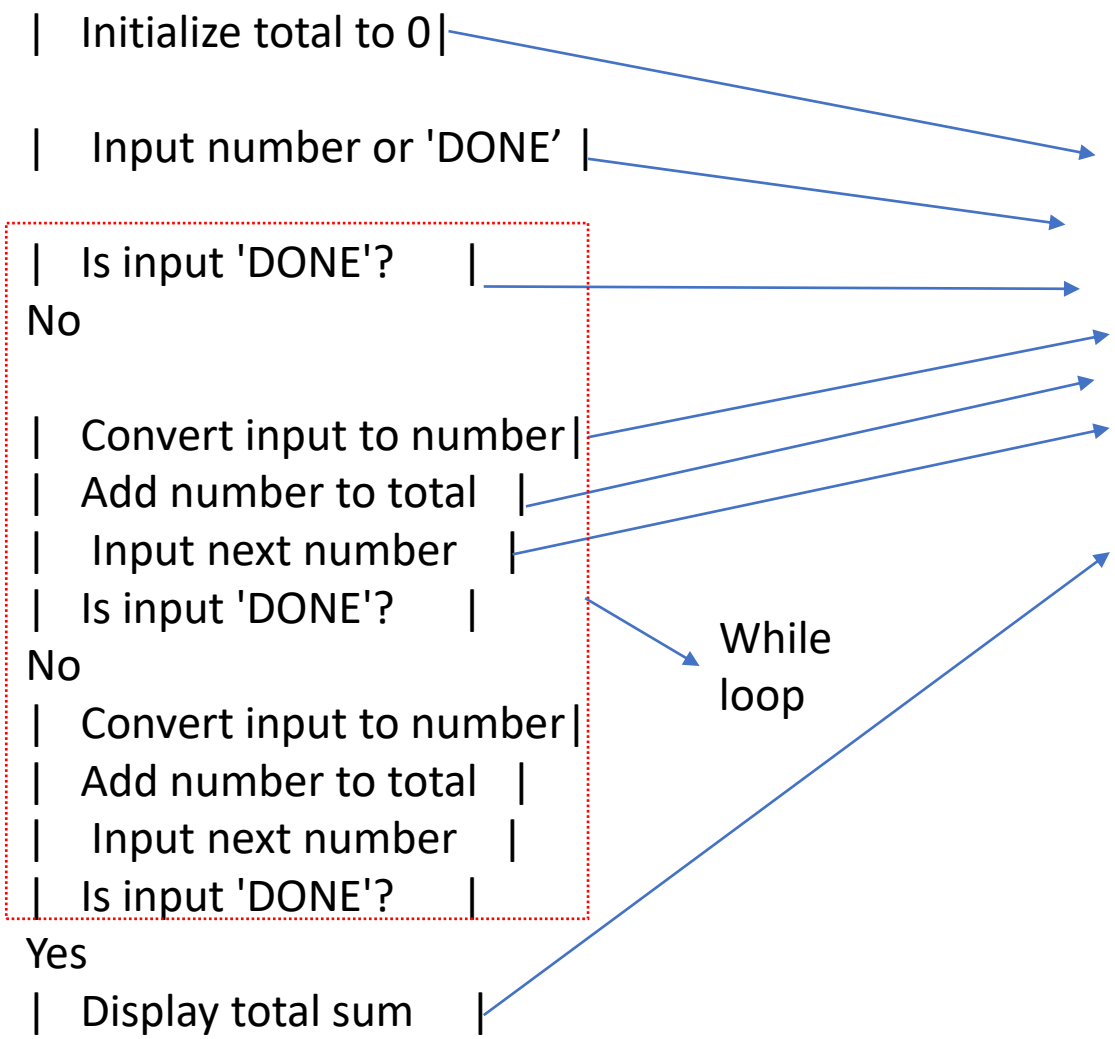
```
txt = "Hello my friends"

x = txt.upper()

print(x)
```

```
HELLO MY FRIENDS
```

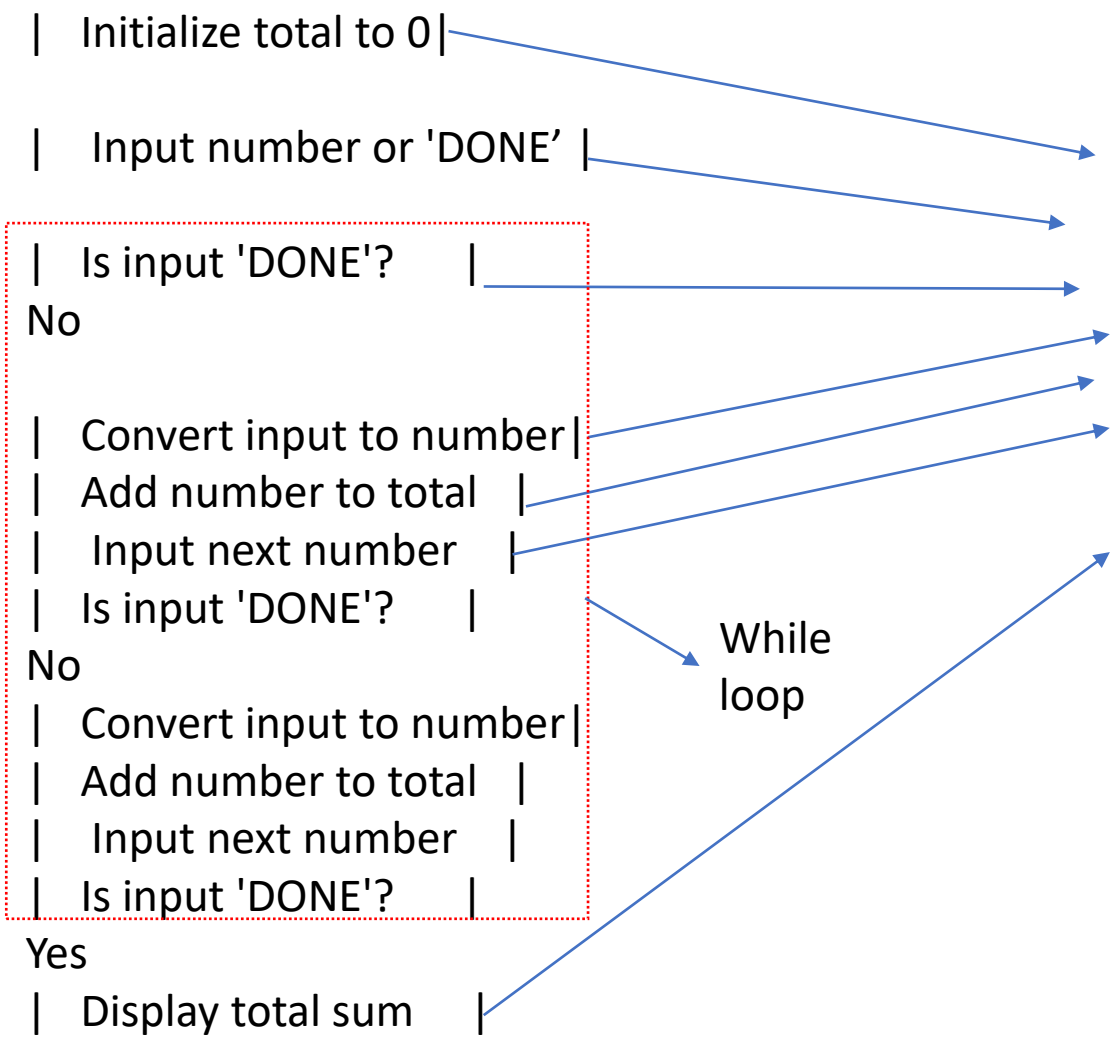
4. Write a Python program using the **while loop** that performs summing an unknown number of numbers **until the user types 'DONE', then the program end.**

- Initialize a variable total to store the sum of numbers:
  Set total to 0.
- Input Number: Prompt the user to input a number or 'DONE'.
- Check if the input is 'DONE'.
  If input is 'DONE', Display the total sum.
  If input is a number, Add the input number to the total.
- Input Next Number: to input the next number.
- Display the total sum.

```
>>>
= RESTART: C:\Users\warhlaingn\A
Enter a number (or DONE): 1
Enter a number (or DONE): 2
Enter a number (or DONE): DONE
The sum is 3
>>>
```



Draw Flowchart




```
total = 0
s = input ('Enter a number (or DONE): '). upper ()
while s!='DONE':
    num = int(s)
    total = total+num
    s = input('Enter a number (or DONE): '). upper ()
print ('The sum is '+ str (total))
```

4. Write a Python program using the **while loop** that performs summing an unknown number of numbers **until the user types 'DONE', then the program end.**

```
total = 0
s = input ('Enter a number (or DONE): '). upper ()
while s!='DONE':
    num = int(s)
    total = total+num
    s = input('Enter a number (or DONE): '). upper ()
print ('The sum is '+ str (total))
```

```
>>>
= RESTART: C:\Users\warhlaingn\A
Enter a number (or DONE): 1
Enter a number (or DONE): 2
Enter a number (or DONE): DONE
The sum is 3
>>>
```

5. Create a variable called **secret_num** and set the value to 50. Ask the user to enter a number. While their guess is not the same as the **secret_num**, tell them if their guess is too low or too high, and ask them to have another guess. If they enter the same value as **secret_num**, display the message 'Well done, you took [**count**] attempts'.

```
= RESTART: C:\Users\warhlaingn\AppData\L
Guess my secret number: 50
Well done, you took 1 attempts.
>>>
= RESTART: C:\Users\warhlaingn\AppData\L
Guess my secret number: 30
Too Low
Have another guess: 40
Too Low
Have another guess: 50
Well done, you took 3 attempts.
>>>
= RESTART: C:\Users\warhlaingn\AppData\L
Guess my secret number: 60
Too High
Have another guess: 55
Too High
Have another guess: 45
Too Low
Have another guess: 35
Too Low
Have another guess: 50
Well done, you took 5 attempts.
>>>
```

| Initialize secret_num to 50|
| Ask user for guess |
| Initialize count to 1|

| Is guess equal to secret_num? |
No
| Is guess less than secret_num? |
Yes
| Inform user it's too low, ask for new guess|
| Increment count

| Go back to asking user for guess |
| Is guess greater than secret_num? |
Yes
| Inform user it's too high, ask for new guess|
| Increment count |

| Go back to asking |
| user for guess Is guess equal to secret_num? |
Yes
| Congratulate user |
| display count |

Draw flowchart

| Initialize secret_num to 50|
| Ask user for guess |
| Initialize count to 1|

| Is guess equal to secret_num? |
No
| Is guess less than secret_num? |
Yes
| Inform user it's too low, ask for new guess|
| Increment count |

| Go back to asking user for guess |
| Is guess greater than secret_num? |
Yes
| Inform user it's too high, ask for new guess|
| Increment count |

| Go back to asking |
| user for guess Is guess equal to secret_num? |
Yes
| Congratulate user |
| display count |

```
secret_num = 50
guess_num = int(input('Guess my secret number: '))
count = 1
while guess_num != secret_num:
    if guess_num < secret_num:
        print('Too Low')
    else:
        print('Too High')
    count = count+1
    guess_num=int(input('Have another guess: '))

print ('Well done, you took ' +  str (count) + ' attempts.')
```

5. Create a variable called **secret_num** and set the value to 50. Ask the user to enter a number. While their guess is not the same as the **secret_num**, tell them if their guess is too low or too high, and ask them to have another guess. If they enter the same value as **secret_num**, display the message 'Well done, you took [**count**] attempts'.

```
secret_num = 50
guess_num = int(input('Guess my secret number: '))
count = 1
while guess_num != secret_num:

    if guess_num < secret_num:
        print('Too Low')

    else:
        print('Too High')

    count = count+1

    guess_num=int(input('Have another guess: '))

print ('Well done, you took ' +  str (count) + ' attempts.')
```

```
= RESTART: C:\Users\warhlaingn\AppData\L
Guess my secret number: 50
Well done, you took 1 attempts.
>>>
= RESTART: C:\Users\warhlaingn\AppData\L
Guess my secret number: 30
Too Low
Have another guess: 40
Too Low
Have another guess: 50
Well done, you took 3 attempts.
>>>
= RESTART: C:\Users\warhlaingn\AppData\L
Guess my secret number: 60
Too High
Have another guess: 55
Too High
Have another guess: 45
Too Low
Have another guess: 35
Too Low
Have another guess: 50
Well done, you took 5 attempts.
>>>
```