Python ~ Control Structure

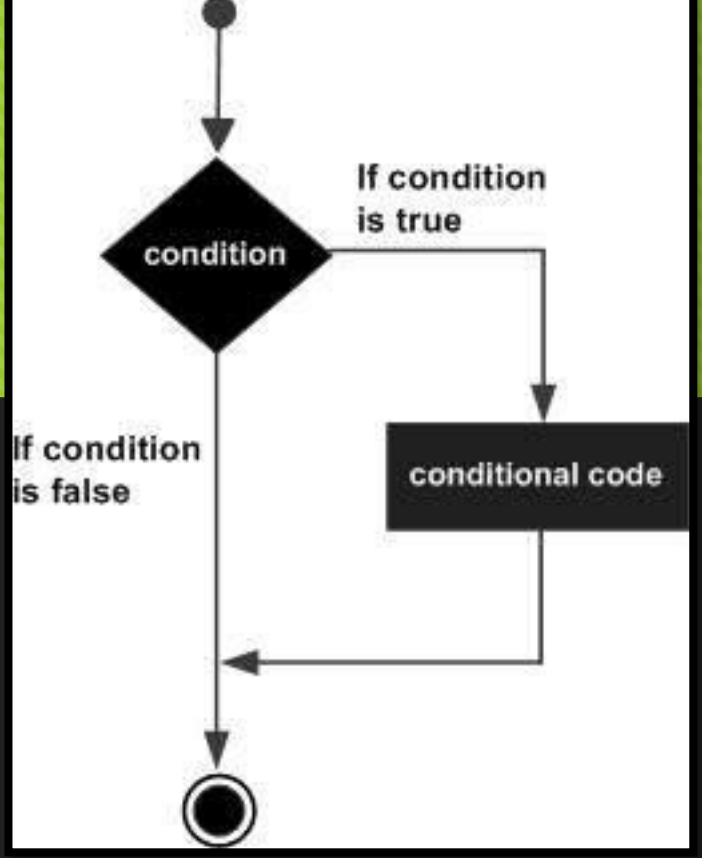
Conditional execution (if…)

- Syntax:

```
if condition:
    do_something
```

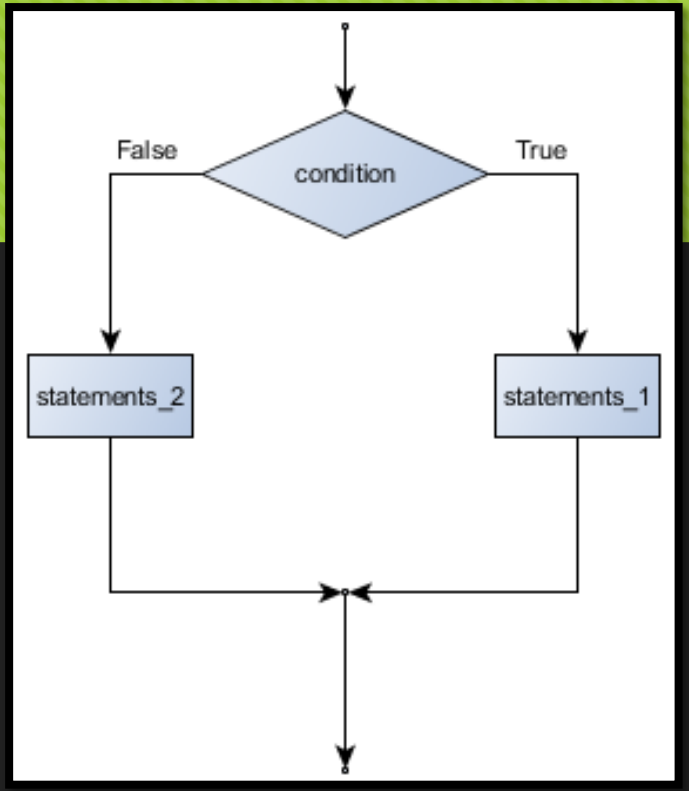
- *Condition* must be statement that evaluates to a boolean value (True or False)

Example:
Checking user input




```
x = input("X=")
if x.isdigit():
    print("You input a number")
```

Alternative execution

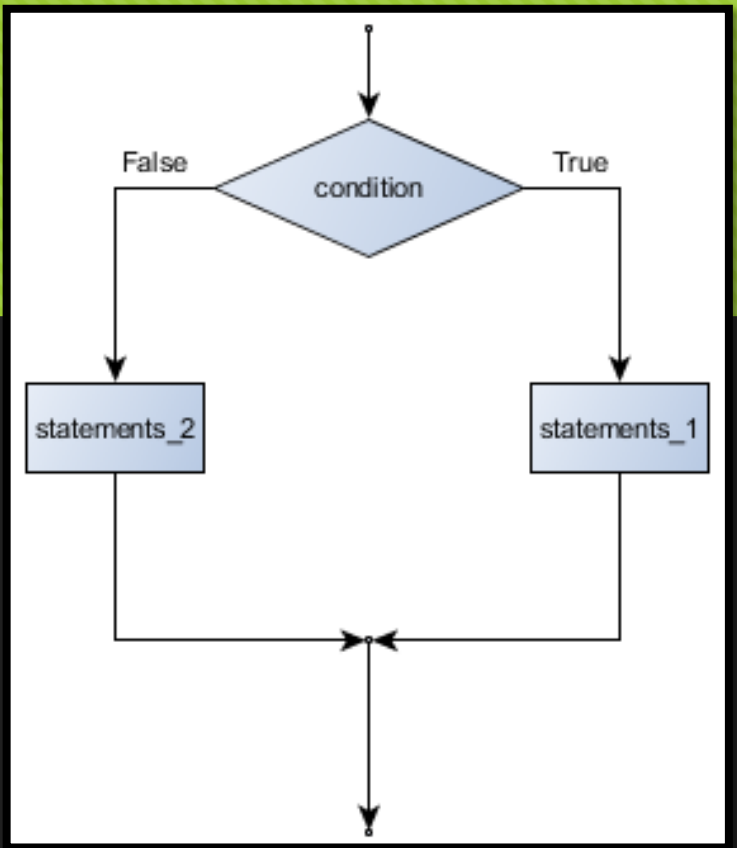


- Syntax:

```
if condition:
    do_something
else:
    do_alternative
```

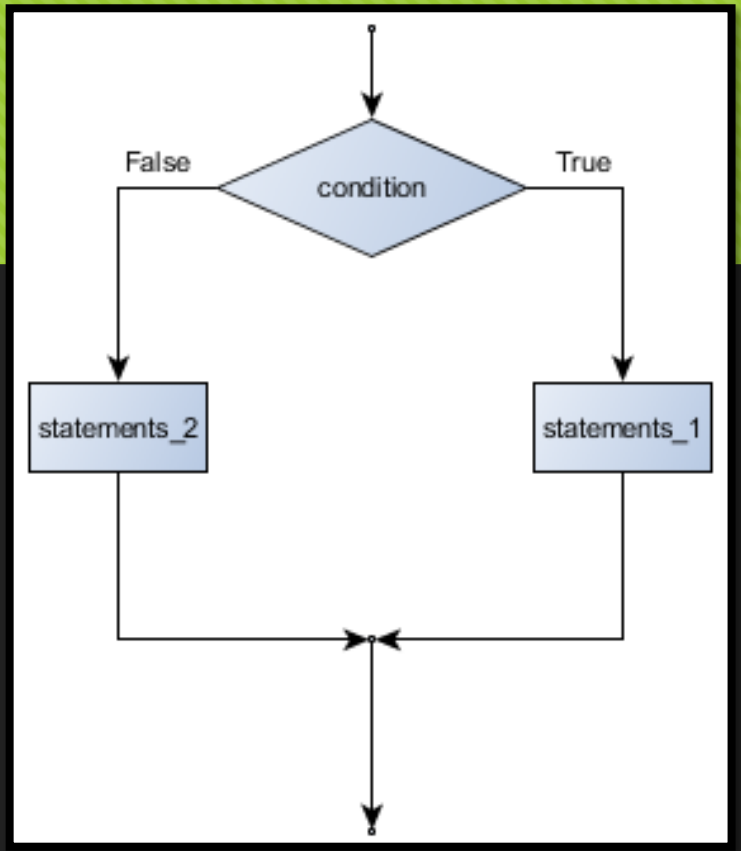
Example: Checking user input

```
x = input("x=")
if x.isdigit():
    print "You input a number"
else:
    print "Please input a number\
        next time"
```

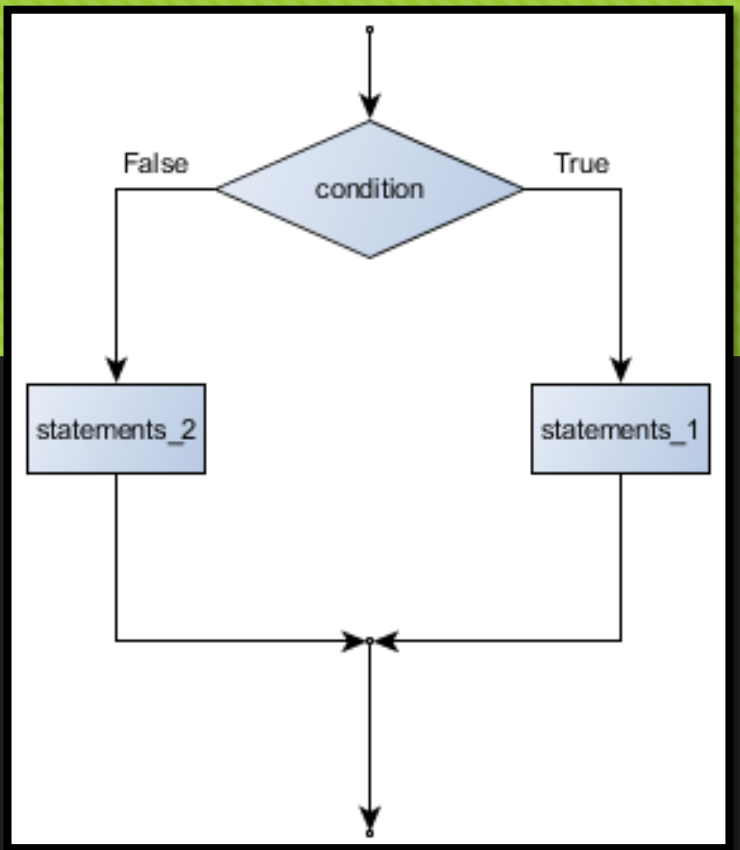


Example:
Avoiding division by zero

```
x = int(input("x="))
y = int(input("y="))
if y <> 0:
    print(x / y)
else:
    print("Attempted division by zero")
```



Example: Checking user input

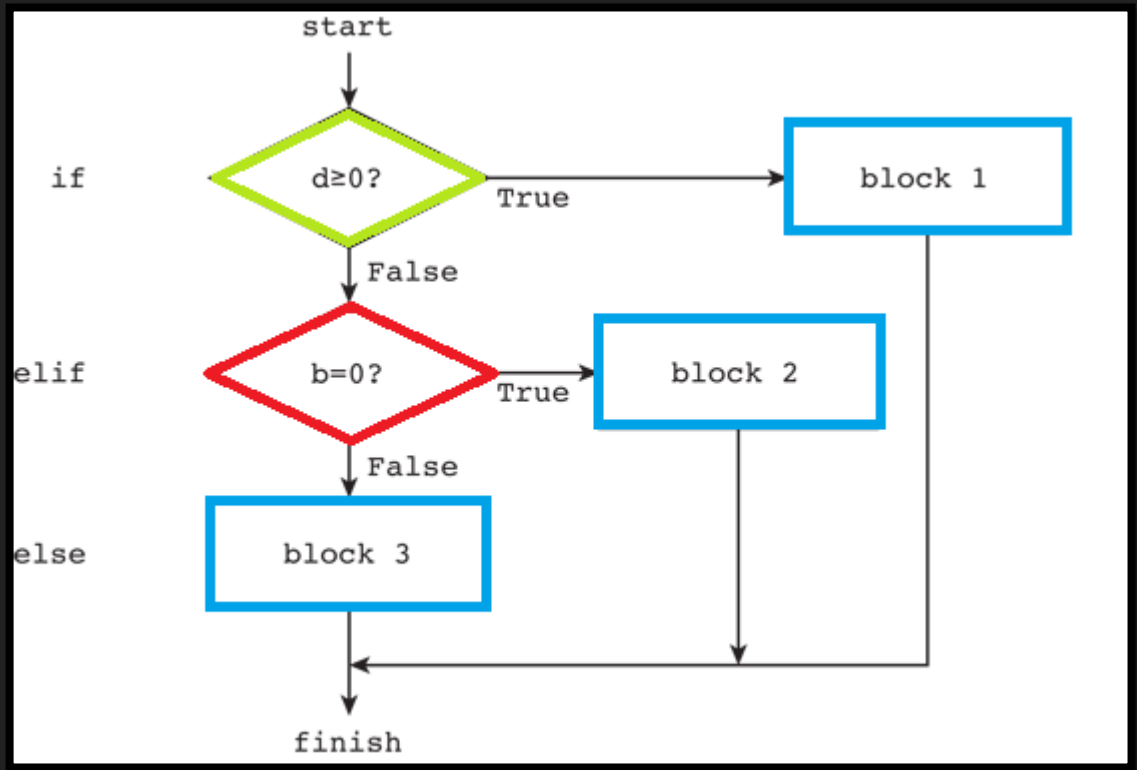



```
x = input("x=")
if x.isdigit():
    print("You input a number")
else:
    print("Please input a number next time")
```

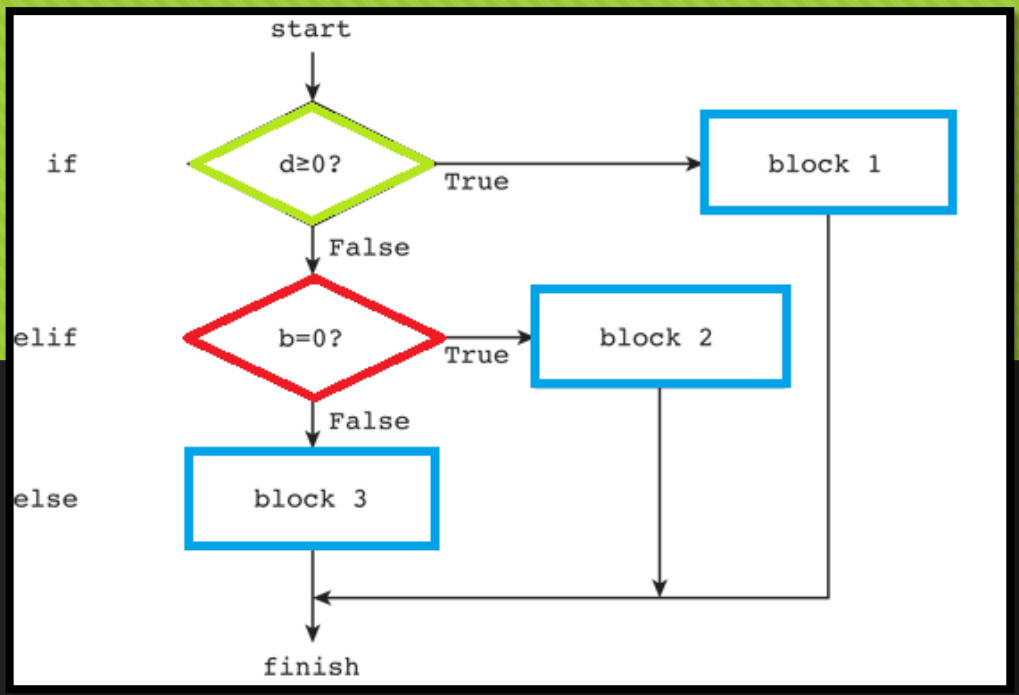
Chained conditionals

- Syntax:

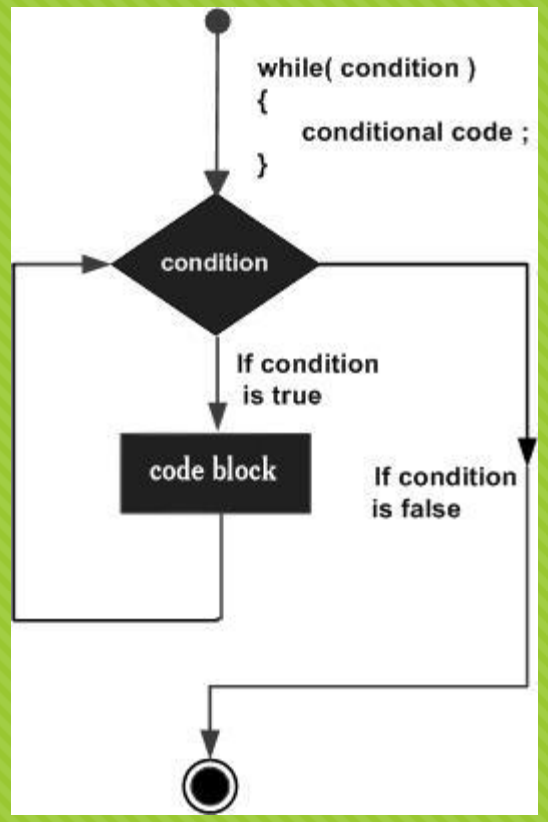
```
if condition:
    do_something
elif condition:
    do_alternative1
else:
    do_alternative2
```

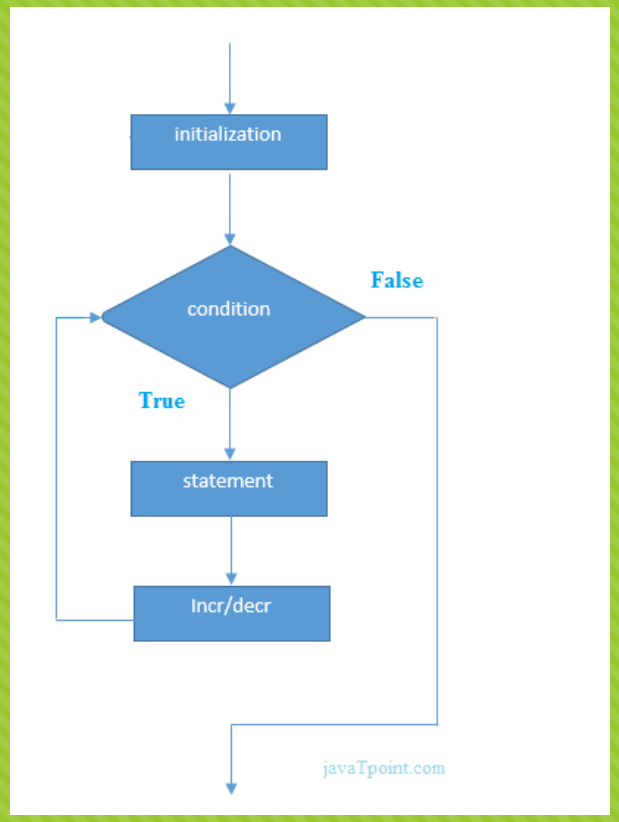


Example:




```
x = int(input("x="))
y = int(input("y="))
if x < y:
    print('x is less than y')
elif x > y:
    print('x is greater than y')
else:
    print('x and y are equal')
```

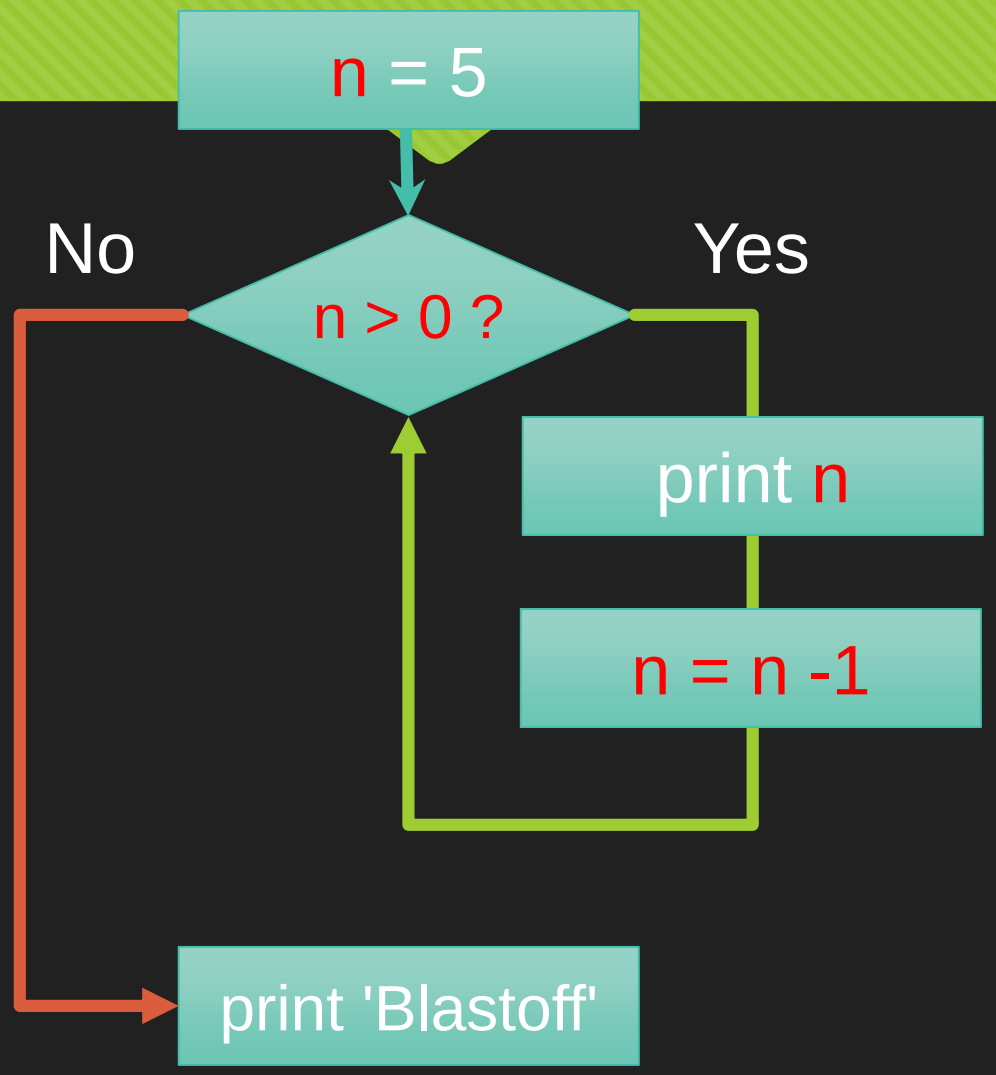




Loop & Iteration

While …Loop

Repeated Steps




```
n = 5
while n > 0 :
    print(n)
    n = n – 1

print('Blastoff!‘)
```

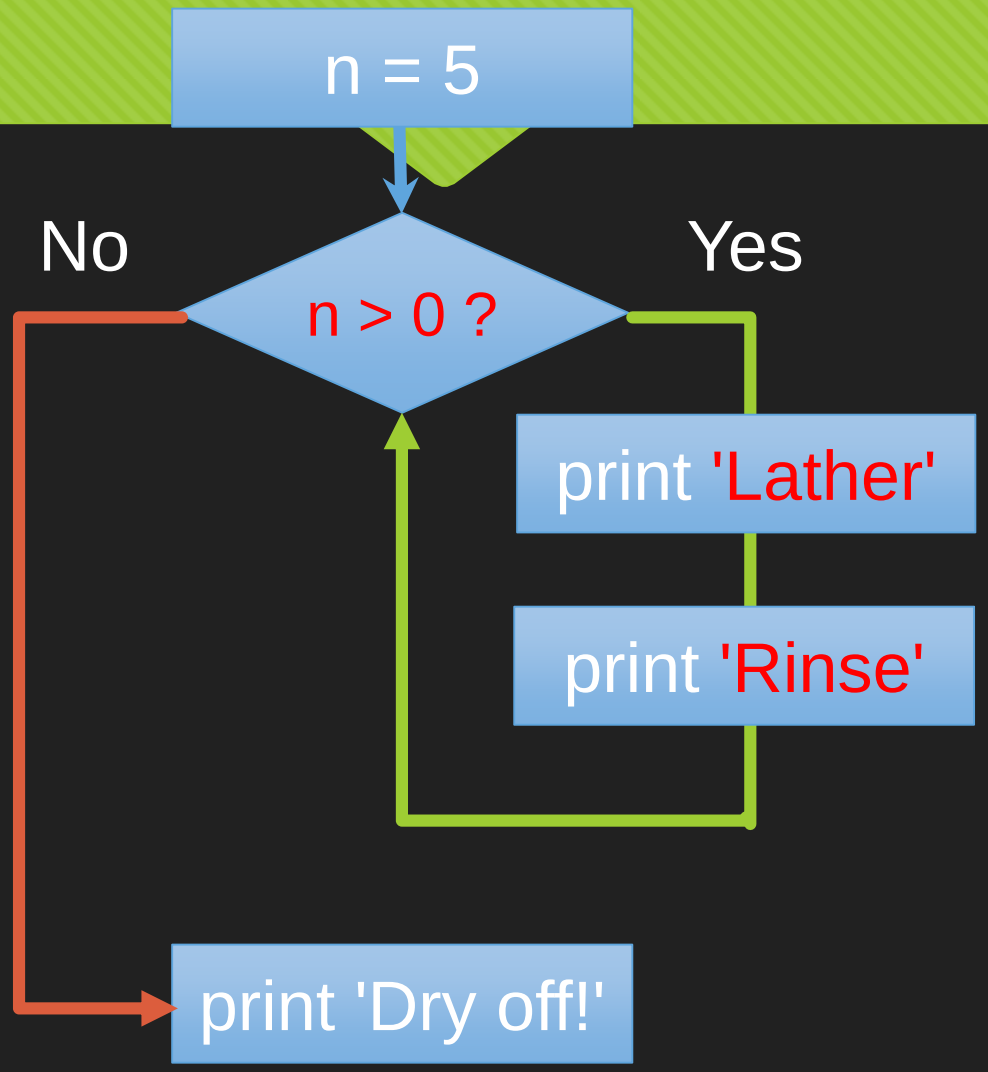
Output:

5
4
3
2
1
Blastoff!

Washing Machine

repeat(5){Lather, Rinse} Dry off

An Infinite Loop

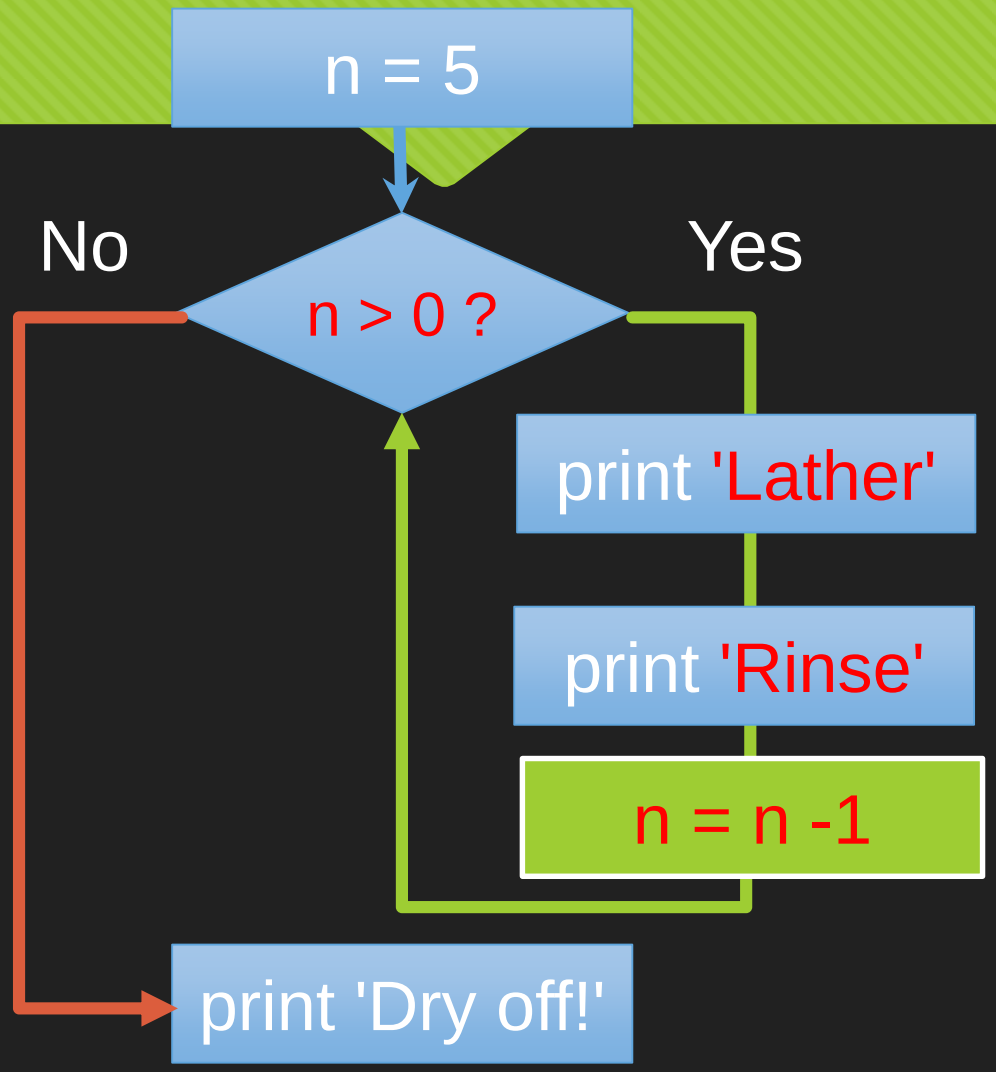



```
n = 5
while n > 0 :
    print('Lather')
    print('Rinse')

print('Dry off! ')
```

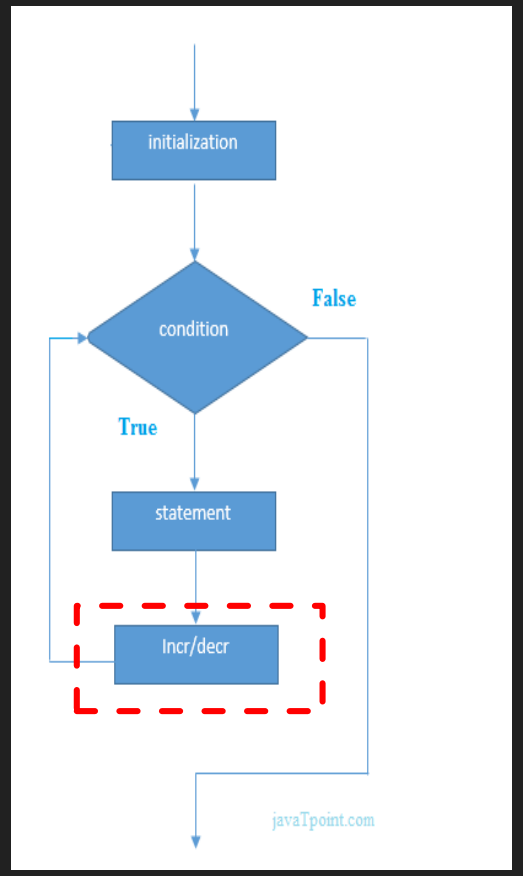
What is wrong with this loop?

Washing Machine

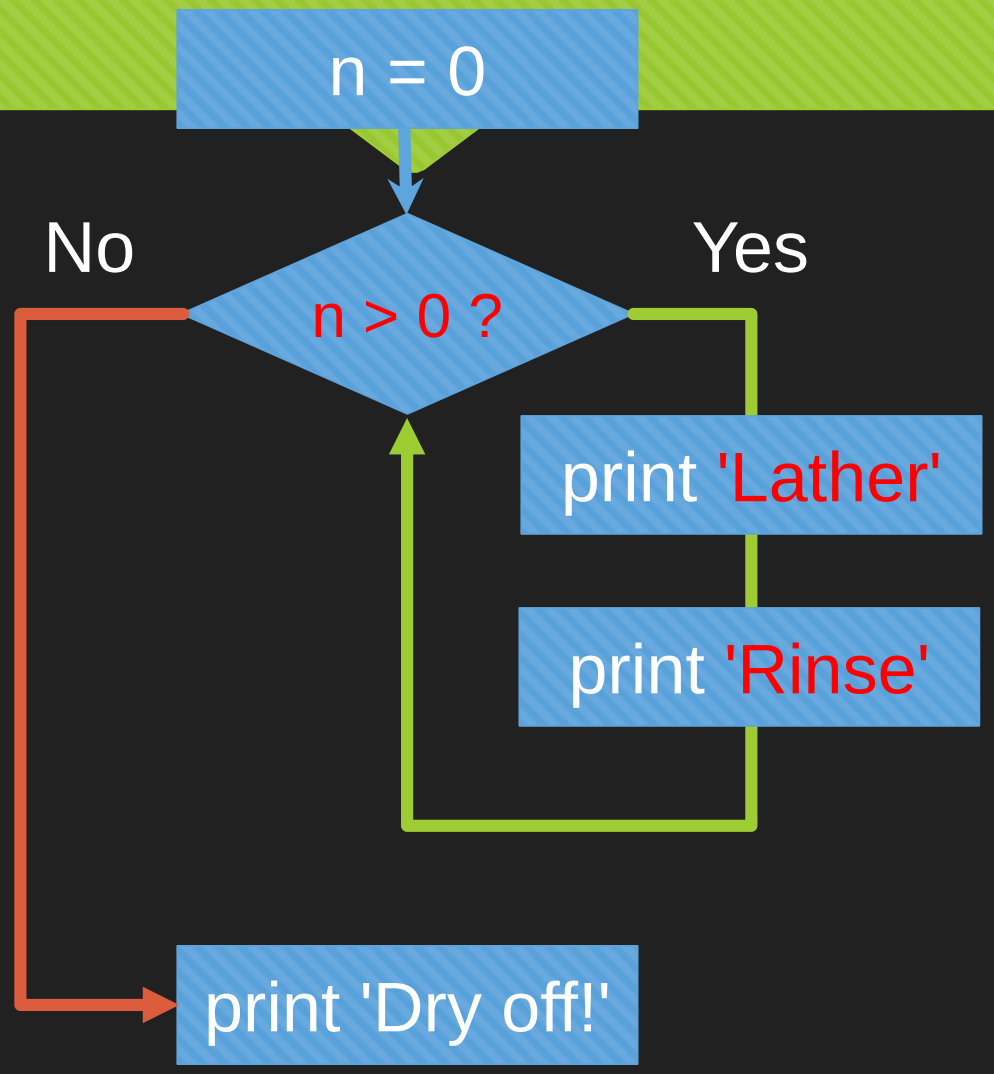
repeat(5){Lather, Rinse} Dry off




```
n = 5
while n > 0 :
    print('Lather')
    print('Rinse')
    n = n - 1

print('Dry off! ')
```



Bad Washing Machine



Another Loop

```
n = 0
while n > 0 :
    print('Lather')
    print('Rinse')
print('Dry off! ')
```

What does this loop do?

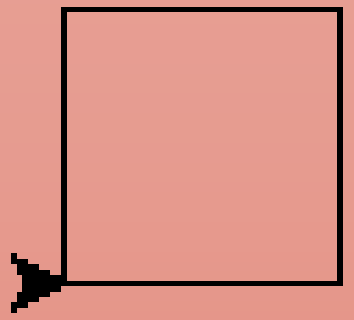
Breaking Out of a Loop

- The **break** statement ends the current loop and jumps to the statement immediately following the loop
- It is like a loop test that can happen anywhere in the body of the loop

```
while True:
    x = int(input())
    if x == -1 :
        break
    print(x)

print('Done!')
```

```
4
4
3
3
-1

Done!
```

```
from turtle import *
wn = Screen()
wn.setup(400,200)

sarah = Turtle()

sarah.forward(50)
sarah.left(90)
sarah.forward(50)
sarah.left(90)
sarah.forward(50)
sarah.left(90)
sarah.forward(50)
sarah.left(90)

wn.exitonclick()
```



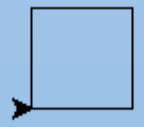
```
from turtle import *
wn = Screen()
wn.setup(400,200)

sarah = Turtle()

#repeat four times

for i in range(4):
    sarah.forward(50)
    sarah.left(90)

wn.exitonclick()
```

def function():

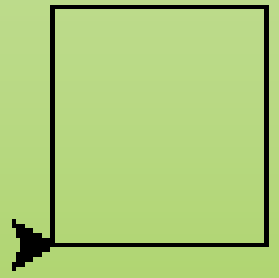
```
from turtle import *

def drawSquare(t, size):
    """Make turtle t draw a square of with side size."""
    for i in range(4):
        t.forward(size)
        t.left(90)
```

```
wn = Screen()                    # Set up the window and its a
alex = Turtle()                  # create alex

drawSquare(alex, 150)            # Call the function to draw the square

wn.exitonclick()
```

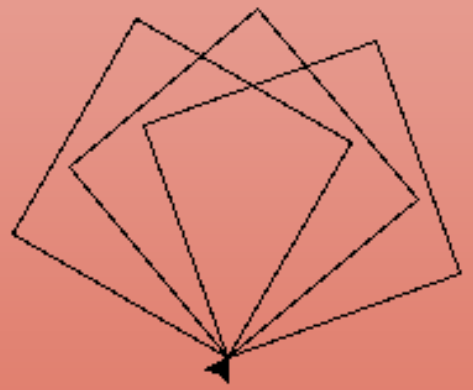
```
from turtle import *

wn = Screen()
alex= Turtle()

for i in range(4):
    alex.forward(150)
    alex.left(90)

wn.exitonclick()
```



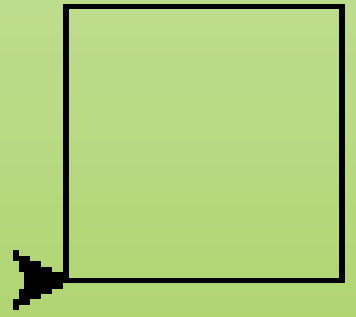
```
from turtle import *

def drawSquare(t, size):
    """Make turtle t draw a square of with side size."""
    for i in range(4):
        t.forward(size)
        t.left(90)
```



```
wn = Screen()                    # Set up the window and its attributes
alex = Turtle()                  # create alex

alex.left(20)
drawSquare(alex, 150)
alex.left(20)
drawSquare(alex, 150)
alex.left(20)
drawSquare(alex, 150)

wn.exitonclick()
```

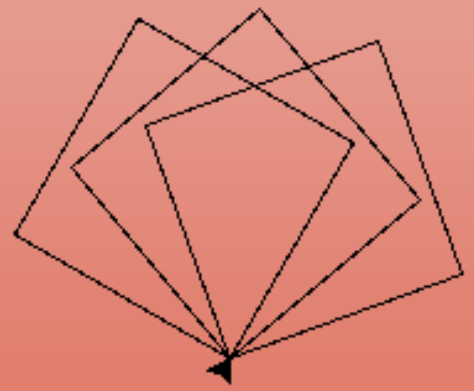


```
from turtle import *

def drawSquare(t, size):
    """Make turtle t draw a square of with side size."""
    for i in range(4):
        t.forward(size)
        t.left(90)
```

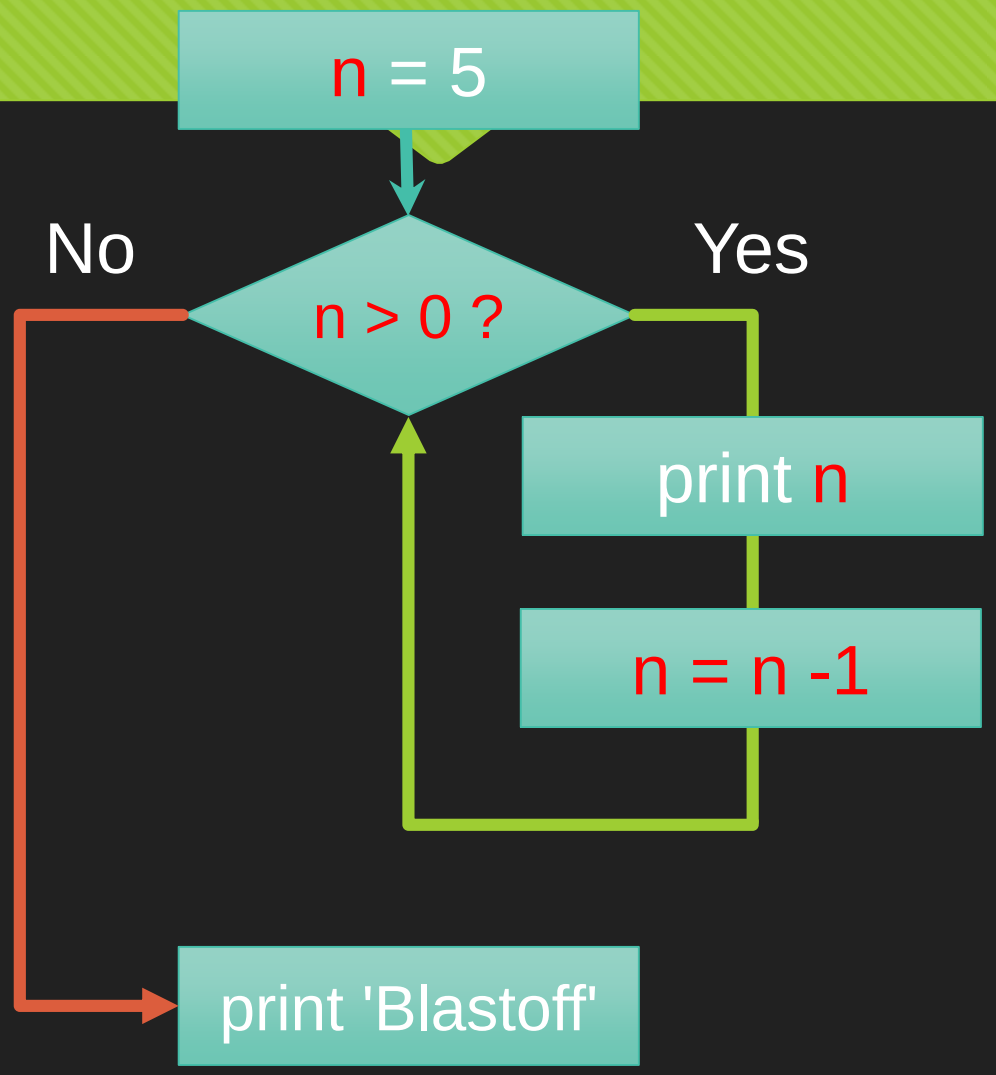


```
wn = Screen()                    # Set up the window and its attributes
alex = Turtle()                  # create alex

alex.left(20)
drawSquare(alex, 150)
alex.left(20)
drawSquare(alex, 150)
alex.left(20)
drawSquare(alex, 150)

wn.exitonclick()
```

```
for n in range(3):
    alex.left(20)
    drawSquare(alex,150)
```



for ...loop




```
n = 5
while n > 0 :
    print(n)
    n = n – 1
print('Blastoff! ')
```

```
for n in range(5,0,-1):
    print(n)

print('Blastoff! ')
```

for

```
for n in [5,4,3,2,1]
    print(n)


print('Blastoff!‘)
```

```
for n in range(5,0,-1):
    print(n)


print('Blastoff!‘)
```

for

```
for n in [5,4,3,2,1]:
    print(n)


print('Blastoff!‘)
```

```
for n in range(5,0,-1):
    print(n)


print('Blastoff!‘)
```

for

```
for n in range(1,5,1) :
    print(n)


print('Finished! ')
```

```
for n in range(1,5,1):
    print('1')


print('Finished! ')
```

for

```
for n in range(0,5,1) :
    print(n)


print('Finished! ')
```

```
for n in range(5):
    print(n)


print('Finished! ')
```

range(start, condition, increase)

range(1,100,1)

range(0,100,1)

range(100)

range(1,100,2)

range(2,100,2)

range(5,100,3)

range(100,1,-1)

range(100,0,-2)

for

```
for n in range(0,50,1):
    drawSquare(alex,50)
```

```
for n in range(0,50,1) :
    drawSquare(alex,n)
```

```
for n in range(0,50,1) :
    drawSquare(alex,n)
    alex.right(20)
```