Python Unit 2

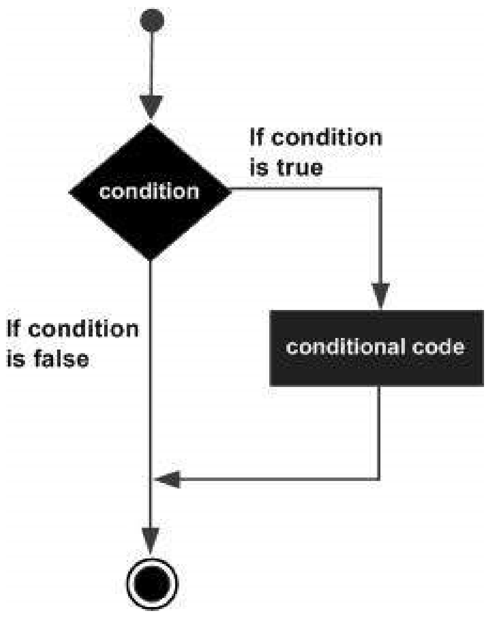
The **if** statement contains a logical expression using which data is compared and a decision is made based on the result of the comparison.

Syntax

```
if expression:
  statement(s)
```

If the boolean expression evaluates to TRUE, then the block of statement(s) inside the if statement is executed. If boolean expression evaluates to FALSE, then the first set of code after the end of the if statement(s) is executed.

Flow Diagram



Example

```
#!/usr/bin/python

var1 = 100
if var1:
  print "1 - Got a true expression value"
  print var1

var2 = 0
if var2:
  print "2 - Got a true expression value"
  print var2
print "Good bye!"
```

Python IF...ELIF...ELSE Statements

An **else** statement can be combined with an **if** statement. An **else** statement contains the block of code that executes if the conditional expression in the if statement resolves to 0 or a FALSE value.

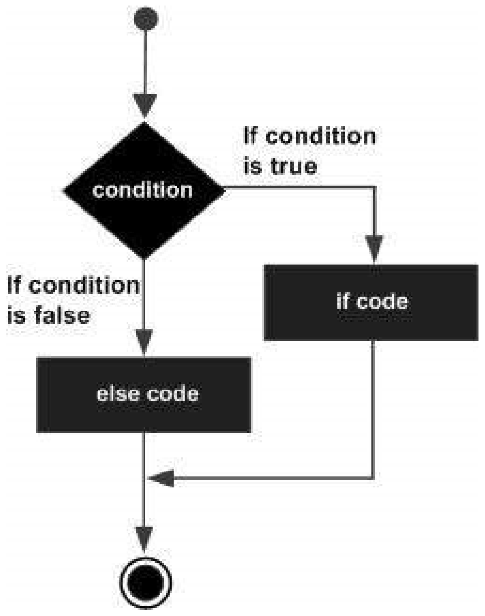
The *else* statement is an optional statement and there could be at most only one **else** statement following **if**.

Syntax

The syntax of the *if...else* statement is –

```
if expression:
  statement(s)
else:
  statement(s)
```

Flow Diagram



Example

```
#!/usr/bin/python

var1 = 100
if var1:
  print "1 - Got a true expression value"
  print var1
```

```
else:
  print "1 - Got a false expression value"
  print var1

var2 = 0
if var2:
  print "2 - Got a true expression value"
  print var2
else:
  print "2 - Got a false expression value"
  print var2

print "Good bye!"
```

The *elif* Statement

The **elif** statement allows you to check multiple expressions for TRUE and execute a block of code as soon as one of the conditions evaluates to TRUE.

Similar to the **else**, the **elif** statement is optional. However, unlike **else**, for which there can be at most one statement, there can be an arbitrary number of **elif** statements following an **if**.

syntax

```
if expression1:
  statement(s)
elif expression2:
  statement(s)
elif expression3:
  statement(s)
else:
  statement(s)
```

Core Python does not provide switch or case statements as in other languages, but we can use if..elif...statements to simulate switch case as follows –

Example

```
#!/usr/bin/python

var = 100
if var == 200:
  print "1 - Got a true expression value"
  print var
elif var == 150:
  print "2 - Got a true expression value"
  print var
elif var == 100:
  print "3 - Got a true expression value"
  print var
else:
  print "4 - Got a false expression value"
  print var

print "Good bye!"
```

Python nested IF statements

In a nested **if** construct, you can have an **if...elif...else** construct inside another **if...elif...else** construct.

Syntax

The syntax of the nested *if...elif...else* construct may be –

```
if expression1:
  statement(s)
  if expression2:
    statement(s)
  elif expression3:
    statement(s)
  elif expression4:
    statement(s)
  else:
    statement(s)
else:
  statement(s)
```

Example

```
#!/usr/bin/python
var = 100
if var < 200:
  print "Expression value is less than 200"
  if var == 150:
    print "Which is 150"
  elif var == 100:
    print "Which is 100"
  elif var == 50:
    print "Which is 50"
  elif var < 50:
    print "Expression value is less than 50"
else:
  print "Could not find true expression"
print "Good bye!"
```

Python for Loop Statements

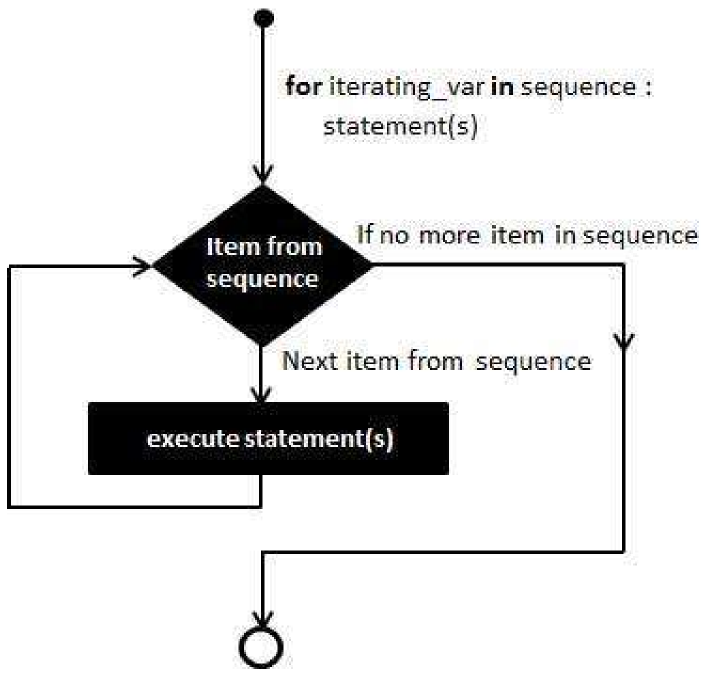
It has the ability to iterate over the items of any sequence, such as a list or a string.

Syntax

```
for iterating_var in sequence:
  statements(s)
```

If a sequence contains an expression list, it is evaluated first. Then, the first item in the sequence is assigned to the iterating variable *iterating_var*. Next, the statements block is executed. Each item in the list is assigned to *iterating_var*, and the statement(s) block is executed until the entire sequence is exhausted.

Flow Diagram



Example

```
#!/usr/bin/python

for letter in 'Python':    # First Example
  print 'Current Letter :', letter

fruits = ['banana', 'apple',  'mango']
for fruit in fruits:       # Second Example
  print 'Current fruit :', fruit

print "Good bye!"
```

Iterating by Sequence Index

An alternative way of iterating through each item is by index offset into the sequence itself. Following is a simple example –

```
#!/usr/bin/python

fruits = ['banana', 'apple',  'mango']
for index in range(len(fruits)):
  print 'Current fruit :', fruits[index]

print "Good bye!"
```

When the above code is executed, it produces the following result –

```
Current fruit : banana
Current fruit : apple
Current fruit : mango
Good bye!
```

Here, we took the assistance of the len() built-in function, which provides the total number of elements in the tuple as well as the range() built-in function to give us the actual sequence to iterate over.

Using else Statement with For Loop

Python supports to have an else statement associated with a loop statement

- If the **else** statement is used with a **for** loop, the **else** statement is executed when the loop has exhausted iterating the list.

The following example illustrates the combination of an else statement with a for statement that searches for prime numbers from 10 through 20.

```
#!/usr/bin/python

for num in range(10,20):     #to iterate between 10 to 20
  for i in range(2,num):    #to iterate on the factors of the number
    if num%i == 0:        #to determine the first factor
      j=num/i           #to calculate the second factor
      print '%d equals %d * %d' % (num,i,j)
      break #to move to the next number, the #first FOR
  else:                 # else part of the loop
    print num, 'is a prime number'
                    break
```

Python Unit 2

A **while** loop statement in Python programming language repeatedly executes a target statement as long as a given condition is true.

Syntax

The syntax of a **while** loop in Python programming language is –

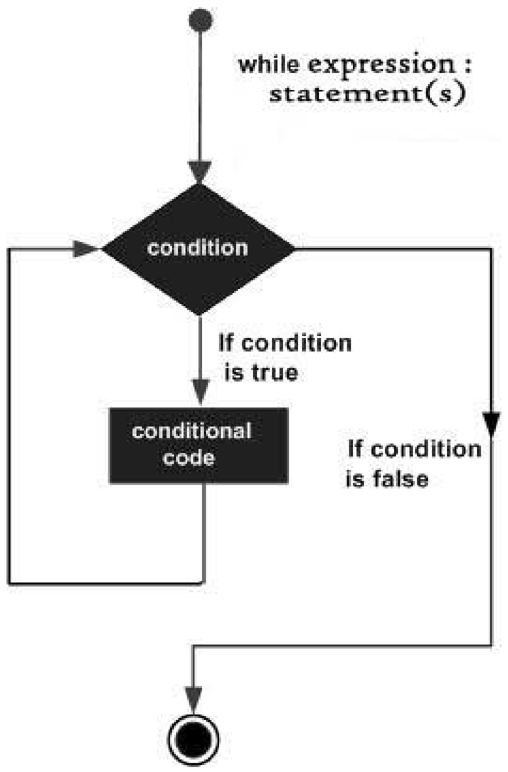
```
while expression:
  statement(s)
```

Here, **statement(s)** may be a single statement or a block of statements. The **condition** may be any expression, and true is any non-zero value. The loop iterates while the condition is true.

When the condition becomes false, program control passes to the line immediately following the loop.

In Python, all the statements indented by the same number of character spaces after a programming construct are considered to be part of a single block of code. Python uses indentation as its method of grouping statements.

Flow Diagram



Here, key point of the while loop is that the loop might not ever run. When the condition is tested and the result is false, the loop body will be skipped and the first statement after the while loop will be executed.

Example

```
#!/usr/bin/python

count = 0
while (count < 9):
  print 'The count is:', count
  count = count + 1

print "Good bye!"
```

The block here, consisting of the print and increment statements, is executed repeatedly until count is no longer less than 9. With each iteration, the current value of the index count is displayed and then increased by 1.

The Infinite Loop

A loop becomes infinite loop if a condition never becomes FALSE. You must use caution when using while loops because of the possibility that this condition never resolves to a FALSE value. This results in a loop that never ends. Such a loop is called an infinite loop.

An infinite loop might be useful in client/server programming where the server needs to run continuously so that client programs can communicate with it as and when required.

```
#!/usr/bin/python

var = 1
while var == 1 :  # This constructs an infinite loop
  num = raw_input("Enter a number  :")
  print "You entered: ", num

print "Good bye!"
```

When the above code is executed, it produces the following result –

```
Enter a number  :20
You entered:  20
Enter a number  :29
You entered:  29
Enter a number  :3
You entered:  3
Enter a number between :Traceback (most recent call last):
  File "test.py", line 5, in <module>
    num = raw_input("Enter a number :")
KeyboardInterrupt
```

Above example goes in an infinite loop and you need to use CTRL+C to exit the program.

Using else Statement with While Loop

Python supports to have an **else** statement associated with a loop statement.

- If the **else** statement is used with a **while** loop, the **else** statement is executed when the condition becomes false.

The following example illustrates the combination of an else statement with a while statement that prints a number as long as it is less than 5, otherwise else statement gets executed.

```
#!/usr/bin/python

count = 0
while count < 5:
  print count, " is  less than 5"
  count = count + 1
else:
  print count, " is not less than 5"
```

When the above code is executed, it produces the following result –

```
0 is less than 5
1 is less than 5
2 is less than 5
3 is less than 5
4 is less than 5
5 is not less than 5
```

Single Statement Suites

Similar to the **if** statement syntax, if your **while** clause consists only of a single statement, it may be placed on the same line as the while header.

Here is the syntax and example of a **one-line while** clause –

```
#!/usr/bin/python

flag = 1
while (flag): print 'Given flag is really true!'
print "Good bye!"
```

It is better not try above example because it goes into infinite loop and you need to press CTRL+C keys to exit

Python nested loops

Python programming language allows to use one loop inside another loop. Following section shows few examples to illustrate the concept.

Syntax

```
for iterating_var in sequence:
  for iterating_var in sequence:
    statements(s)
  statements(s)
```

The syntax for a **nested while loop** statement in Python programming language is as follows –

```
while expression:
  while expression:
    statement(s)
  statement(s)
```

A final note on loop nesting is that you can put any type of loop inside of any other type of loop. For example a for loop can be inside a while loop or vice versa.

Example

The following program uses a nested for loop to find the prime numbers from 2 to 100 –

```
#!/usr/bin/python

i = 2
while(i < 100):
  j = 2
  while(j <= (i/j)):
    if not(i % j):  break
    j = j + 1
  if (j > i/j) : print i, " is prime"
  i = i + 1

print "Good bye!"
```

Python break statement

It terminates the current loop and resumes execution at the next statement, just like the traditional break statement in C.

The most common use for break is when some external condition is triggered requiring a hasty exit from a loop. The **break** statement can be used in both *while* and *for* loops.

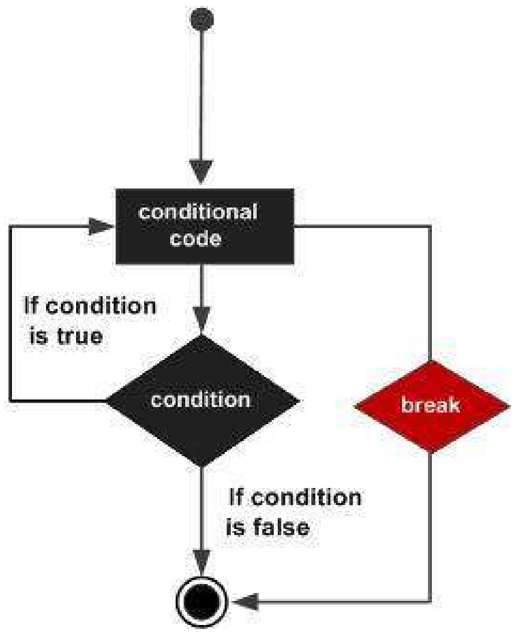
If you are using nested loops, the break statement stops the execution of the innermost loop and start executing the next line of code after the block.

Syntax

The syntax for a **break** statement in Python is as follows –

```
break
```

Flow Diagram



Example

```
#!/usr/bin/python

for letter in 'Python':     # First Example
  if letter == 'h':
    break
  print 'Current Letter :', letter

var = 10                    # Second Example
while var > 0:
  print 'Current variable value :', var
  var = var -1
  if var == 5:
    break

print "Good bye!"
```

Python continue statement

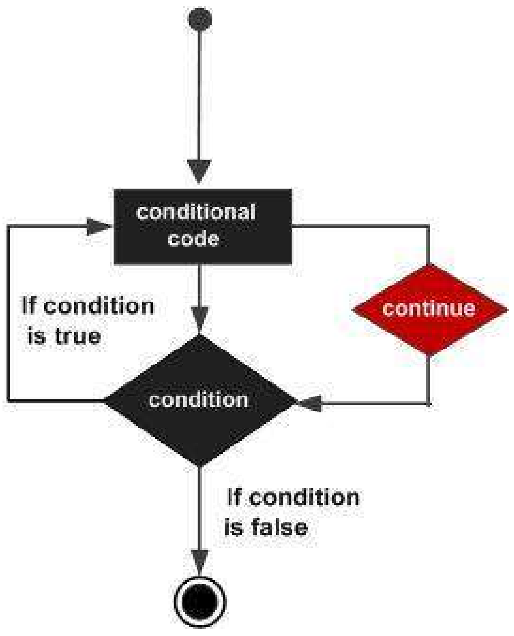
It returns the control to the beginning of the while loop.. The **continue** statement rejects all the remaining statements in the current iteration of the loop and moves the control back to the top of the loop.

The **continue** statement can be used in both *while* and *for* loops.

Syntax

```
continue
```

Flow Diagram



Example

```
#!/usr/bin/python

for letter in 'Python':     # First Example
   if letter == 'h':
      continue
   print 'Current Letter :', letter

var = 10                    # Second Example
while var > 0:
   var = var -1
   if var == 5:
      continue
   print 'Current variable value :', var
print "Good bye!"
```

Python pass Statement

It is used when a statement is required syntactically but you do not want any command or code to execute.

The **pass** statement is a *null* operation; nothing happens when it executes. The **pass** is also useful in places where your code will eventually go, but has not been written yet (e.g., in stubs for example) –

Syntax

```
pass
```

Example

```
#!/usr/bin/python

for letter in 'Python':
   if letter == 'h':
      pass
      print 'This is pass block'
   print 'Current Letter :', letter
print "Good bye!"
```

String Methods

Method	Description
capitalize()	Converts the first character to upper case
casefold()	Converts string into lower case
center()	Returns a centered string
count()	Returns the number of times a specified value occurs in a string
encode()	Returns an encoded version of the string
endswith()	Returns true if the string ends with the specified value
expandtabs()	Sets the tab size of the string
find()	Searches the string for a specified value and returns the position of where it was found
format()	Formats specified values in a string
format_map()	Formats specified values in a string
index()	Searches the string for a specified value and returns the position of where it was found

isalnum()	Returns True if all characters in the string are alphanumeric
isalpha()	Returns True if all characters in the string are in the alphabet
isascii()	Returns True if all characters in the string are ascii characters
isdecimal()	Returns True if all characters in the string are decimals
isdigit()	Returns True if all characters in the string are digits
isidentifier()	Returns True if the string is an identifier
islower()	Returns True if all characters in the string are lower case
isnumeric()	Returns True if all characters in the string are numeric
isprintable()	Returns True if all characters in the string are printable
isspace()	Returns True if all characters in the string are whitespaces
istitle()	Returns True if the string follows the rules of a title
isupper()	Returns True if all characters in the string are upper case
join()	Converts the elements of an iterable into a string
ljust()	Returns a left justified version of the string
lower()	Converts a string into lower case
lstrip()	Returns a left trim version of the string

maketrans()	Returns a translation table to be used in translations
partition()	Returns a tuple where the string is parted into three parts
replace()	Returns a string where a specified value is replaced with a specified value
rfind()	Searches the string for a specified value and returns the last position of where it was found
rindex()	Searches the string for a specified value and returns the last position of where it was found
rjust()	Returns a right justified version of the string
rpartition()	Returns a tuple where the string is parted into three parts
rsplit()	Splits the string at the specified separator, and returns a list
rstrip()	Returns a right trim version of the string
split()	Splits the string at the specified separator, and returns a list
splitlines()	Splits the string at line breaks and returns a list
startswith()	Returns true if the string starts with the specified value

strip()	Returns a trimmed version of the string
swapcase()	Swaps cases, lower case becomes upper case and vice versa
title()	Converts the first character of each word to upper case
translate()	Returns a translated string
upper()	Converts a string into upper case
zfill()	Fills the string with a specified number of 0 values at the beginning