Strings

Chapter 6

Python for Everybody
www.py4e.com

String Data Type

- A string is a sequence of characters
- A string literal uses quotes 'Hello' or "Hello"
- For strings, + means "concatenate"
- When a string contains numbers, it is still a string
- We can convert numbers in a string into a number using int()

```
>>> str1 = "Hello"
>>> str2 = 'there'
>>> bob = str1 + str2
>>> print(bob)
Hellothere
>>> str3 = '123'
>>> str3 = str3 + 1
Traceback (most recent call
last):  File "<stdin>", line 1,
in <module>
TypeError: cannot concatenate
'str' and 'int' objects
>>> x = int(str3) + 1
>>> print(x)
124
>>>
```

Reading and Converting

- We prefer to read data in using strings and then parse and convert the data as we need
- This gives us more control over error situations and/or bad user input
- Input numbers must be converted from strings

```
>>> name = input('Enter:')
Enter:Chuck
>>> print(name)
Chuck
>>> apple = input('Enter:')
Enter:100
>>> x = apple - 10
Traceback (most recent call
last):  File "<stdin>", line 1,
in <module>
TypeError: unsupported operand
type(s) for -: 'str' and 'int'
>>> x = int(apple) - 10
>>> print(x)
90
```

Looking Inside Strings

- We can get at any single character in a string using an index specified in square brackets
- The index value must be an integer and starts at zero
- The index value can be an expression that is computed

b	a	n	a	n	a
0	1	2	3	4	5

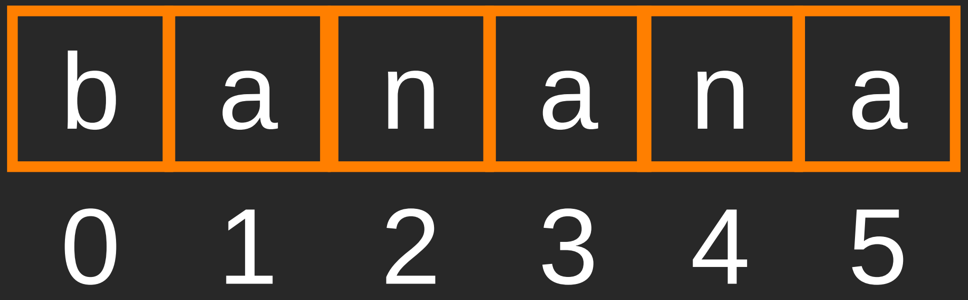
```
>>> fruit = 'banana'
>>> letter = fruit[1]
>>> print(letter)
a
>>> x = 3
>>> w = fruit[x - 1]
>>> print(w)
n
```

A Character Too Far

- You will get a python error if you attempt to index beyond the end of a string.
- So be careful when constructing index values and slices

```
>>> zot = 'abc'
>>> print(zot[5])
Traceback (most recent call
last):  File "<stdin>", line
1, in <module>IndexError:
string index out of range
>>>
```

Strings Have Length



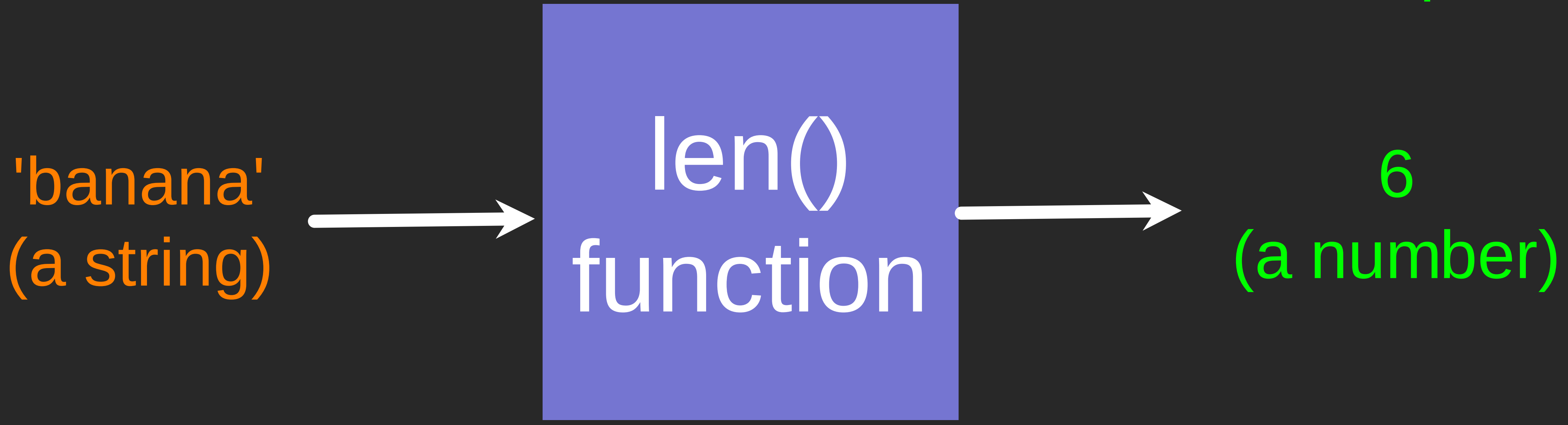
The built-in function len gives us the length of a string

```
>>> fruit = 'banana'
>>> print(len(fruit))
6
```

len Function (1 of 2)

```
>>> fruit = 'banana'
>>> x = len(fruit)
>>> print(x)
6
```

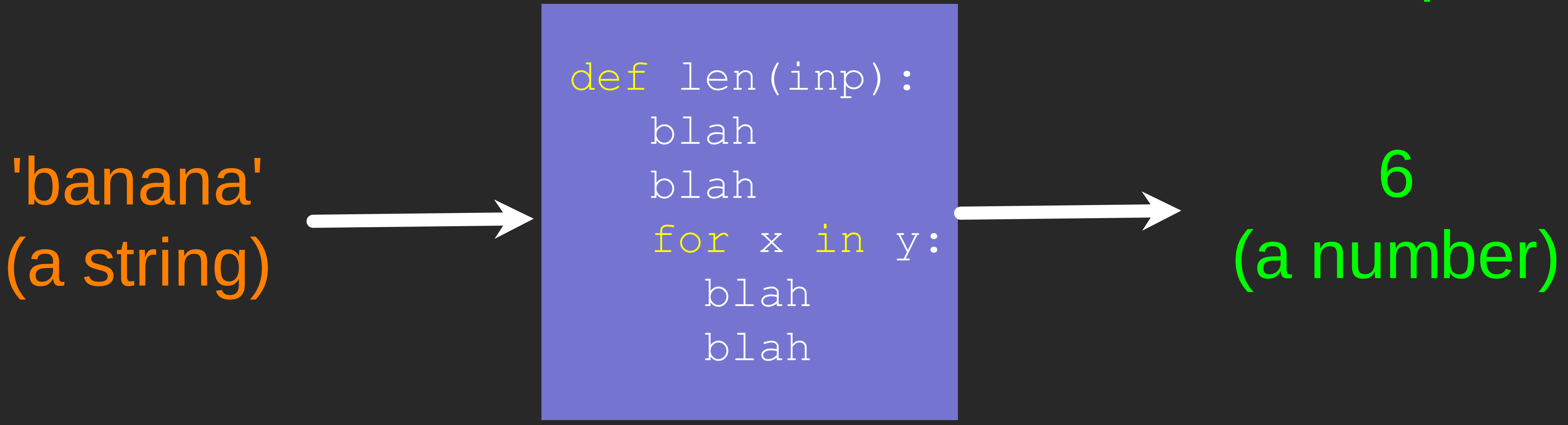
A function is some stored code that we use. A function takes some input and produces an output.



len Function (2 of 2)

```
>>> fruit = 'banana'
>>> x = len(fruit)
>>> print(x)
6
```

A function is some stored code that we use. A function takes some input and produces an output.



'banana'
(a string)

```
def len(inp):
   blah
   blah
   for x in y:
     blah
     blah
```

6
(a number)

Looping Through Strings (1 of 3)

Using a while statement and an iteration variable, and the len function, we can construct a loop to look at each of the letters in a string individually

```
fruit = 'banana'
index = 0
while index < len(fruit):
    letter = fruit[index]
    print(index, letter)
    index = index + 1
```

```
0 b
1 a
2 n
3 a
4 n
5 a
```

Looping Through Strings (2 of 3)

- A definite loop using a for statement is much more elegant
- The iteration variable is completely taken care of by the for loop

```
fruit = 'banana'
for letter in fruit:
    print(letter)
```

```
b
a
n
a
n
a
```

Looping Through Strings (3 of 3)

- A definite loop using a for statement is much more elegant
- The iteration variable is completely taken care of by the for loop

```
fruit = 'banana'
for letter in fruit :
    print(letter)


index = 0
while index < len(fruit) :
    letter = fruit[index]
    print(letter)
    index = index + 1
```

```
b
a
n
a
n
a
```

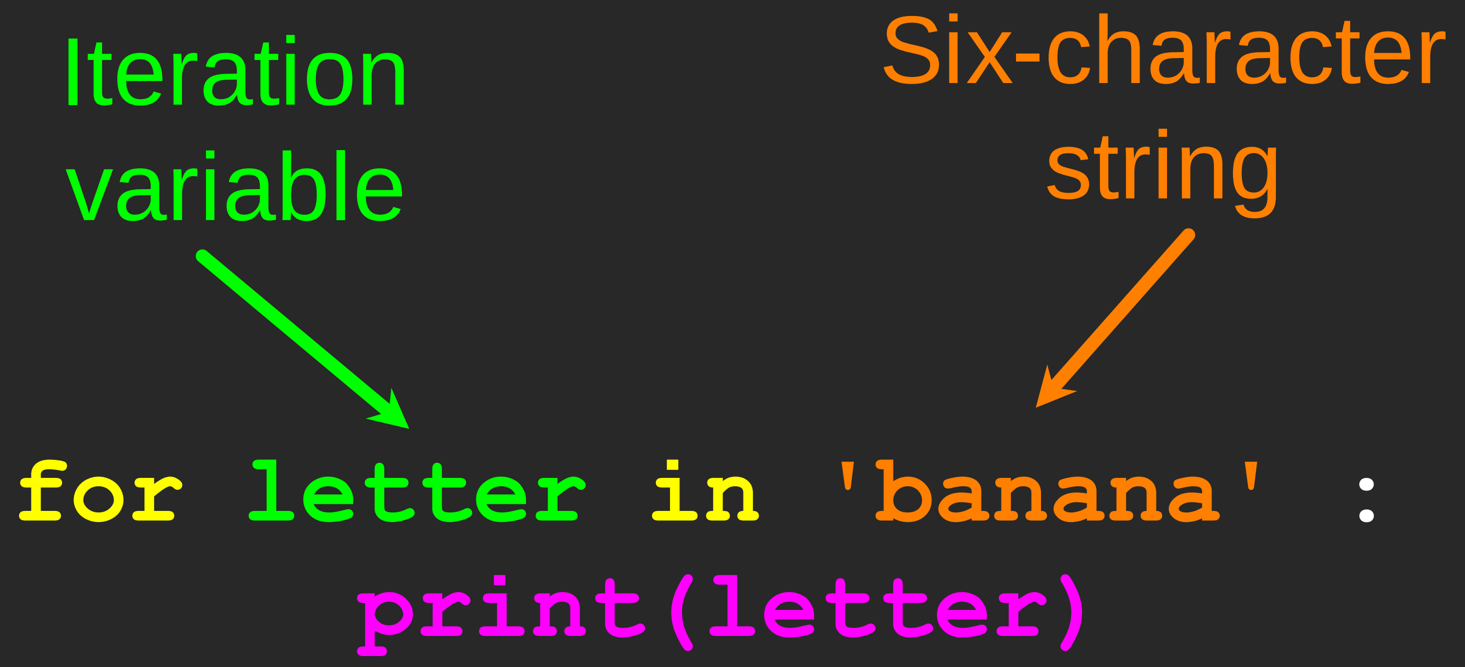
Looping and Counting

This is a simple loop that loops through each letter in a string and counts the number of times the loop encounters the 'a' character

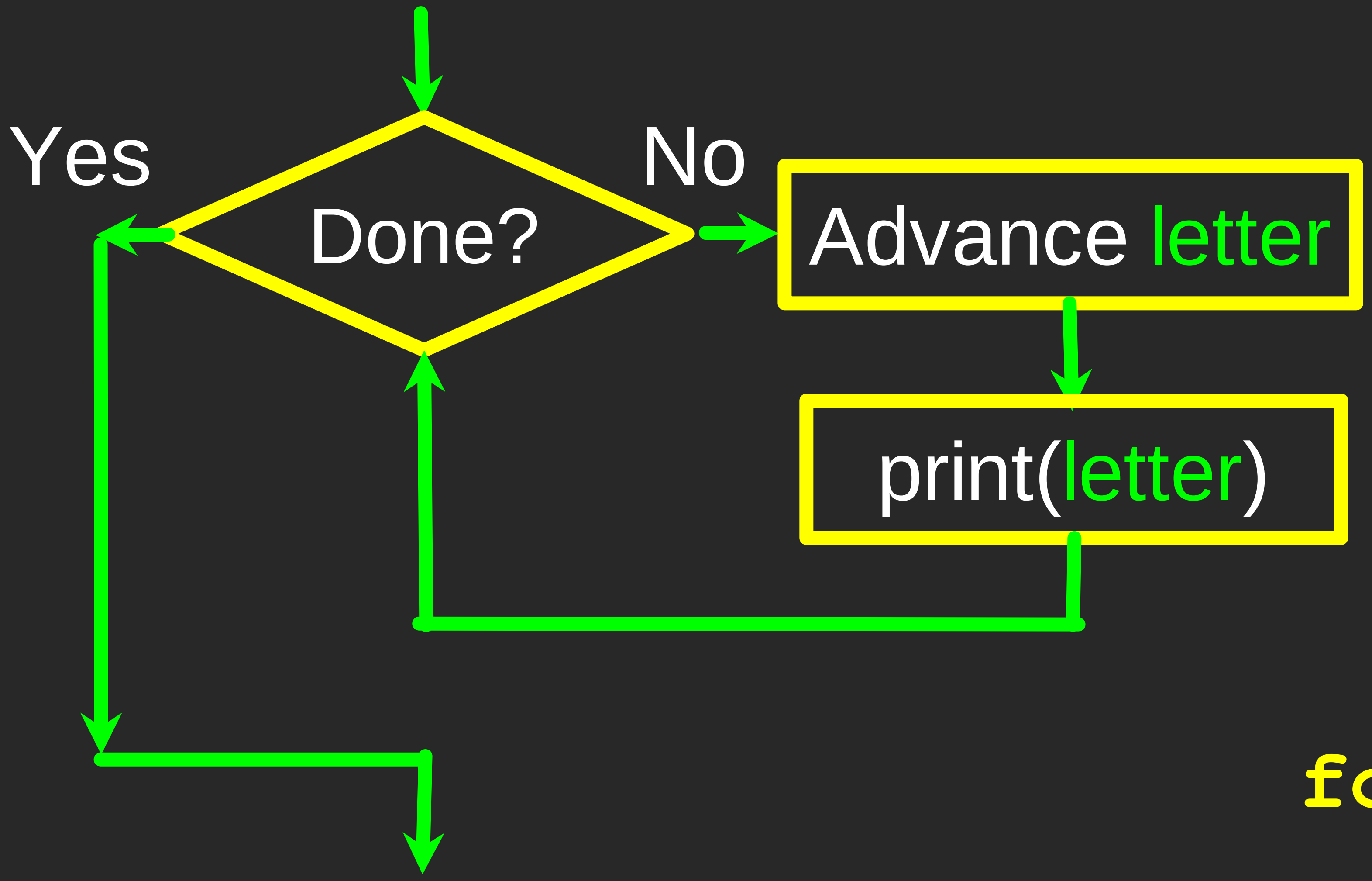
```
word = 'banana'
count = 0
for letter in word :
    if letter == 'a' :
        count = count + 1
print(count)
```

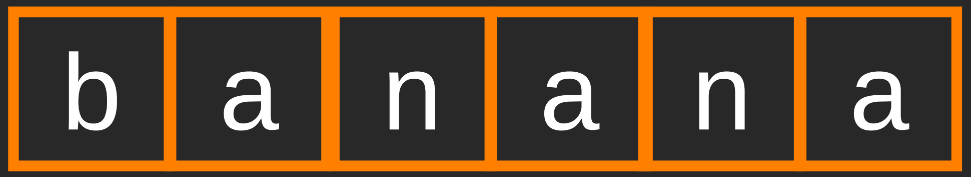
Looking Deeper into in

- The iteration variable “iterates” through the sequence (ordered set)
- The block (body) of code is executed once for each value in the sequence
- The iteration variable moves through all of the values in the sequence



```
for letter in 'banana' :
    print(letter)
```





```
for letter in 'banana' :
    print(letter)
```

The iteration variable "iterates" through the string and the block (body) of code is executed once for each value in the sequence

Slicing Strings (1 of 2)

M	o	n	t	y		P	y	t	h	o	n
0	1	2	3	4	5	6	7	8	9	10	11

- We can also look at any continuous section of a string using a colon operator
- The second number is one beyond the end of the slice - “up to but not including”
- If the second number is beyond the end of the string, it stops at the end

```
>>> s = 'Monty Python'
>>> print(s[0:4])
Mont
>>> print(s[6:7])
P
>>> print(s[6:20])
Python
```

Slicing Strings (2 of 2)

M	o	n	t	y		P	y	t	h	o	n
0	1	2	3	4	5	6	7	8	9	10	11

If we leave off the first number or the last number of the slice, it is assumed to be the beginning or end of the string respectively

```
>>> s = 'Monty Python'
>>> print(s[:2])
Mo
>>> print(s[8:])
thon
>>> print(s[:])
Monty Python
```

Manipulating Strings..

Acknowledgements / Contributions