

# String Concatenation

When the `+` operator is applied to strings, it means “concatenation”

```
>>> a = 'Hello'
>>> b = a + 'There'
>>> print(b)
HelloThere
>>> c = a + ' ' + 'There'
>>> print(c)
Hello There
>>>
```



# Using **in** as a Logical Operator

- The **in** keyword can also be used to check to see if one string is “in” another string
- The **in** expression is a logical expression that returns **True** or **False** and can be used in an **if** statement

```
>>> fruit = 'banana'
>>> 'n' in fruit
True
>>> 'm' in fruit
False
>>> 'nan' in fruit
True
>>> if 'a' in fruit :
...     print('Found it!')
...
Found it!
>>>
```



# String Comparison

```
if word == 'banana':  
    print('All right, bananas.')  
if word < 'banana':  
    print('Your word, ' + word + ', comes before banana.')elif word > 'banana':  
    print('Your word, ' + word + ', comes after banana.')else:  
    print('All right, bananas.')
```



- Python has a number of string **functions** which are in the **string library**
- These **functions** are already **built into** every string - we invoke them by appending the function to the string variable
- These **functions** do not modify the original string, instead they return a new string that has been altered

# String Library

```
>>> greet = 'Hello Bob'
>>> zap = greet.lower()
>>> print(zap)
hello bob
>>> print(greet)
Hello Bob
>>> print('Hi There'.lower())
hi there
>>>
```



```
>>> stuff = 'Hello world'
>>> type(stuff)
<class 'str'>
>>> dir(stuff)
['capitalize', 'casefold', 'center', 'count', 'encode',
'endswith', 'expandtabs', 'find', 'format', 'format_map',
'index', 'isalnum', 'isalpha', 'isdecimal', 'isdigit',
'isidentifier', 'islower', 'isnumeric', 'isprintable', 'isspace',
'istitle', 'isupper', 'join', 'ljust', 'lower', 'lstrip',
'maketrans', 'partition', 'replace', 'rfind', 'rindex', 'rjust',
'rstrip', 'rsplit', 'rstrip', 'split', 'splitlines',
'startswith', 'strip', 'swapcase', 'title', 'translate', 'upper',
'zfill']
```

<https://docs.python.org/3/library/stdtypes.html#string-methods>



**str.replace(*old*, *new*[, *count*])**

Return a copy of the string with all occurrences of substring *old* replaced by *new*. If the optional argument *count* is given, only the first *count* occurrences are replaced.

**str.rfind(*sub*[, *start*[, *end*]])**

Return the highest index in the string where substring *sub* is found, such that *sub* is contained within *s*[*start*:*end*]. Optional arguments *start* and *end* are interpreted as in slice notation. Return `-1` on failure.

**str.rindex(*sub*[, *start*[, *end*]])**

Like `rfind()` but raises `ValueError` when the substring *sub* is not found.

**str.rjust(*width*[, *fillchar*])**

Return the string right justified in a string of length *width*. Padding is done using the specified *fillchar* (default is an ASCII space). The original string is returned if *width* is less than or equal to `len(s)`.

**str.rpartition(*sep*)**

Split the string at the last occurrence of *sep*, and return a 3-tuple containing the part before the separator, the separator itself, and the part after the separator. If the separator is not found, return a 3-tuple containing two empty strings, followed by the string itself.

**str.rsplit(*sep*=None, *maxsplit*=-1)**

Return a list of the words in the string, using *sep* as the delimiter string. If *maxsplit* is given, at most *maxsplit* splits are done, the *rightmost* ones. If *sep* is not specified or `None`, any whitespace string is a separator. Except for splitting from the right, `rsplit()` behaves like `split()` which is described in detail below.



# String Library

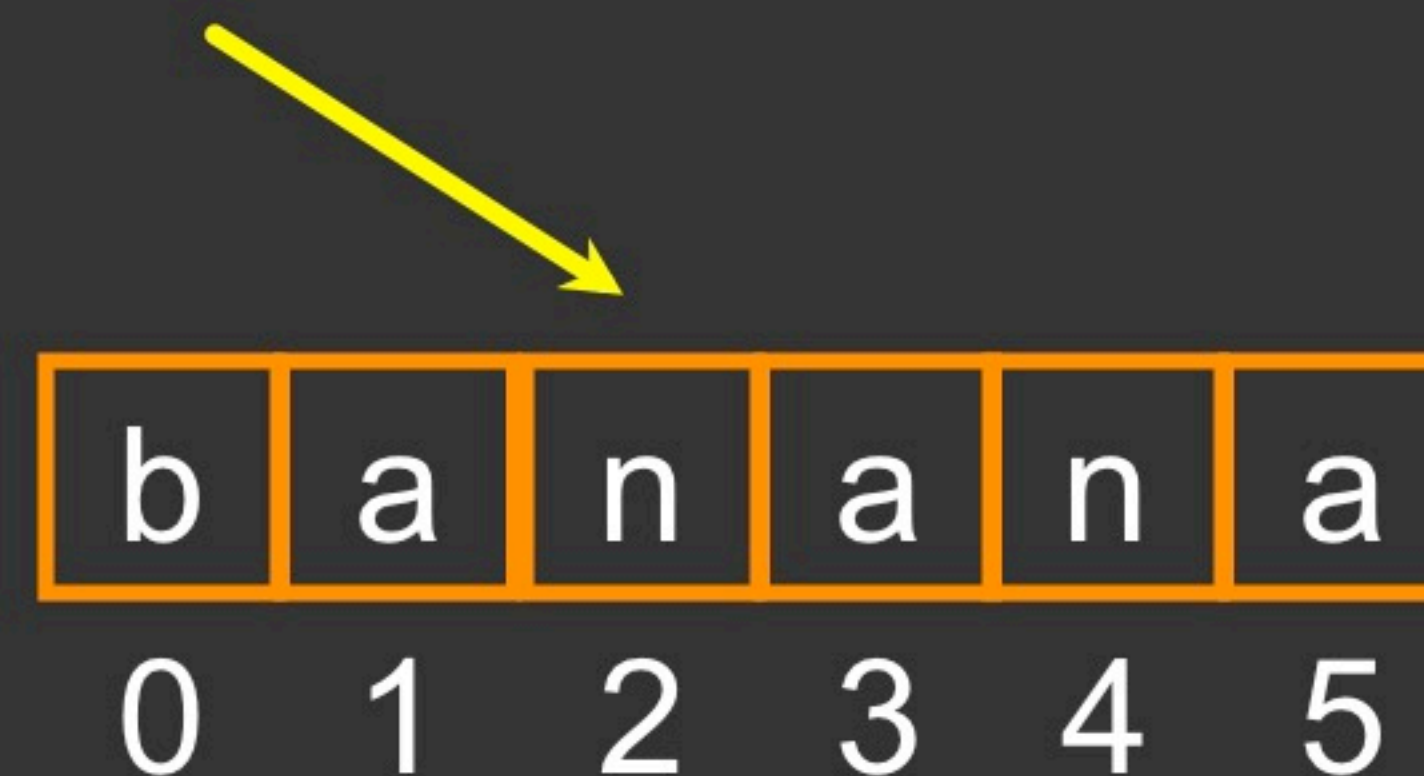
```
str.capitalize()  
str.center(width[, fillchar])  
str.endswith(suffix[, start[, end]])  
str.find(sub[, start[, end]])  
str.lstrip([chars])
```

```
str.replace(old, new[, count])  
str.lower()  
str.rstrip([chars])  
str.strip([chars])  
str.upper()
```



# Searching a String

- We use the `find()` function to search for a substring within another string
- `find()` finds the first occurrence of the substring
- If the substring is not found, `find()` returns `-1`
- Remember that string position starts at zero



```
>>> fruit = 'banana'
>>> pos = fruit.find('na')
>>> print(pos)
2
>>> aa = fruit.find('z')
>>> print(aa)
-1
```



# Making Everything UPPER CASE

- You can make a copy of a string in **lower case** or **upper case**
- Often when we are searching for a string using **find()** we first convert the string to lower case so we can search a string regardless of case

```
>>> greet = 'Hello Bob'
>>> nnn = greet.upper()
>>> print(nnn)
HELLO BOB
>>> www = greet.lower()
>>> print(www)
hello bob
>>>
```



# Search and Replace

- The `replace()` function is like a “search and replace” operation in a word processor
- It replaces **all occurrences** of the **search string** with the **replacement string**

```
>>> greet = 'Hello Bob'
>>> nstr = greet.replace('Bob', 'Jane')
>>> print(nstr)
Hello Jane
>>> nstr = greet.replace('o', 'x')
>>> print(nstr)
Hel1x Bxb
>>>
```



# Stripping Whitespace

- Sometimes we want to take a string and remove whitespace at the beginning and/or end
- `lstrip()` and `rstrip()` remove whitespace at the left or right
- `strip()` removes both beginning and ending whitespace

```
>>> greet = '    Hello Bob    '  
>>> greet.lstrip()  
'Hello Bob '  
>>> greet.rstrip()  
'    Hello Bob'  
>>> greet.strip()  
'Hello Bob'  
>>>
```



# Prefixes

```
>>> line = 'Please have a nice day'
```

```
>>> line.startswith('Please')
```

```
True
```

```
>>> line.startswith('p')
```

```
False
```



# Parsing and Extracting

21                      31  
↓                      ↓  
From stephen.marquard@uct.ac.za Sat Jan 5 09:14:16 2008

```
>>> data = 'From stephen.marquard@uct.ac.za Sat Jan 5 09:14:16 2008'
>>> atpos = data.find('@')
>>> print(atpos)
21
>>> sppos = data.find(' ', atpos)
>>> print(sppos)
31
>>> host = data[atpos+1 : sppos]
>>> print(host)
uct.ac.za
```





# Strings and Character Sets

Python 2.7.10

```
>>> x = '이광춘'
>>> type(x)
<type 'str'>
>>> x = u'이광춘'
>>> type(x)
<type 'unicode'>
>>>
```

Python 3.5.1

```
>>> x = '이광춘'
>>> type(x)
<class 'str'>
>>> x = u'이광춘'
>>> type(x)
<class 'str'>
>>>
```

In Python 3, all strings are Unicode



# Summary

- String type
- Read/Convert
- Indexing strings []
- Slicing strings [2:4]
- Looping through strings with **for** and **while**
- Concatenating strings with +
- String operations
- String library
- String Comparisons
- Searching in strings
- Replacing text
- Stripping white space





## Acknowledgements / Contributions



These slides are Copyright 2010- Charles R. Severance ([www.dr-chuck.com](http://www.dr-chuck.com)) of the University of Michigan School of Information and [open.umich.edu](http://open.umich.edu) and made available under a Creative Commons Attribution 4.0 License. Please maintain this last slide in all copies of the document to comply with the attribution requirements of the license. If you make a change, feel free to add your name and organization to the list of contributors on this page as you republish the materials.

Initial Development: Charles Severance, University of Michigan School of Information

... Insert new Contributors and Translators here

...