THE UNIVERSITY OF WESTERN AUSTRALIA

Lecture 10
Strings

Objectives

- To understand the string data type and how strings are represented in a computer.
- To understand the basic idea of sequences and indexing as they apply to Python strings and lists.

The String Data Type

- The most common use of personal computers is word processing.
- Text is represented in programs by the string data type.
- A string is a sequence of characters enclosed within quotation marks (") or apostrophes (').

The String Data Type

```
>>> str1="Hello"
>>> str2='spam'
>>> print(str1, str2)
Hello spam
>>> type(str1)
<class 'str'>
>>> type(str2)
<class 'str'>
```

The String Data Type

- Getting a string as input

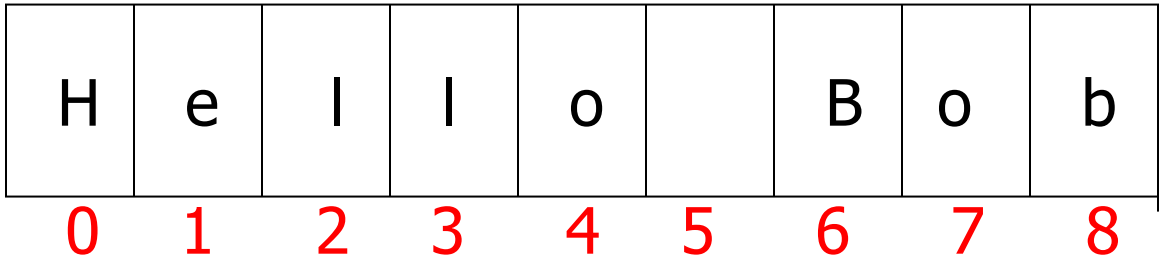
```
>>> firstName = input("Please enter your name: ”)
Please enter your name: John
>>> print("Hello", firstName)
Hello John
```

- Notice that the input is not evaluated. We want to store the typed characters, not to evaluate them as a Python expression, e.g. convert to `int`.

The String Data Type

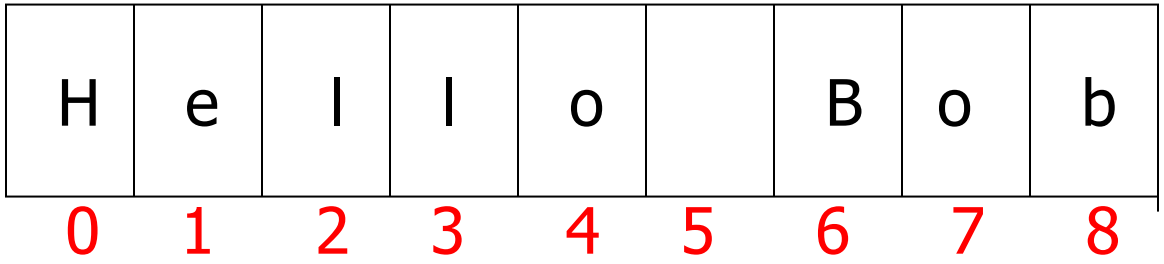
- We can access the individual characters in a string through indexing.
- The positions in a string are numbered from the left, starting with 0.
- The general form is <string>[<expr>] where the value of expr (i.e., an integer) determines which character is selected from the string.

The String Data Type




```
>>> greet = "Hello Bob"
>>> greet[0]
'H'
>>> print(greet[0], greet[2], greet[4])
H l o
>>> x = 8
>>> print(greet[x - 2])
B
```

The String Data Type



- In a string of *n* characters, the last character is at position *n-1* since we start counting with 0.
- We can index from the right side using negative indexes.

```
>>> greet[-1]
'b'
>>> greet[-3]
'B'
```

The String Data Type

- Indexing returns a string containing a single character from a larger string.

- We can also access a contiguous sequence of characters, called a substring, through a process called slicing.

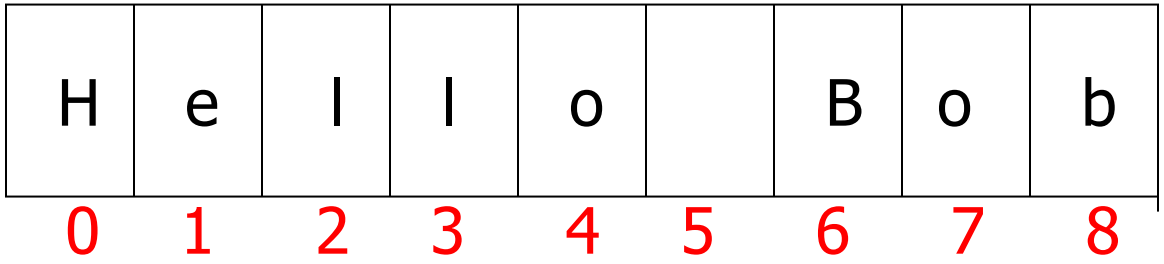
Slicing Strings

changhsinlee.com

The String Data Type

- Slicing:
  <string>[<start>:<end>]
- start and end should both be *ints*
- The slice contains the substring beginning at position start and runs up to **but does NOT include** the position end.

The String Data Type




```
>>> greet[0:3]
'Hel'
>>> greet[5:9]
' Bob'
>>> greet[:5]
'Hello'
>>> greet[5:]
' Bob'
>>> greet[:]
'Hello Bob'
```

This is same as `greet`

The String Data Type

- If either start or end expression is missing, then the start or the end of the string are used.
- Can we put two strings together into a longer string?
- Concatenation "glues" two strings together (+)
- Repetition builds up a string by multiple concatenations of a string with itself (*)

The String Data Type

Operator	Meaning
+	Concatenation
*	Repetition
<string>[]	Indexing
<string>[:]	Slicing
len(<string>)	Length
for <var> in <string>:	Iteration through characters

The String Data Type

```
>>> "spam" + "eggs"
'spameggs'
>>> "Spam" + "And" + "Eggs"
'SpamAndEggs'
>>> 3 * "spam"
'spamspamspam'
>>> "spam" * 5
'spamspamspamspamspam'
>>> (3 * "spam") + ("eggs" * 5)
'spamspamspameggseggseggseggseggs'
```

The String Data Type

The function `len()` is used to return the length of string.

```
>>> len("spam")
4
>>> for ch in "Spam!":
        print(ch, end=" ")

S p a m !
```

Note: ' ' printed after each character value

Summary

- We learned how strings are represented in a computer.
- We learned about substrings and string slicing.
- We learned how various operations can be performed on strings.