Computer Science

String manipulation

Lesson Objectives

Students will learn about:

- Commands that are used to manipulate strings
- String conversion operations in Python
- An example program to find the number of lowercase letters in a string using Python programming language.

Content

1.

String

- String is a data type used to store a number of characters.

Pseudocodes

- Consider a variable with name 'stringname'

- To obtain the length of the string: stringname.length is used

- To get a substring from the string:
  stringname.subString(startingPosition, numberOfCharacters) is used.
  Starting position of a string starts from value 0.

- Example: *stringname= "String handling"*
  Print(stringname.length) returns: 15
  Print(Stringname.substring(4,6)) returns: ng han

Pseudocodes

For converting cases, the following functions are used:

- stringname.upper: to convert to uppercase characters

- stringname.lower: to convert to lowercase characters

Note: These functions work perfectly in Python.

```
>>> stringname='Computer SCIENCE'
>>> stringname.upper()
'COMPUTER SCIENCE'
>>> stringname.lower()
'computer science'
>>>
```

Pseudocodes

- ASC() function is used to convert a character to its ASCII code.
- CHR() function is used to convert ASCII codes to its equivalent character

Example: *ASC ('A') = 65 and CHR(65)='A'*

len command

- This command is used to return the length of string.
- Python program to find the number of character in your name is given.

name=str(input('Enter your name '))

print ('The number of character in your name is ', len(name))

```
Enter your name Sophie
The number of character in your name is  6
```

Return character(s) from a string

- To return character from the string name, the command name[position of character] is used.

- name[0] returns the first character of the name. For eg: 'S' is returned if name='Sophie'

- name[2:3] returns the third character of the name. For eg: 'p' is returned if name='Sophie'

- name[1:4] returns the characters from position 1 to 4. For eg: 'oph' is returned if name='Sophie'

Return character(s) from a string: Output

```
>>> stringname='Python programming language'
>>> stringname[0]
'P'
>>> stringname[4:10]
'on pro'
>>> stringname[10:12]
'gr'
>>> stringname[7]
'p'
>>>
```

Locating sub-strings

- To check whether a substring is present in a string or not, 'sub-string' in string_name is used.

- This command returns TRUE if sub-string exists.

- The output for this example is shown.

```
string='I like chocolates'
print('like' in string)
print('flower' in string)
```

```
True
False
```

Locating sub-strings

- In Python programming, string.find(searchstring) is used to return the starting position of a searchstring.

- name.find('oph') where name='Sophie' returns value 1.

- This find command can also be used to check whether a substring is present in a string or not.

- Find command returns a value of -1 if the sub-string is not present.

- In VB.net, InStr(name,'oph') performs the same operation.

```
>>> string='I like chocolates'
>>> string.find('like')
2
>>> string.find('flower')
-1
```

Concatenation

- Two strings are combined to a single one using the + sign.

- An example with its output is shown.

string1=str(input('Enter your first string '))

string2=str(input('Enter your second string'))
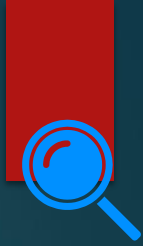
print (string1+string2)

```
Enter your first string Rose
Enter your second string Jasmine
RoseJasmine
```

Character ↔ ASCII code

- ord() function in Python is used to convert a character to its ASCII code.

- chr() function in Python is used to convert ASCII codes to its equivalent character

```
>>> ord('p')
112
>>> chr(112)
'p'
>>> ord('A')
65
>>> chr(98)
'b'
```

String conversion

- Programmers often change the data type stored within a variable. This is called casting.

- An integer is changed to string to be displayed as a message.

- String conversions: integer/ real numbers to string and vice versa.
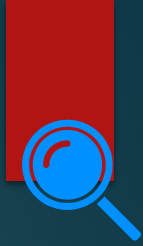
Integer/ real → String

- str(): Converts any specified value to string. The python code to converter a value 20 to string is:

    z=str(20)

    print(z)

- When the above code is run, 20 is printed in the screen.

String→ Integer

- int(): Converts specified string to integer. The python code to converter a string to integer is:

      x=int("45")

      print(x)

- When the above code is run, 45 is printed in the screen.

String→ Real

- float(): Converts specified string to real number. The python code to converter a string to real number is:

  x=float("5.5")

  print(x)

- When the above code is run, 5.5 is printed in the screen.

- int() function is used when the number is an integer, that is, does not have decimal places. In case, the number has decimal places, float () function is used.
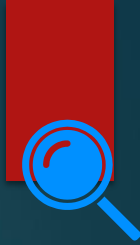
Example program

- Python program to calculate number of lowercase characters in a string is given.

- i takes each character from the string and checks whether it is in lowercase using the islower() method. If the condition is satisfied, the value of count is incremented.

```
string=str(input("Enter string:"))
count=0
for i in string:
    if(i.islower()):
        count=count+1
print("The number of lowercase characters is: ", count)
```

Example program

- Output:

```
Enter string:String programming IN PYTHON
The number of lowercase characters is:   16
>>> |
```

```python
string=str(input("Enter string:"))
count=0
for i in string:
    if(i.islower()):
        count=count+1
print("The number of lowercase characters is: ", count)
```

Let's review some concepts

len command

Command is used to return the length of string.

find command

string.find(searchstring) is used to return the starting position of a search string.

Find command returns a value of -1 if the sub-string is not present.

Return character(s) from a string

To return character from the string name, the command name[position of character] is used.

Concatenation

Two strings are combined to a single one using the + sign.

Locate substrings in a string To check whether a substring is present in a string or not, 'substring' in string_name is used.

String conversion operations

- str(): Integer/ real → String
- int(): String→ Integer
- float(): String→ Real

2.

Activity

Activity-1
Duration: 15 minutes

1. Create a Python program to calculate the number of vowels in a string.

2. Create a Python program to check if a string is a palindrome or not. Palindrome are strings which are same when read in both forward and reverse directions. For example: madam

3.

End of topic questions

End of topic questions

1. What command is used to number the characters in a string using Python programming language?

2. How can characters be returned from string? Explain your answer using a suitable example.

3. What command is used to find whether a substring is present in a string or not? Explain your answer using examples.

4. What command is used to find the starting position of a substring in a string using Python programming language?

End of topic questions

5. What symbol is used to concatenate two strings?

6. When is float() function used instead of int() function?

7. Create a python program to find the number of uppercase characters in a string.

8. Create a python program to find whether a substring is present in a string or not. If present, the program also returns the position of the sub-string.

Credit

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