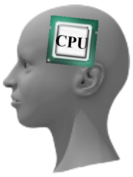
National 5 Computing Homework



Computational Thinking

Topic 5 - Built-In Functions

Name -

Grade - / 32

Feedback

All programming languages have built-in functions that allow basic tasks to be carried out without the need for additional code.

A few examples of text functions (in the language Python 3.3) are shown below:

len( ) The **Length** function counts the number of characters in a string

```
word = “Century”
print(len(word))
```

Output from Program

```
7
```

count( ) The **Count** function **r**eturns the number of times one string occurs in another string
Note - The count function is case sensitive so in the example below only 2 occurrences of “s” are found. The capital S is not counted.

```
sentence = “Six rain ridden summers”
print(sentence.count(“s”))
```

Output from Program

```
2
```

replace( ) The **Replace** function finds some given text in a string and replaces it with alternative text.

```
motto = “Work Hard, Study Hard”
newMotto = motto.replace(“Hard”,”Well”)
print(newMotto)
```

Output from Program

```
Work Well, Study Well
```

1. For each of the small programs below write down the expected output.

a)

```
word = “Processor”
print(len(word))
```

Output from Program (1)

```
9
```

b)

```
usersGuess = “Rio Grande”
print(len(word))
```

Output from Program (1)

```
10
```

c)

```
wordOne = “Tailor”
wordTwo = “Made”
wordsTogether = wordOne + wordTwo
print(len(wordsTogether))
```

Output from Program (1)

```
10
```

d)

```
lyrics = “Don't criticize what you can't understand”
print(lyrics.count(“c”))
```

Output from Program (1)

```
3
```

e)

```
quotation = “There are only two kinds of people who are really
fascinating: people who know absolutely everything, and people
who know absolutely nothing. - Oscar Wilde”
print(quotation.count(“re”))
```

Output from Program (1)

```
4
```

f)

```
quotation = “One day I will find the right words.”
quotationTwo = quotation.replace(“find”,”discover”)
print(quotationTwo)
```

Output from Program (1)

```
One day I will discover the right
words.
```

g)

```
quotation = “I met an old lady once, almost a hundred years old, and she told me…”
quotation = quotation.replace(“lady”,”gentleman”)
quotation = quotation.replace(“she”,”he”)
print(quotation)
```

Output from Program (1)

```
I met an old gentleman once, almost
a hundred years old, and he told
me…
```

Created by Mr G Reid, PTC Technologies, Buckhaven High School, September 2013

2. The following examples combine two or more of the text functions. Like before, try and predict the output from the following. You may wish to use a bit of scrap paper to scribble your working on.

a)

```
word = “Code & Coding”
word  = word.replace(“Code”,”Programs”)
print(word)
print(len(word))
```

Output from Program

```
Programs & Coding
17
```

(1)

b)

```
quotationPart1 = “Nobody”
quotationPart2 = “can make you feel inferior without your”
quotationPart3 = “consent”
total = len(quotationPart1) + len(quotationPart3) + quotationPart2.count(“e”)
print(total)
```

Output from Program

```
17
```

(1)

c)

```
password = “hheeh_shh01”
password = password.replace(“hh”,“fff”)
password = password.replace(“ee”,“e”)
print(“Number of characters in password =”,len(password))
```

Output from Program

```
Number of characters in password = 12
```

(1)

d)

```
sentenceOne = “The to boys learned to new skills”
sentenceTwo = sentenceOne.replace(“to”,“two”)
sentenceThree = sentenceTwo.replace(“boy”,“girls”)
totalLetterW = sentenceOne.count(“w”) + sentenceTwo.count(“w”) + sentenceThree.count(“w”)
totalLetterB = sentenceOne.count(“b”) + sentenceTwo.count(“b”) + sentenceThree.count(“b”)
print(totalLetterW + totalLetterB)
```

Output from Program

```
9
```

(1)

e)

```
messageScrambled = “t s d 20:30”
if len(messageScrambled) >= 15:
    messageScrambled = messageScrambled.replace(“t”,“Don’t”)
    messageScrambled = messageScrambled.replace(“s”,“Arrive”)
    messageScrambled = messageScrambled.replace(“d”,“at”)
else:
    messageScrambled = messageScrambled.replace(“t”,“Meet”)
    messageScrambled = messageScrambled.replace(“s”,“me”)
    messageScrambled = messageScrambled.replace(“d”,“at”)
if (len(messageScrambled) >= 15:
    message = messageScrambled.replace(“20”,“18”)
else:
    message = messageScrambled.replace(“30”,“15”)
print(message)
```

Output from Program

```
Meet me at 18:30
```

(1)

3. Using the inputs given, predict what the output will be from the following small program.

```
usersWord = str(input(“Please enter a word of your choice”))
a = usersWord.count(“a”)
e = usersWord.count(“e”)
i = usersWord.count(“i”)
o = usersWord.count(“o”)
u = usersWord.count(“u”)
vow = a + e + i + o + u
cons = len(usersWord) - vow
print(“Vowels =”,vow,“, Consonants =”,cons)
```

	Input Entered		Output from Program	
a)	software	→	Vowels = 3 , Consonants = 5	(1)
b)	assignment	→	Vowels = 3 , Consonants = 7	(1)
c)	conditional	→	Vowels = 5 , Consonants = 6	(1)
d)	python	→	Vowels = 1 , Consonants = 5	(1)

The most common type of built-in functions found in programming languages are mathematical functions.

A few examples of mathematical functions (in the language Python 3.3) are shown below:

round( ) The **Round** function reduces the number of decimal places in a number rounding up or down as required. In the example below 4.6783 is rounded to 1 decimal place.

```
number = round(4.6783,1)
print(number)
```

```
Output from Program
4.7
```

int( ) The **Integer** function changes a real number into an integer by removing all the decimal places, without rounding up or down.

```
number = 4.6783
print(int(number))
```

```
Output from Program
4
```

ceil( ) The **Ceiling** function round a real number up to the nearest integer. Note that this function requires “import math” at the top of your program.

```
import math
number = math.ceil(4.6783)
print(number)
```

```
Output from Program
5
```

% The **Modulus** function calculates the remainder when one number is divided by another.

```
leftOver = 13%5
print(number)
```

```
Output from Program
3
```

pow( ) The **Power** multiplies one number to the power of another number. The example below would calculate 4 to the power of 2 (or 4 squared).

```
answer = pow(4,2)
```

```
Output from Program
16
```

4. For each of the small programs below write down the expected output.

a)

```
height = 193.734
print(round(height,2)
```

```
Output from Program
193.73
```

(1)

b)

```
shoeSize = 10.3
print(round(shoeSize,0))
```

```
Output from Program
10
```

(1)

c)

```
weight = 78.65
print(math.ceil(weight))
```

```
Output from Program
79
```

(1)

d)

```
offcut = 25%7
print(offcut)
```

```
Output from Program
4
```

(1)

e)

```
value = 12.5%3
print(math.ceil(value))
```

```
Output from Program
1
```

(1)

f)

```
measurement = 3.48
woodNeeded = math.ceil(measurement)
print(woodNeeded)
```

```
Output from Program
4
```

(1)

g)

```
value = 57.884
value = round(value,1)
print(ceil(value))
```

```
Output from Program
58
```

(1)

h)

```
cat = 5.91
dog = int(cat)
print(pow(dog,2))
```

Output from Program

25

(1)

i)

```
cake = 99.9999
cake = 100 - int(cake)
cake = cake + 2
print(pow(cake,cake))
```

Output from Program

27

(1)

j)

```
guess = 12
guess2 = pow(guess,2)
print(int((guess2-44)/3))
```

Output from Program

33

(1)

5. Using the inputs given, predict what the output will be from the following program.

```
import math
usersOption = str(input(“Please enter a mathematical function of your choice”))
numberOne = float(input(“Please enter the first number”))
numberTwo = float(input(“Please enter the second number”))
if usersOption == “integer”:
        answer = int(numberOne + numberTwo)
elif usersOption == “modulus”:
        answer = numberOne%numberTwo
        answer = numberOne%answer
elif usersOption == “ceiling”:
        answer = math.ceil(numberOne + numberTwo)
        answer = math.ceil(answer/2)
elif usersOption == “square”:
        answer = pow((int(numberOne) + int(numberTwo)),2)
        answer = pow(int(numberOne),2) + answer
elif usersOption == “round”:
        answer = round((numberOne + numberTwo),1)
        answer = round(answer + 0.7,0)
else:
        answer = int(numberOne)+pow(numberTwo,2)+math.ceil(numberOne)+round(numberTwo,2)
print(answer)
```

	usersOption	numberOne	numberTwo	Output from Program	
a)	square	5.2	3.9	89	(1)
b)	modulus	39	5	3	(1)
c)	ceiling	23.79	14.38	20	(1)
d)	integer	7.845	13.1	20	(1)
e)	round	34.55	8.13	43	(1)
f)	percentage	6.7	7	69	(1)