

Work through the following sections. Seek assistance whenever needed. From <http://schmidt.nuigalway.ie/cs102/python> files with Python programs can be downloaded. Present your results to one of the demonstrators, so that a record of your achievements can be kept.

16. TRUE OR FALSE?

1. Python uses the percent sign as a string-formatting operator.
2. The process of associating a file with a variable in a program is called “reading” the file.
3. Programmers rarely define their own functions.
4. A function may only be called at one place in a program.
5. Information can be passed into a function through parameters.
6. Every Python function returns some value.
7. In Python, a function can only return one value.
8. Python functions can never modify a parameter.
9. One reason to use functions is to reduce code duplication.
10. It's a bad idea to define a new function if it makes a program longer.

17. MULTIPLE CHOICE.

1. Which of the following is not a legal format specifier?
a) %3f b) %3l c) %-8.3f d) %05d
2. Which of the following is not a file reading method in Python?
a) read b) readall c) readline d) readlines
3. The part of a program that uses a function is called the
a) user b) caller c) callee d) statement
4. A Python function definition begins with the keyword
a) def b) define c) function d) defun
5. A function can send output back to the program with a
a) send b) print c) output d) return
6. Formal parameters and arguments are matched up by
a) name b) position c) ID d) interests
7. Which of the following is not a step in the function calling process?
(a) the calling program suspends
(b) the formal parameters are assigned the values of the actual arguments
(c) the body of the function executes
(d) control returns to the point just before the function was called.
8. A function with no return statement returns
a) nothing b) its parameters c) its variables d) None

9. A function can modify the value of an argument only if it is
 a) mutable b) a list c) passed by reference d) a variable

18. PROGRAMMING EXERCISES.

- Show the string that would result from each of the following string formatting operations. If the operation is not legal explain why.
 - "Looks like %s and %s for breakfast" % ("ham", "eggs")
 - "This is %d %s %d %s" % (2, "fast", 4, "me")
 - "Hello %s" % ("Joe", "Smith")
 - "%0.2f %0.2f" % (1.4, 1.4142)
 - "%7.5f %7.5f" % (1.4, 1.4142)
 - "Time left %02d:%05.2f" % (1, 37.374)
 - "%3d" % ("14")
- Write a program that counts the number of words in a sentence entered by the user.
- Write a program that calculates the average word length in a sentence entered by the user.
- Write a definition for a function `sumN(n)` that returns the sum of the first `n` nonnegative integers. Write a definition for a function `sumNCubes(n)` that returns the sum of the cubes of the first `n` nonnegative integers. Then use these functions in a program that prompts the user for `n` and prints out the sum of the first `n` nonnegative integers and the sum of the cubes of the first `n` nonnegative integers.
- According to *Heron's Formula*, the area A of a triangle with sides of length a , b , and c can be calculated as

$$A = \sqrt{s(s-a)(s-b)(s-c)}, \quad \text{where } s = \frac{1}{2}(a+b+c).$$

Write a function that computes the area of a triangle given the lengths of its three sides as parameters. Use your function to augment the program `triangle2.py` so that it also displays the area of the triangle.

- Write and test a function `sumList(numbers)` which takes a list `numbers` as its argument and returns the sum of the numbers in the list.
- Write and test a function `squareList(numbers)` which takes a list `numbers` as its argument and modifies the list by replacing each number in the list by its square.
- Write and test a function `toNumbers(strings)` which takes a list `strings` of strings as its argument and modifies each entry in the list by converting it to a number.
- Use the previous three functions to implement a program that computes the sum of the squares of numbers read from a file, containing one number per line. Your program should prompt for a file name and print out the sum of the squares. (Hint: use `readlines()`.)