Sub programs – functions and procedures

1. Which of the following statements is MOST TRUE about procedures and functions in programming?

   a) Procedures and functions are interchangeable terms; they both perform specific tasks but don't return values.

   b) Procedures always return a value, while functions may or may not return a value.

   c) Functions are pre-defined by the programming language, while procedures are written by the programmer.

   d) Functions always return a value, while procedures NEVER return a value

2. What is a key benefit of using procedures and functions in programming?

   a) They prevent errors by making code more complex and difficult to understand.

   b) They improve code readability by allowing the same code block to be used in different parts of the program.

   c) They automatically handle memory management, reducing the programmer's workload.

   d) They slow down program speed by duplicating code in multiple locations.

3. In your code, you have a variable named "score" defined outside all functions. This variable is considered:

   a) A parameter

   b) A local variable, as its scope is limited to the sub program it is in

   c) A global variable, as it can be accessed from any part of your code.

   d) An undefined variable, as its location is not specified.

4. Explain the difference between a function and a procedure.

5. Which of the following terms refers to a variable passed into a function to be used within its code block?

   a) Local Variable
   b) Global Variable
   c) Argument
   d) Parameter

6. You are working on a program to calculate the volume of a cylinder.
   The formula to calculate the volume of a cylinder is **V=πr2h**

   Include a function named calculate_volume that takes two parameters: radius and height. The function should calculate and return the volume of the cylinder.
   In your main program, call the calculate_volume function and display the resulting volume.

Finally, go over to https://ccrcomputing.weebly.com/using-sub-programs.html and watch the Craig 'n' Dave video on sub programs and take the knowledge check.

ANSWERS

1. d) Functions always return a value, while procedures NEVER return a value

2. b) They improve code readability by allowing the same code block to be used in different parts of the program.

3. c) A global variable, as it can be accessed from any part of your code.
   Local variables are only accessible from inside sub programs.
   Parameters are the variables that receive data passed from the main program into sub programs.

4. A function always ends with a return command because it always returns a value back to the main program. A procedure doesn't return a value.

5. d) Parameter.
   An argument is the name of the variable in the sub program call. The data in the argument is passed into the parameter.

6.

```
1  # The formula to calculate the volume of a cylinder is V=πr2h
2  import math # needed in order to use pi
3
4  radius = 0.0
5  height = 0.0
6
7  def calculate_volume(pRadius, pHeight):
8      return math.pi* (pRadius**2) *pHeight
9  # brackets not needed but make it easier to read
10
11 radius = float(input("Enter the radius of the cylinder: "))
12 height = float(input("Enter the height of the cylinder: "))
13
14 volume = calculate_volume(radius,height)
15 volume = round(volume,2) # rounds to 2 decimal places
16
17 print("The volume of the cylinder is " + str(volume))
```