Why was the computer cold?

It left its Windows open!

Source: https://punsteria.com/computer-science-puns

Thank you, Jayden
In-Class Activity

• Our in-class activity #6 -> 1%
  • Write your answer to question _2_ on a sheet of paper
  • Write your lastname, firstname and student number
  • At the end of today’s class, hand in your sheet of paper in the appropriate pile:
    • Pile 1 -> if your lastname start with a letter that is between ‘A’ and ‘L’
      • Pile 1 is on your left-hand side of the classroom
    • Pile 2 -> if your lastname start with a letter that is between ‘M’ to letter ‘Z’
      • Pile 2 is on your right-hand side of the classroom

Course grading scheme on our course website: Best 7 in-class exercises out of 10: 1% each, for a total of 7%
First, let’s demonstrate Box Tracing
# Execution of the main part of program

print(f'{number}! = {factorial(number)}')

```python
def factorial(aNumber):
    """Recursive factorial function with aNumber as parameter and returning aNumber!"""

    # Base Case
    if aNumber <= 1:
        return 1

    # Recursive Case
    return aNumber * factorial(aNumber-1)
```

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**1st execution of factorial (1st invocation)**

**2nd execution of factorial (2nd invocation)**

**3rd execution of factorial (3rd invocation)**

**4th execution of factorial (4th invocation)**

**5th execution of factorial (5th invocation)**
Theory and Understanding

Try to answer the questions 1st without using your computer, then confirm your answer using IDLE!
Question 1

Consider the following program:

```python
def special(numbers):
    for num1 in numbers:
        for num2 in numbers:
            if num1 < num2:
                return num1 + num2

# ***Main part of the program
print(special([3,1,2]))
```

a. What would it print on the computer monitor screen once it has completely executed? 4

b. What is the value of the variable `num2` during the outer loop’s 1st iteration and inner loop’s 2nd iteration? `num2 = 1`

c. What is the value of the variable `num1` when the `return` statement is executed? `num1 = 1`
Q. 2

Consider the following program:

```python
def printTriangleOfChar(aChar, aLength):
    # Recursively prints "aChar" in an increasing number of times in
    # the shape of a right-angle triangle, where "aLength" is the length
    # of the base of the triangle.

    # Base Case
    if aLength == 0:
        return

    # Recursive Case
    printTriangleOfChar(aChar, aLength-1)
    print(F'\{aChar * aLength}\')
    return

### Main part of my program

# Ask the user for a character
theChar = input("Please, enter the character: ")

# Ask the user for the length of the base of the triangle
baseLength = int(input(f"Please, the length of the base of the triangle: "))

# Call printTriangleOfChar with this character and this base length
printTriangleOfChar(theChar, baseLength)
```

a. How many lines will be printed on the screen when the user enters 6 as the base length?

Overall, the program prints 8 lines and the function itself prints 6 lines:

```
Please, enter the character: $
Please, the length of the base of the triangle: 6
$
$
$$
$$$ $$
$$$$
$$$$$
$$$$$$
```

Q. 2

Consider the following program:

```python
def printTriangleOfChar(aChar, aLength):
    '''Recursively prints "aChar" in an increasing number
    of times in the shape of a right-angle triangle, where
    "aLength" is the length of the base of the triangle.'''
    # Base Case
    if aLength == 0 :
        return
    # Recursive Case
    printTriangleOfChar(aChar, aLength-1)
    print(F'{aChar * aLength}')
    return

### Main part of my program

# Ask the user for a character
theChar = input("Please, enter the character: ")

# Ask the user for the length of the base of the triangle
baseLength = int(input(f"Please, the length of the base of the triangle: "))

# Call printTriangleOfChar with this character and this base length
printTriangleOfChar(theChar, baseLength)
```

b. How many times will the function `printTriangleOfChar` be called when the above program executes and the user enters # as the character and 5 as the base length? **6 times**

c. What is the value of `aLength` during the above recursive function’s 4th invocation when the user enters * as the character and 7 as the base length? `aLength = 4`
Coding

Try to solve the problem (i.e., write your Python program) 1st on a piece of paper without using your computer!
**Step 1 - Problem Statement**

Write a program that reverses a string recursively. For example, your function would reverse “Hello, World!” producing “!dlrow ,olleH”

You can assume that the user is well-behaved.
Question 4

Step 1 - Problem Statement

Write a program that prints stars recursively.

- **Sample Run 1:**

```
Please, enter the number of stars to print: 6
******
*****
****
***
**
*

```

- **Sample Run 2:**

```
Please, enter the number of stars to print: 12
**********
**********
**********
**********
**********
**********
**********
**********
**********
**********
**********
**********

```

- **Sample run 3:**

```
Please, enter the number of stars to print: 1
*
*

```

- **Sample run 4:**

```
Please, enter the number of stars to print: 0

```
