Assignment 6 (CS141, 2021-2022)

In this assignment we will compute x^n, where both x and n will be provided by the user as input to the program. Write a function that given two numbers x and n, computes x^n in an iterative manner (using loops), and call this function from the main body of the program. Now, the write a separate function that computes x^n, but in a recursive manner. Again, call this function from the main body of the program.

Now, think about how many times in the recursive program, the function calls itself. We want to write a program that uses as few function calls to itself as possible. Remember, in class we discussed that each function call takes some space, and we want to write a program that does not take too much space. One idea would be to check if n is even, then we can write $x^n = (x^{n/2})^2$. And, if n is odd, we write $x^n = x * x^{n-1}$. But, now we get $(n-1)$ to be even and we can write $x^{n-1} = (x^{(n-1)/2})^2$. Can you combine these ideas to design a faster recursive program to compute x^n? How many function calls to itself does this program make?

Name your submission as `Assgn6-YourRollNo.py` and upload the `.py` file in the google classroom.