LAB 07

SUBMISSION INSTRUCTIONS

Submit 1 python file using the naming convention below (replace JaneDoe with your first and last name respectively):

- JaneDoe7.py

QUESTION

1. Write a program that contains the recursive functions below (please note for all the functions, you must use recursion and not loops or built in Python functions):
    a. def power(x, y): This function should recursively compute the power of a number (x represents the number and y represents the power to which its being raised – assume y will always be a positive integer) e.g.,
        i. print(power(2, 3)) # $2^3 = 8$
        ii. print(power(-2, 3)) # $-2^3 = -8$
        iii. print(power(1, 5)) # $1^5 = 1$
    b. def cat_ears(n): If every cat has 2 ears, this function should recursively compute the total number of ears based off the number of cats (n represents the total number of cats) e.g.,
        i. print(cat_ears(0)) # 0 – 0 cats have 0 ears in total
        ii. print(cat_ears(1)) # 2 – 1 cat has 2 ears in total
        iii. print(cat_ears(2)) # 4 – 2 cats have 4 ears in total
    c. def alien_ears(n): We have aliens standing in a line, numbered 1, 2, ... The odd aliens (1, 3, …) have 3 ears. The even aliens (2, 4, …) have 2 ears. This function should return the total number of alien ears (n represents the total number of aliens) e.g.,
        i. print(alien_ears(1)) # 3 – (alien 1 has 3 ears)
        ii. print(alien_ears(2)) # 5 – (alien 1 has 3 ears, alien 2 has 2 ears)

    Please note:
    - For the power function, you should only deal with positive powers (0 is not a positive number).
    - For the cat_ears function, account for 0 cats.
    - For the alien_ears function, there is no position 0 (this should be factored in selecting your base case).
    - Your Python file only needs to have the 3 functions. The 3 functions should return values (not print them).
    - The print statements I provided are to help you test if your functions work. You are not required to have them in your Python file.