

## L5 PROBLEM 3 (5 points possible)

The function `recurPower(base, exp)` from Problem 2 computed  $\text{base}^{\text{exp}}$  by decomposing the problem into one recursive case and one base case:

$$\begin{aligned}\text{base}^{\text{exp}} &= \text{base} \cdot \text{base}^{\text{exp}-1} && \text{if } \text{exp} > 0 \\ \text{base}^{\text{exp}} &= 1 && \text{if } \text{exp} = 0\end{aligned}$$

Another way to solve this problem just using multiplication (and remainder) is to note that

$$\begin{aligned}\text{base}^{\text{exp}} &= (\text{base}^2)^{\frac{\text{exp}}{2}} && \text{if } \text{exp} > 0 \text{ and } \text{exp} \text{ is even} \\ \text{base}^{\text{exp}} &= \text{base} \cdot \text{base}^{\text{exp}-1} && \text{if } \text{exp} > 0 \text{ and } \text{exp} \text{ is odd} \\ \text{base}^{\text{exp}} &= 1 && \text{if } \text{exp} = 0\end{aligned}$$

Write a procedure `recurPowerNew` which recursively computes exponentials using this idea.

```
1 def recurPowerNew(base, exp):
2     '''
3     base: int or float.
4     exp: int >= 0
5
6     returns: int or float; base^exp
7     '''
8     # Your code here
9
```

Unanswered

Note: In programming there are many ways to solve a problem. For your code to check correctly here, though, you must write your recursive function such that you make a recursive call directly to the function `recurPowerNew`. Thank you for understanding.

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