Generated Question

Exam Question for Stress Testing List Comprehension

Question: Understanding List Comprehension

You are tasked with creating a function that processes a list of integers and returns a new list based on a series of transformations defined by the following rules:

1. **Double** the value of odd integers.
2. **Square** the value of even integers.
3. If the integer is **negative**, it should be replaced with `0`.
4. Maintain the original order of the numbers in the resulting list.

Write a function called `transform_numbers(nums)` that uses list comprehension to implement this functionality.

Function Signature:

```python
def transform_numbers(nums: List[int]) -> List[int]:
    """
    Given a list of integers, perform the transformations defined above and return the new list.

    >>> transform_numbers([1, 2, -3, 4, -5])
```

```
    [2, 4, 0, 16, 0]

    >>> transform_numbers([-1, -2, -3])
    [0, 0, 0]

    >>> transform_numbers([3, 0, 2, 4])
    [6, 0, 4, 16]
    """
```

Requirements:

- You must use **list comprehension**.
- The input list `nums` may contain any integers (positive, negative, zero).
- Include at least **three additional doctests** covering various scenarios (e.g., all negatives, all odds, all evens).
- No import statements are allowed.
- Ensure your code follows proper style guidelines, including spacing and meaningful variable names.

Note to Students:

This question is designed to assess your understanding of list comprehension in Python. Make sure you can explain each part of your solution during the exam. Pay attention to edge cases in your doctests to ensure robustness.