In writing code you do not need to worry about specifying the proper `import statements`. You do not need to worry about getting function or method names exactly right. Assume that all libraries and packages we have discussed are imported in any code you write.
PROBLEM 1:

Consider the following functions (that use pre-defined alphabets from the string module):

```python
def lowerHide3 (letter):
    return string.lowercase[(string.lowercase.find(letter)+3) % len(string.lowercase)]

def upperHide3 (letter):
    return string.uppercase[(string.uppercase.find(letter)+3) % len(string.uppercase)]

def encrypt3 (str):
    result = ''
    for c in str:
        if c.isupper():
            result += upperHide3(c)
        elif c.islower():
            result += lowerHide3(c)
        else:
            result += c
    return result
```

What is returned with the call `encrypt3('Duke Year: 2014')`

A. 'Fwmg Agct: 2014'
B. 'Gxnh Bhdu: 2014'
C. 'gxnh bhdu: 2014'
D. 'Gxnh Bhdu; 5347'
PROBLEM 2:

Which of the following is the list that results from the list comprehension:

```
[ num for num in range(12) if num/2 < 4 ]
```

A. [0, 1, 2, 3]
B. [0, 1, 2, 3, 4, 5, 6, 7, 8]
C. [1, 2, 3, 4, 5, 6, 7]
D. [0, 1, 2, 3, 4, 5, 6, 7]
PROBLEM 3:

Consider the following dictionary:

\[
d = \{ 'Owl':5, 'Bear':2, 'Red Wolf':14, 'Red Robin': 14, 'Beetle':3 \}
\]

The dictionary is sorted by the lines of code below:

\[
\text{sortedPairs = sorted(d.items(), key=operator.itemgetter(0))}
\text{sortedPairs = sorted(sortedPairs, key=operator.itemgetter(1), reverse=True)}
\]

Which of the following is the value of \textit{sortedPairs}:

A. [ ('Red Robin', 14), ('Red Wolf', 14), ('Owl', 5), ('Beetle', 3), ('Bear', 2) ]
B. [ ('Red Wolf', 14), ('Red Robin', 14), ('Owl', 5), ('Beetle', 3), ('Bear', 2) ]
C. [ ('Bear', 2), ('Beetle', 3), ('Owl', 5), ('Red Robin', 14), ('Red Wolf', 14) ]
Consider the following function, `findLongest`, with line numbers added for reference, which is supposed to find the longest consecutive block of the value `target` occurring in the list `nums`; however, `findLongest` does not work as intended.

For example, if `nums` contains the values `[7, 10, 10, 15, 15, 10, 10, 10, 10, 15, 10, 10]`, the call `findLongest(10)` should return 3, the length of the longest consecutive block of 10, but instead it returns 7.

```python
def findLongest(nums, target):
    Line 1:   lenCount = 0
    Line 2:   maxLen = 0
    Line 3:   for n in nums:
    Line 4:     if n == target:
    Line 5:         lenCount += 1
    Line 6:     else:
    Line 7:         if lenCount > maxLen:
    Line 8:             maxLen = lenCount
    Line 9:         if lenCount > maxLen:
    Line 10:             maxLen = lenCount
    Line 11:   return maxLen
```

**PROBLEM 4:**

Which of the following best describes the value actually returned by a call to `findLongest`?

A. It is the length of the shortest consecutive block of the value `target` in `nums`.

B. It is the length of `nums`.

C. It is the number of occurrences of the value `target` in `nums`.

D. It is the length of the first consecutive block of the value `target` in `nums`.

E. It is the length of the last consecutive block of the value `target` in `nums`.

**PROBLEM 5:**

Which of the following changes should be made so that function `findLongest` will work as intended?

A. Insert the statement `lenCount = 0` between lines 3 and 4.

B. Insert the statement `lenCount = 0` between lines 6 and 7.

C. Insert the statement `lenCount = 0` between lines 8 and 9 (but indented as in line 8).

D. Insert the statement `lenCount = 0` between lines 8 and 9 (but indented as in line 7).

E. Insert the statement `lenCount = 0` between lines 8 and 9 (but indented as in line 6).
PROBLEM 6:

Which of the following statements is true regarding the halting problem and the traveling salesman problem. Inefficiently below means that every program written to solve the problem will provably take centuries to run for relatively small inputs.

A. The halting problem can be solved by a computer program but only inefficiently.
B. The traveling salesman problem can be solved by a computer program but only inefficiently.
C. Neither problem can be solved by a computer program.
D. Both problems can be solved efficiently.
Consider the following recursive function.

```python
def result(m, n):
    if n == 0:
        return 1
    else:
        t = result(m, n/2)
        if n % 2 == 0:
            return t * t
        else:
            return m * t * t
```

PROBLEM 7:

What is returned with the call `result(10, 3)`

A. 30
B. 3000
C. 59049
D. 10000
E. 1000

PROBLEM 8:

Of the following, which best indicates the task performed by the function above if only positive parameters are passed to the function?

A. It approximates \( \sqrt[n]{m} \) — the \( m \)th root of \( n \).
B. It approximates \( \sqrt[m]{n} \) — the \( n \)th root of \( m \).
C. It computes \( n^m \) — the \( m \)th power of \( n \).
D. It computes \( m^n \) — the \( n \)th power of \( m \).
E. It computes the roots of a quadratic with leading coefficient 1