### Midterm #1 Solution Key

#### Professor William T. Verts

<table>
<thead>
<tr>
<th>NAME</th>
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<table>
<thead>
<tr>
<th>QUESTION</th>
<th>POINTS</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>25</td>
<td></td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100</strong></td>
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15 Points – Do any 15; do more for extra credit. In this problem assume that the statements $S = "KANGAROO", L = [7,"HOUSE",2], and T = (4,"DOG")$ have already been executed. Show the values of $N$ after each statement is executed (all are independent of one another). Indicate any cases where the computation cannot take place because of some form of error. Be very careful about the type of the result, particularly integers and floats, and make certain to put quotes around string results.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>1. $N = \text{len}(S)$</td>
<td>8</td>
</tr>
<tr>
<td>2. $N = \text{len}(L[1])$</td>
<td>5</td>
</tr>
<tr>
<td>3. $N = \text{len}(T[0])$</td>
<td>error</td>
</tr>
<tr>
<td>4. $N = 1.0 / 2$</td>
<td>0.5</td>
</tr>
<tr>
<td>5. $N = 1 / 2$</td>
<td>0</td>
</tr>
<tr>
<td>6. $N = 3 + 4 * 2$</td>
<td>11</td>
</tr>
<tr>
<td>11. $N = T + T$</td>
<td>(4, &quot;DOG&quot;, 4, &quot;DOG&quot;)</td>
</tr>
<tr>
<td>12. $N = L + T$</td>
<td>error</td>
</tr>
<tr>
<td>15. $N = S[\text{len}(S)-1]$</td>
<td>&quot;O&quot;</td>
</tr>
<tr>
<td>16. $N = S[\text{len}(T)]$</td>
<td>&quot;N&quot;</td>
</tr>
<tr>
<td>17. $N = \text{range}(\text{len}(L))$</td>
<td>[0, 1, 2]</td>
</tr>
<tr>
<td>18. $N = \text{range}(3, 9, 2)$</td>
<td>[3, 5, 7]</td>
</tr>
<tr>
<td>19. $N = [X*X \text{ for } X \text{ in } \text{range}(4)]$</td>
<td>[0, 1, 4, 9]</td>
</tr>
<tr>
<td>20. $N = (5-4j) + (2+2j)$</td>
<td>(7-2j)</td>
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20 Points – What is printed out by each of the following statements?

A. `for x in [4,1,3]: print x`  
   `4 1 3`

B. `for x in range(5): print x`  
   `0 1 2 3 4`

C. `for x in range(5,10): print x`  
   `5 6 7 8 9`

D. `for x in range(5,10,2): print x`  
   `5 7 9`

20 Points – Completely rewrite the following code fragment to perform exactly the same task using a `while`-loop instead of a `for`-loop:

```python
for Frog in range(97,572,19):
    print Frog
```

```python
Frog = 97
while (Frog < 572):
    print Frog
    Frog = Frog + 19
```

10 Points – Show what is printed out as the result from calling `F2(9,2,5)`

```python
def F1(L,M,N):
    print "N=" , N              N=2
    print "M=" , M              M=9
    print "L=" , L              L=5
    return

def F2(L,M,N):
    F1(N,L,M)
    return
```
10 Points – Find and correct all the syntax errors in the following code (don’t worry about what the code is supposed to do; it doesn’t do anything useful). There are at least 10 errors; \( \frac{1}{2} \)-point extra credit per extra error for finding more than 10.

# A Very Strange Function

```python
define My Function (Temp):
    Glop = Temp + 1
    While (Temp <= 42):
        Result = 'Don't do that'
        Glop = 3*(Glop)
        Temp = 7 + Temp * 6
    if (Glop != 5):
        Result = "No"
    elseif (Glop < Temp):
        Result = "Toad"
    else:
        return
    Frog = Result
    If (Temp == 10):
        Temp = Temp - 3
    return [Result, 4]
```

(def, no space, add : )
(use while not While)
(use double quotes)
(missing multiply)
(missing : )
(missing : )
(missing double quote)
(missing : )
(if not If, missing = )
(return not rerun)
For reference, the JES function `addRectFilled` needs the canvas, the x and y coordinates of the upper left corner, the width and height of the rectangle, and the color, in that order: \( \text{addRectFilled} \ (\text{Canvas},X,Y,\text{Width},\text{Height},\text{Color}) \)

Complete the following Python function to paint a filled rectangle at \( X, Y \) with the width and height as indicated. The color of the rectangle should be **red** if \( \text{Width} \) is **greater** than \( \text{Height} \), and **green** otherwise.

```python
def addRectStrange (Canvas,X,Y,Width,Height):
    # SOLUTION #1
    if (Width > Height):
        addRectFilled(Canvas,X,Y,Width,Height,red)
    else:
        addRectFilled(Canvas,X,Y,Width,Height,green)

    # SOLUTION #2
    if (Width > Height):
        C = red
    else:
        C = green
    addRectFilled(Canvas,X,Y,Width,Height,C)

    # SOLUTION #3
    C = green
    if (Width > Height): C = red
    addRectFilled(Canvas,X,Y,Width,Height,C)
```

return