141 Recitation Week 4

1. What does a function return if it has no return statement in its body?

2. What is wrong with the following code fragment?

```
def draw_square_rec(sides):
    if sides == 0:
        pass
    else:
        forward(100)
        draw_square_rec(sides)
draw_square_rec(4)
```

3. What is wrong with the following loop that is supposed to print the numbers 0 through 9?

```
i = 0
while i  > 10:
    print(i)
    i = i + 1
```

4. What is the output of the following program? Trace through the assignments using memory diagrams.

```
x = 10
y = x
z = x + y
x = 20 +  z
y = 30
print("x:", x, "y:", y, "z:", z)
```

5. The Euclid's Algorithm for finding Greatest Common Divisor is defined as:

```
For m >= n > 0, gcd(m,n) =

if n divides m with no remainder: n

otherwise: gcd(n, remainder of m/n)
```

a.) Write `gcd(m,n)` as a tail recursive function.

b.) Do substitution traces for:

```
gcd(468, 24)
gcd(135, 19)
```

6. Write a complete Python program, `polygon.py`, that draws a regular polygon of N sides where each side is length L. The program should first prompt the user for these two values.

a.) Write the recursive implementation in a function called `draw_polygon_rec`. What arguments should the function take? What is the base case?

b.) Write an iterative implementation in a function called `draw_polygon_iter`. What arguments should the function take? When should the loop terminate?