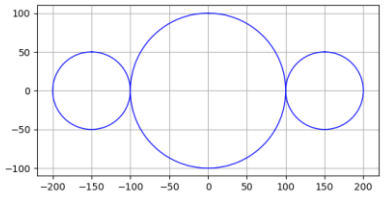
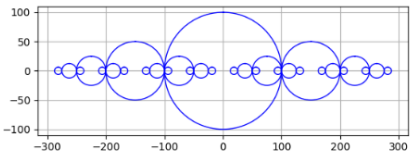
CS2302 Data Structures
Spring 2020
Exam 1

1. Write the function *nested_circles(ax, n, x0, y0, r)* that draws a figure like the one below, where n is the depth of recursive calls, x0,y0 is the center of the figure, and r is the radius of the circle (see starter code for sample runs).





2. Write the **recursive** function *multiples(L,k)* that receives a Python list L and an integer k and returns the number of elements in L that are multiples of k.
3. Write the function *first_plus_third(L)* that receives a reference to a List object L (as defined in singly_linked_list.py) and returns the sum of its first and third elements, if they exist.
4. Write the function *sll_to_list(L)* that receives a reference to a List object L (as defined in singly_linked_list.py) and returns Python list containing the elements in L.
5. Write the function *sum_non_edge(A)* that receives a numpy 2D array A that represents an image and returns the sum of the pixels that are not on the edge of A (that is, the sum of the elements that are not in the first row, first column, last row or last column in A). You are allowed but not required to use slicing and/or numpy built-in functions.