AI607 HW1

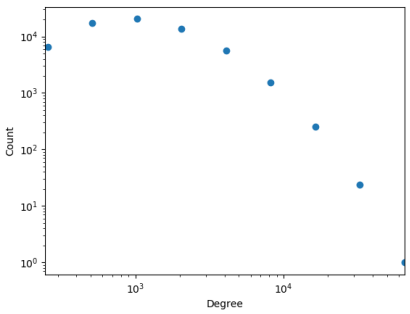
20194293 고경렬

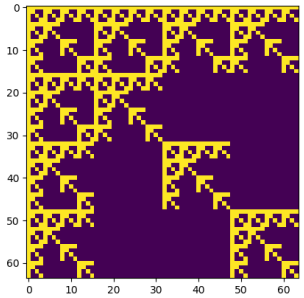
The Kronecker Graph Generation

1. Visualizing the degree distribution

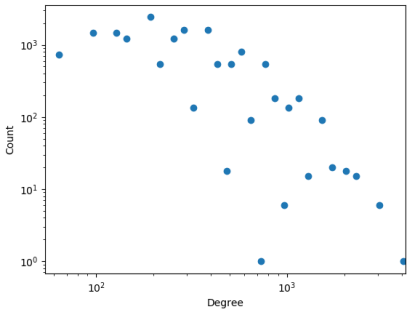
   There are two cases with varying initiator of the Kronecker graph. Left plot is the degree distribution as required in the description file of HW1 and the right plot is the adjacency matrix when k=3 which is further attached to better ensure the correctness of the implementation.

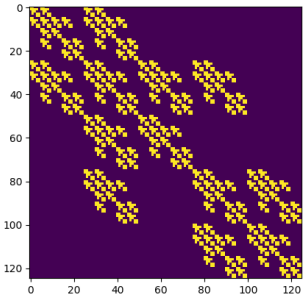
   A. Case 1: k = 8 (151.78 sec without plotting function)



   B. Case 2: k = 6 (6.92 sec without plotting function)



2. Comparison of case 1 and case 2

   Both in case 1 and in case 2, the count tends to decrease as the degree increases following the power law distribution. As it is generated in a recursive manner, many hubs exist in the low-level hierarchy when they are within the hub in the high-level hierarchy. While the connectivity is highly focused by one community in case 1, it is comparably equally distributed in case 2. This is because the degree of each node for the initiators is [4,2,2,2] in case 1 and [2,4,2,3,2] in case 2. We can see that the unique number of the degree is 2 and 3, respectively, which results in the diverse unique degrees in case 2 even if k and the number of total nodes are smaller(8>6, 4**8>5**6).