CS 2XC3 Lab Report 7

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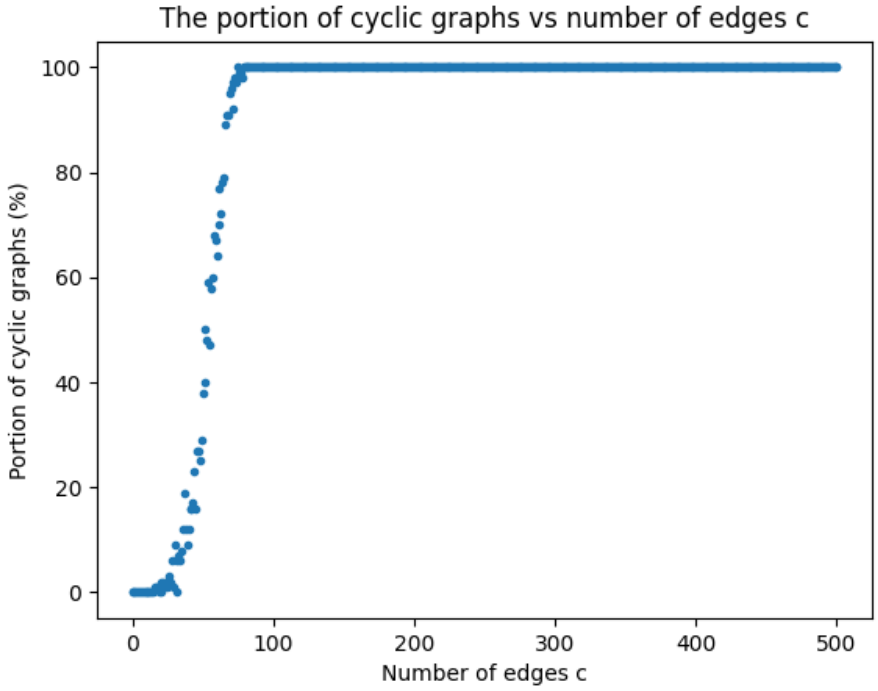
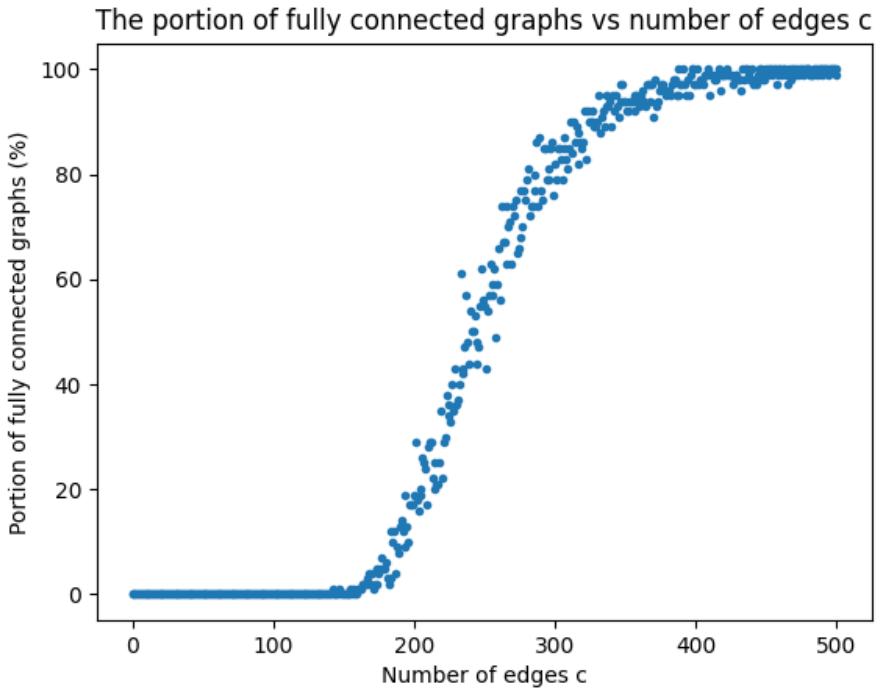
1 Cycles and Connected Probability

For the experiment, we added edge between a and b by randomly choosing a, b over the interval $0 <= a, b < k$. We experimented with different c values ranged from 0 to 500. For each of the c values, 100 graphs with randomly added edges were tested about its cyclic property and connected property. The portions are calculated based of the 100 samples taken for each c value. Below are the results of our experiments.

We can see that, for cyclic property, when $c = 55$, roughly half of the graphs are cyclic, and almost all graphs are cyclic from $c = 75$ on. For connected property, almost no graphs are connected until $c = 160$. When $c = 245$, roughly half of the graphs are connected, and almost all graphs are connected from $c = 450$ on.

We find that the c value for graphs to be connected is much less than that for graphs to be cyclic. The most obvious reason is the minimum number of edges required to form a cycle is 3 while that of forming a fully connected graph of size k is k - 1. Since we always tested with graphs of size 100, it is much less likely to be fully connected than cyclic for any graph.




The portion of fully connected graphs vs number of edges c
Portion of fully connected graphs (%)
0
20
40
60
80
100
0
100
200
300
400
500
Number of edges c