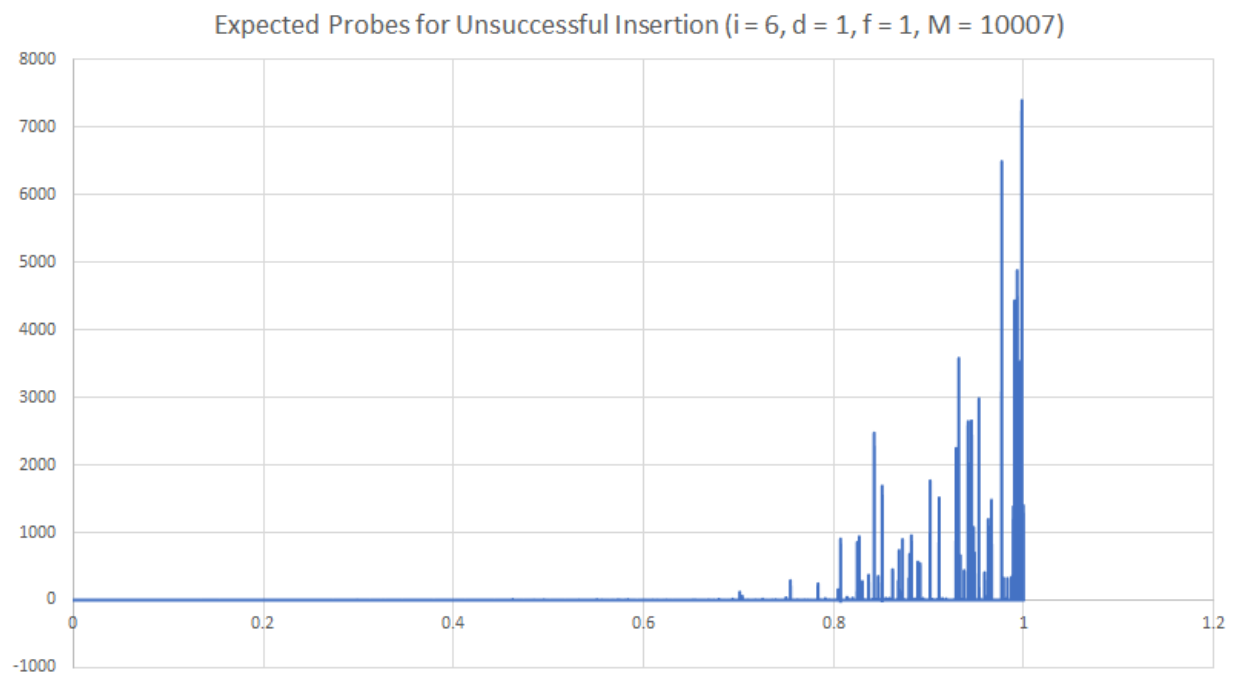
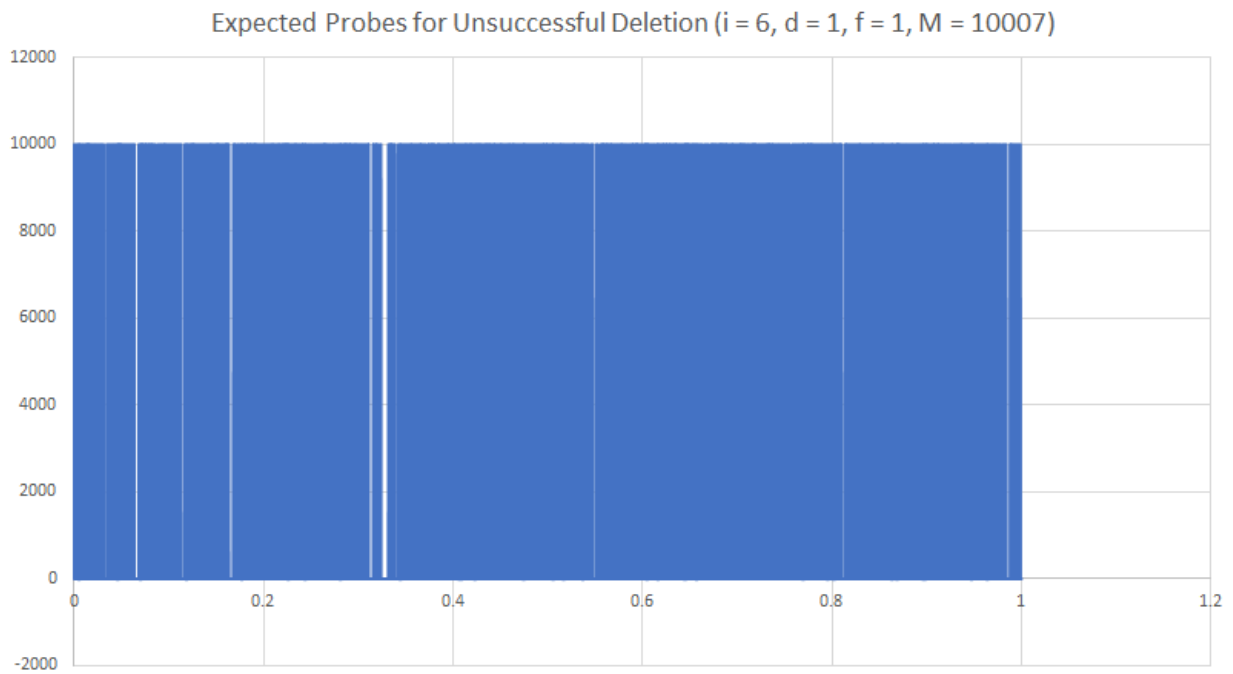
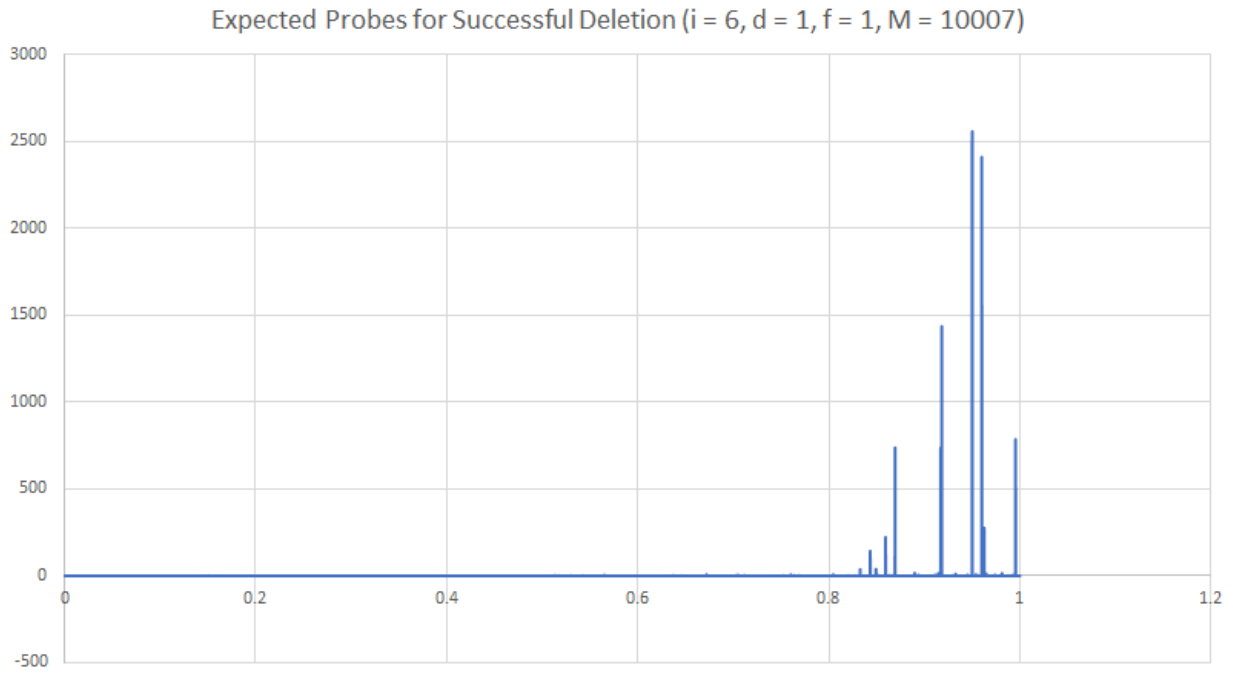
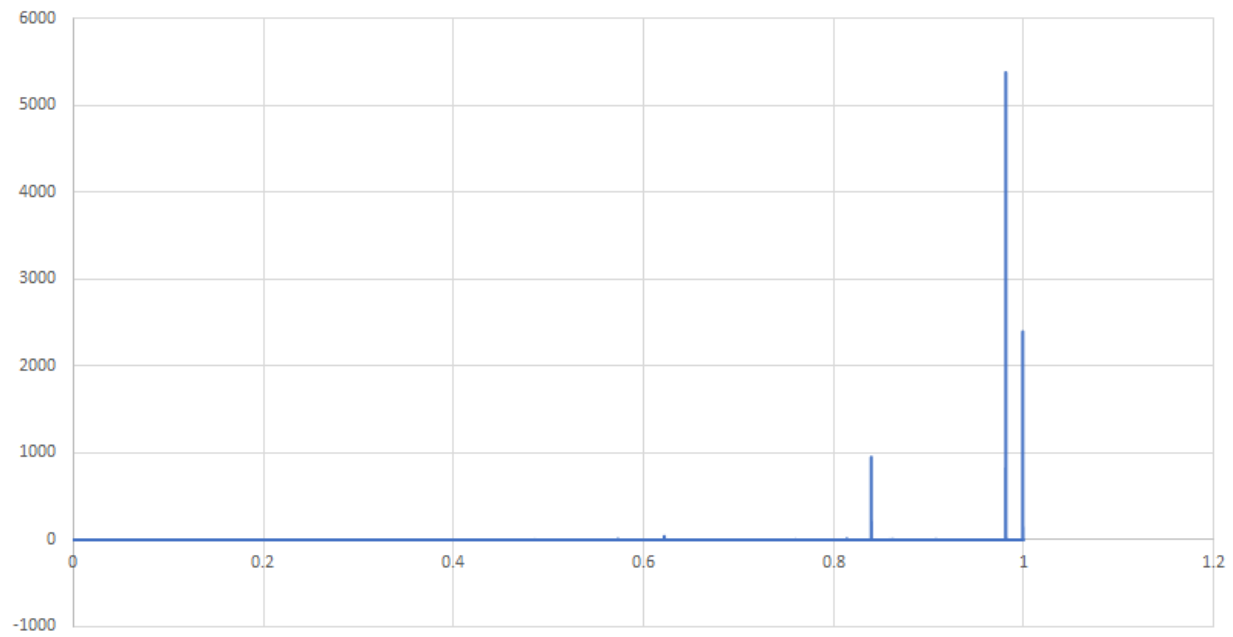
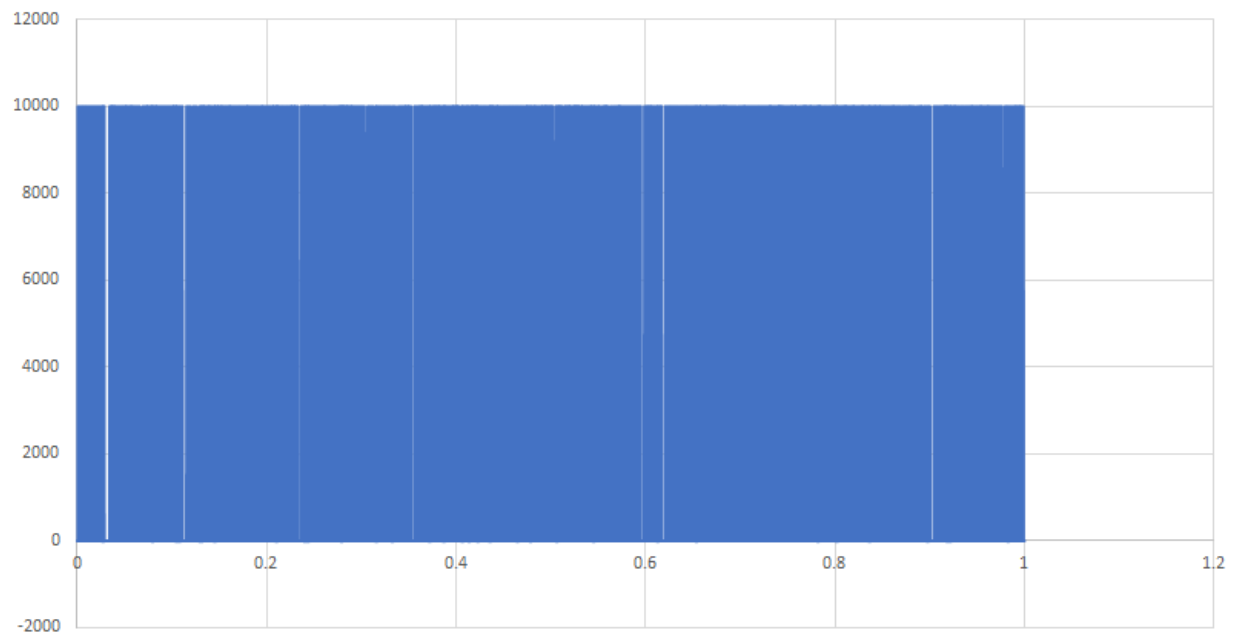


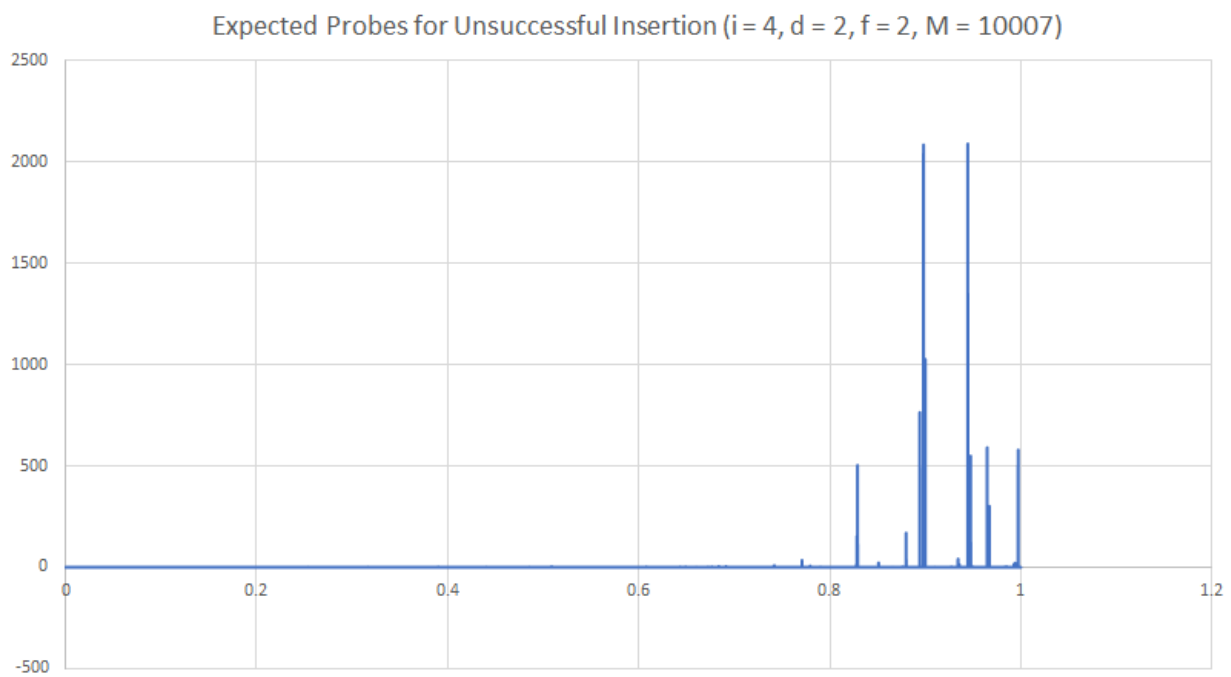
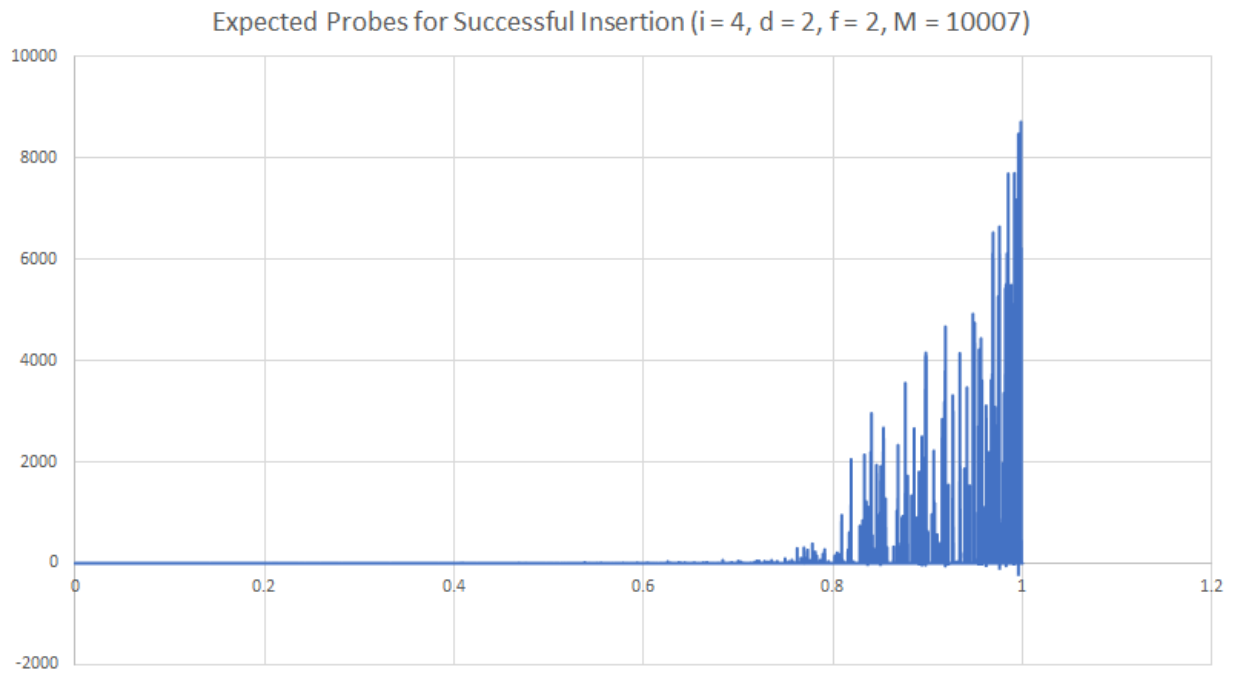
**x-axis represents the load factor of the hash table ( $\lambda$ )**

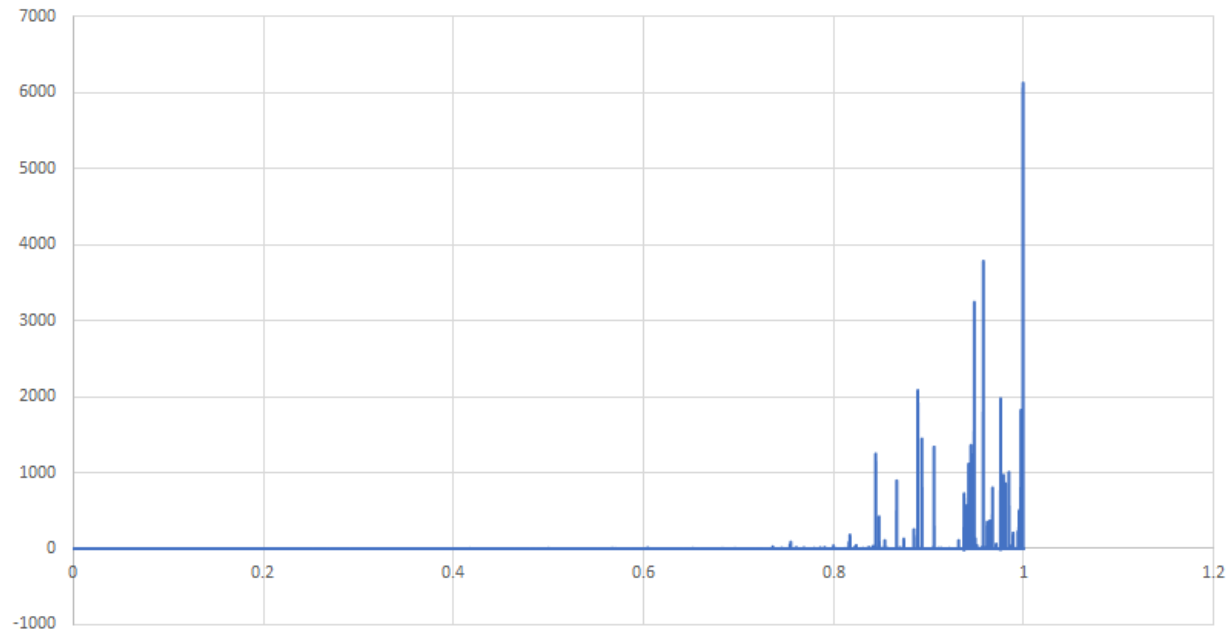
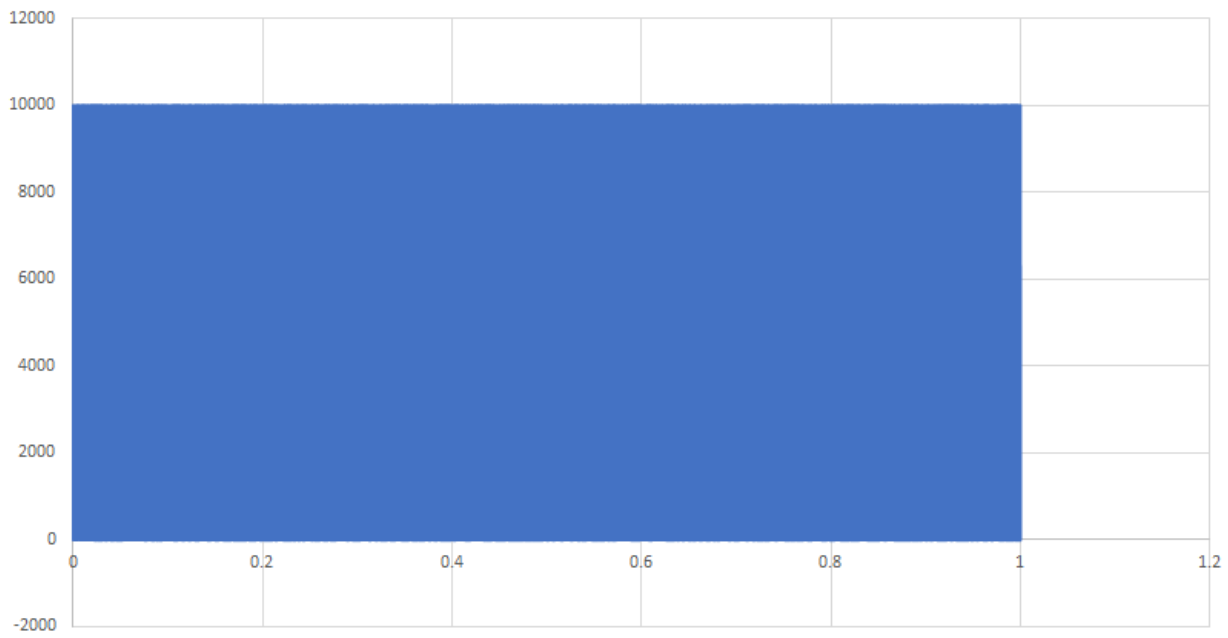
**y-axis represents the average probes**

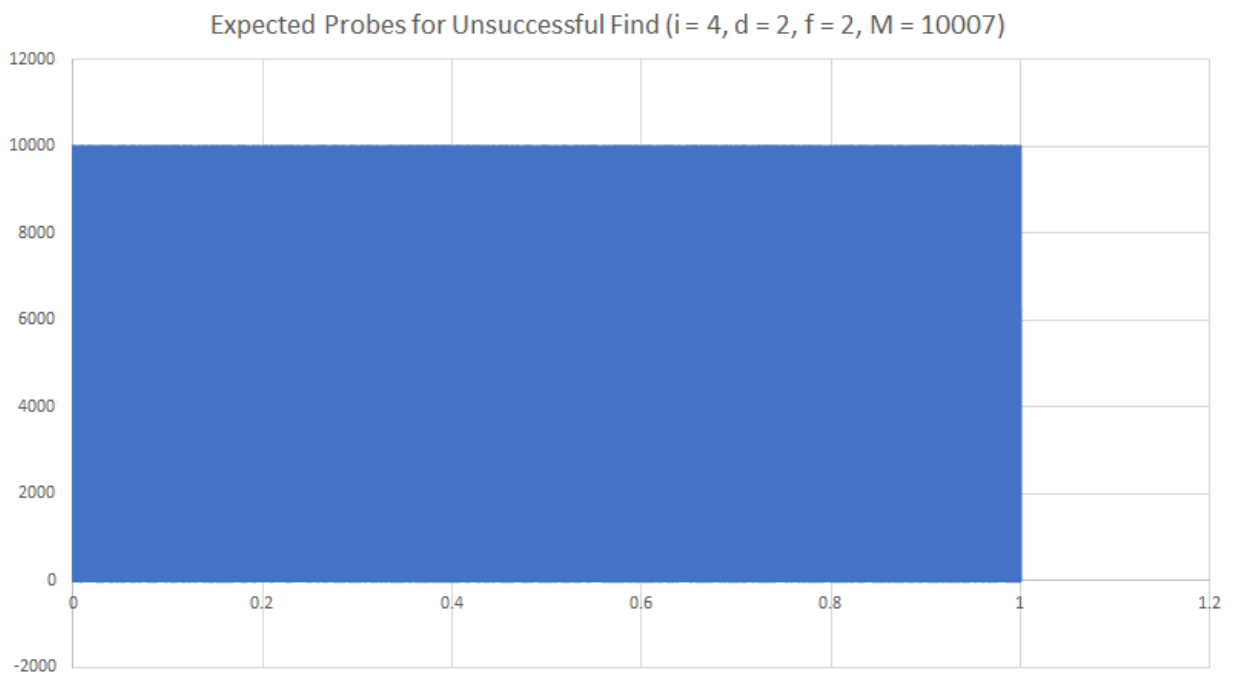
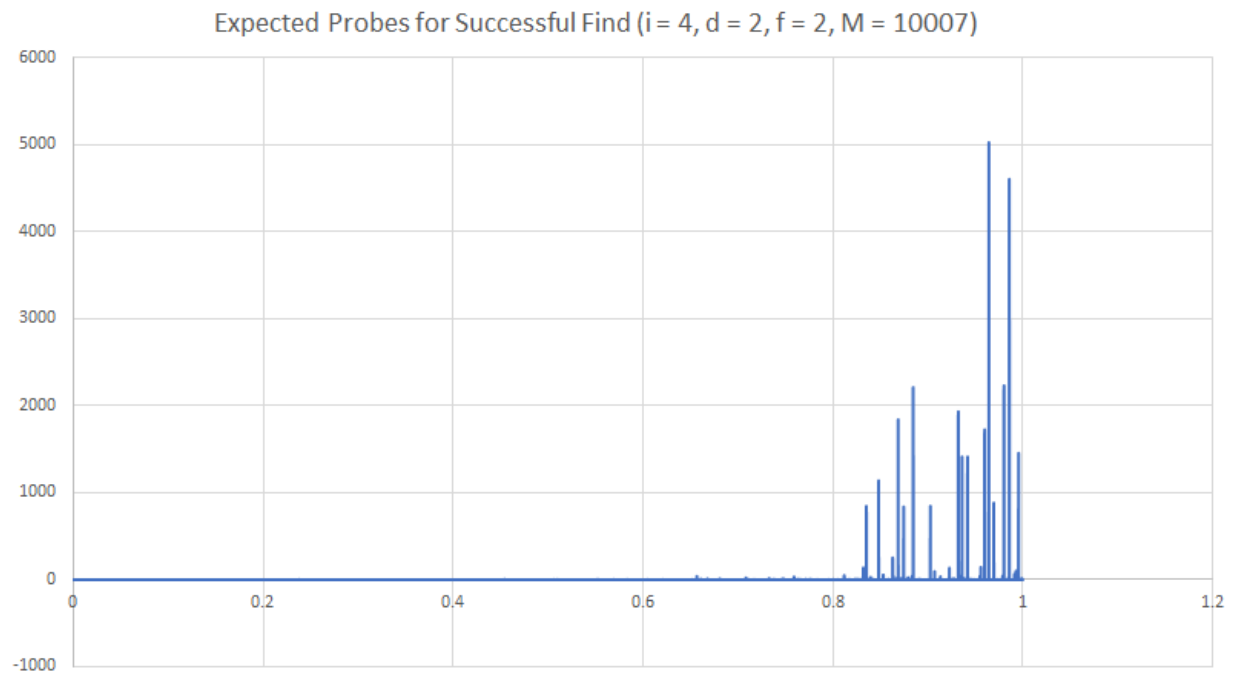


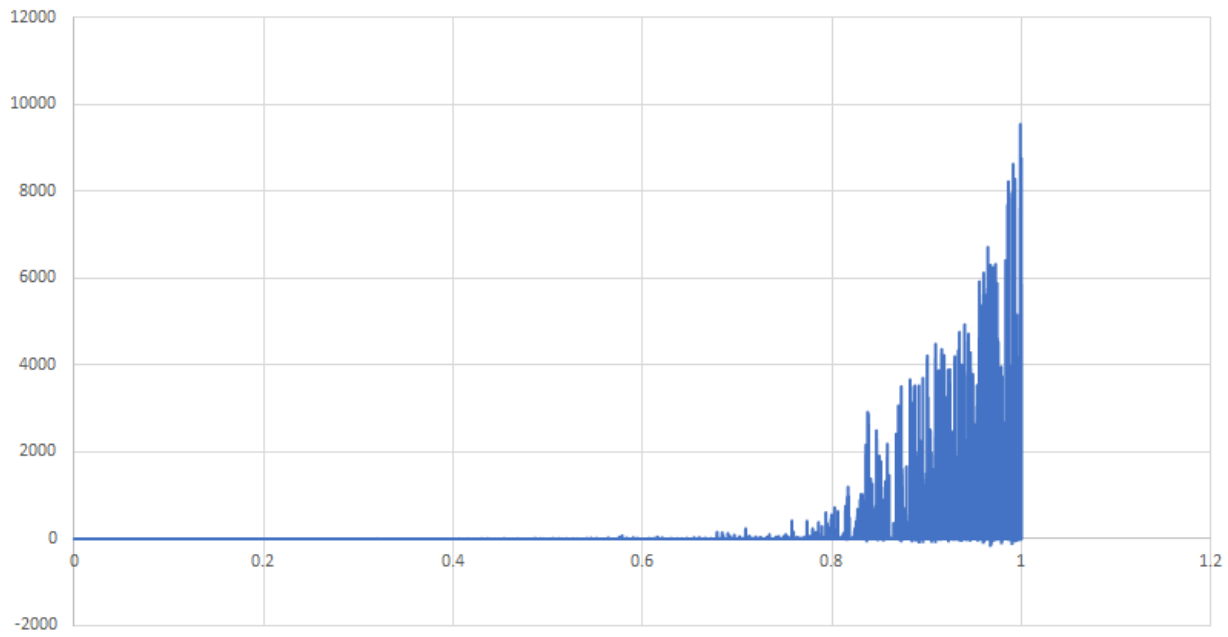
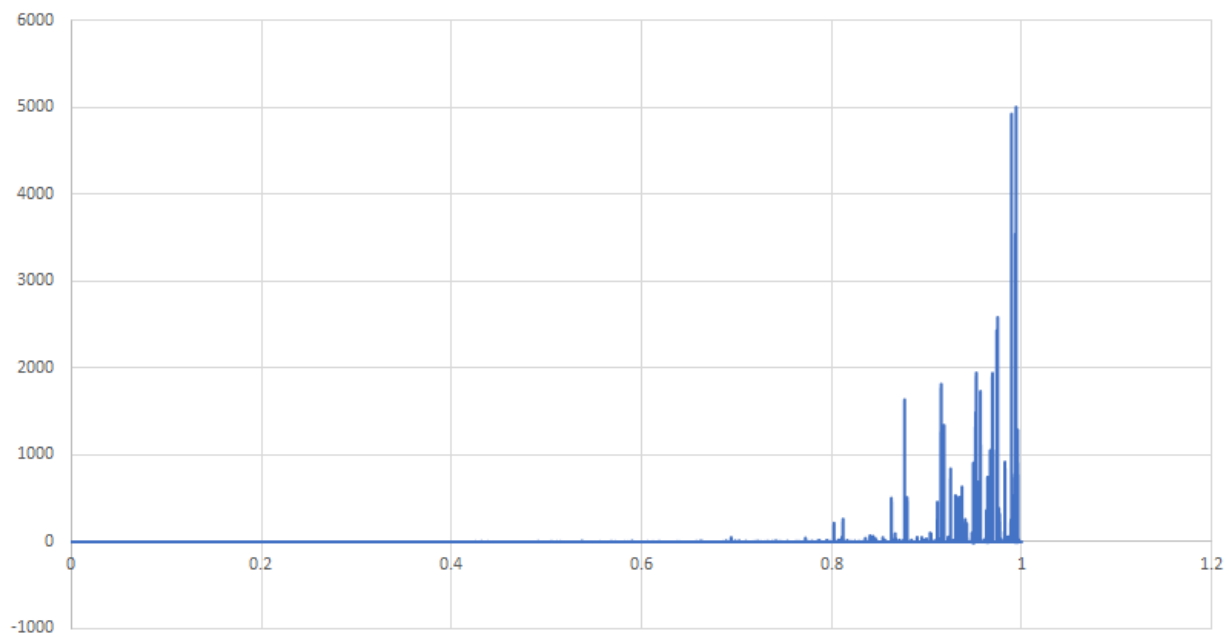


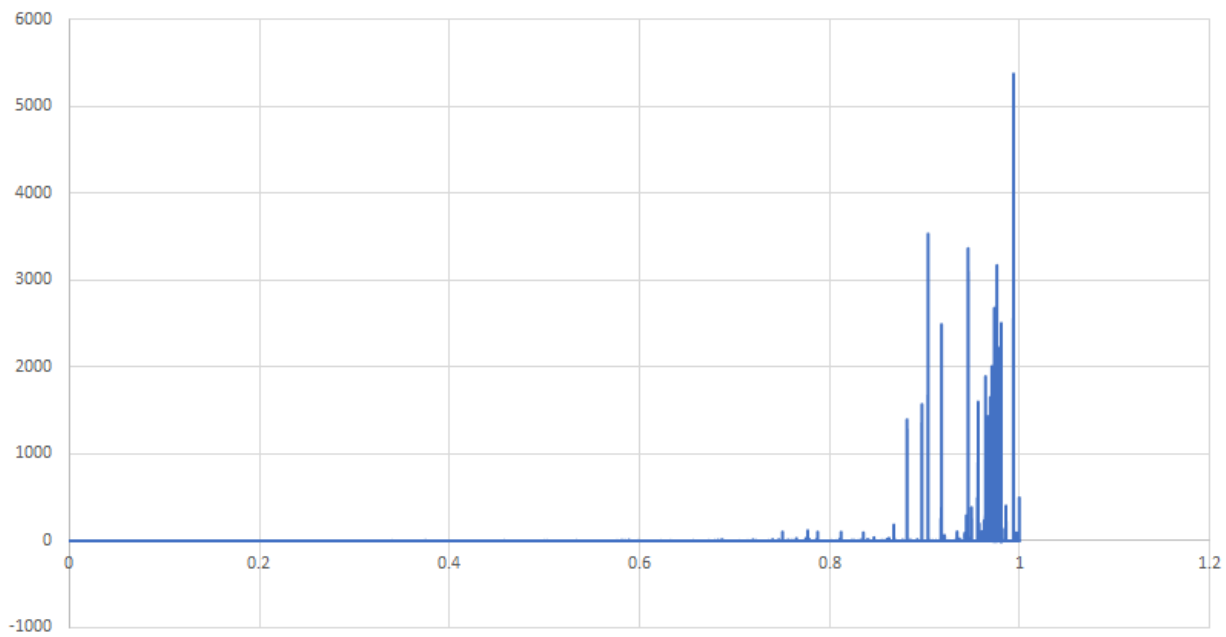
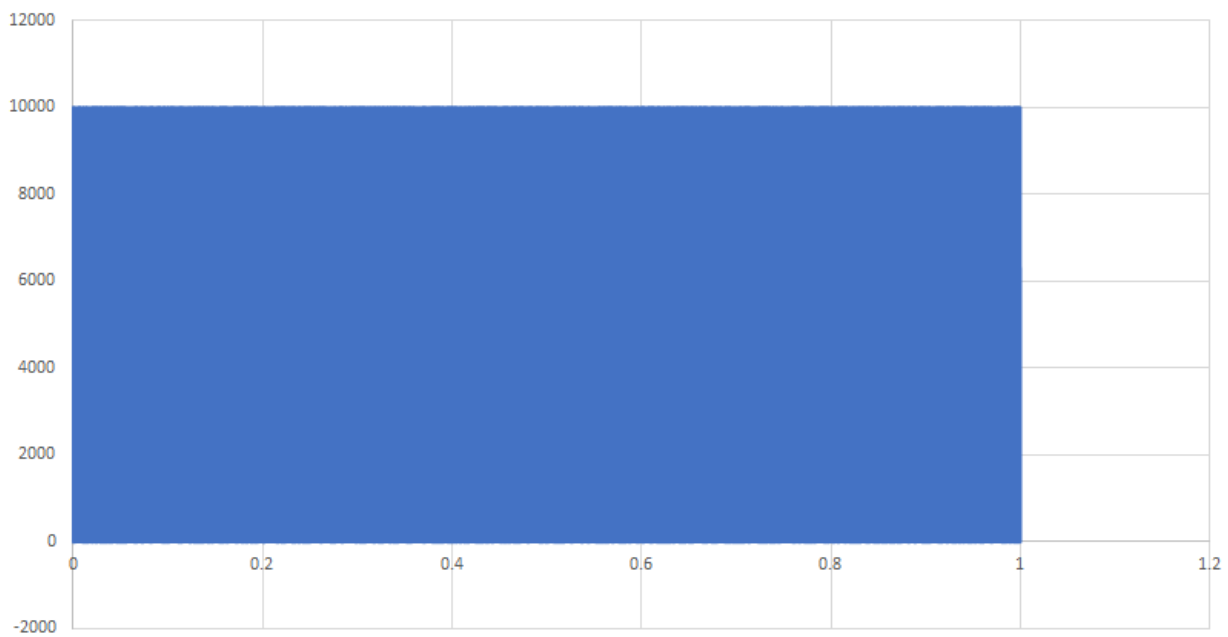
Expected Probes for Successful Find ( $i = 6, d = 1, f = 1, M = 10007$ )Expected Probes for Unsuccessful Find ( $i = 6, d = 1, f = 1, M = 10007$ )



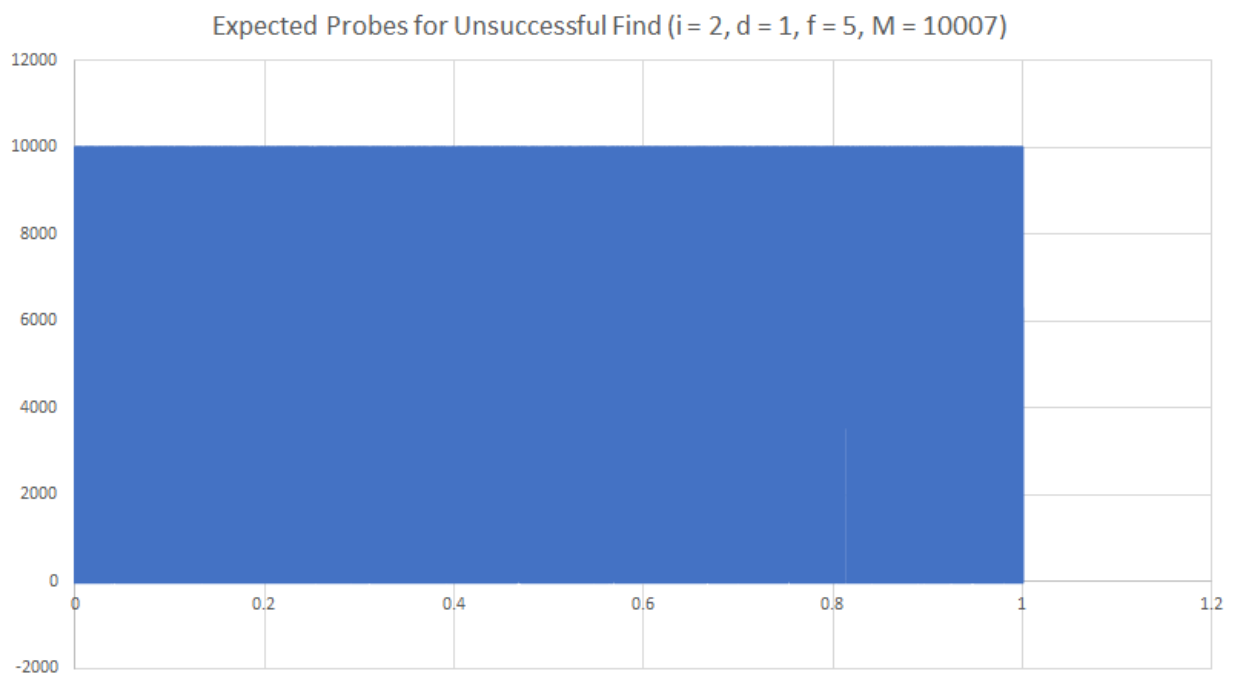
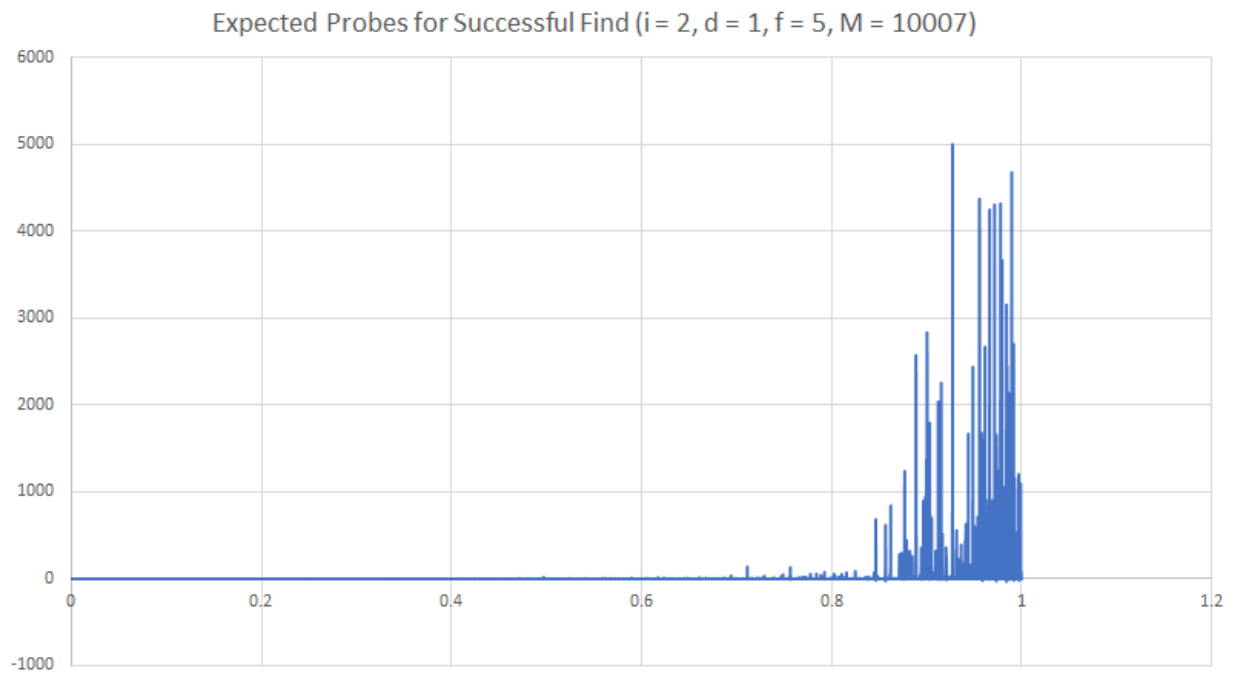
Expected Probes for Successful Deletion ( $i = 4, d = 2, f = 2, M = 10007$ )Expected Probes for Unsuccessful Deletion ( $i = 4, d = 2, f = 2, M = 10007$ )



Expected Probes for Successful Insertion ( $i = 2$ ,  $d = 1$ ,  $f = 5$ ,  $M = 10007$ )Expected Probes for Unsuccessful Insertion ( $i = 2$ ,  $d = 1$ ,  $f = 5$ ,  $M = 10007$ )

Expected Probes for Successful Deletion ( $i = 2, d = 1, f = 5, M = 10007$ )Expected Probes for Unsuccessful Deletion ( $i = 2, d = 1, f = 5, M = 10007$ )





- I have changed some of the parts of the hash table implementation from the lecture notes and the course book. As it has been described in the homework documentation I have included the find position method into insert and remove methods in order to keep track of probing in a better way. I have also removed the resizing operation in order to keep the hash table size constant after being initialized. I have added generate method to HashTable class to for using the tables for the operations and their outcomes and output the result to .csv files. I have removed the quadratic probing implementation and implemented linear probing for the hash table.
- I have added the graphics in previous pages but I had some troubles while generating them with Excel for example the Unsuccessful Deletion graph with values  $i = 6$ ,  $d = 1$ ,  $f = 1$  has a shape which I wasn't expecting but I have included the csv files, the values are correct and I replaced the 0/0 values which are causing errors to 0 hoping to get better results but it didn't help much. **For all graphs the x-axis represents the load factor of the hash table ( $\lambda$ ) and the y-axis represents the number of probes per transaction of that type of transaction and outcome.**
- This homework helped me to understand better how do hash tables work and I witnessed that using different  $i$ ,  $d$ ,  $f$  values didn't make much difference for the hash tables. It could be expected to see probes getting much more higher with lower load factor while using  $i = 2$ ,  $d = 1$ ,  $f = 5$  but for all cases the critical points were around the load factor of 0.8 for successful insertions, unsuccessful insertions, successful deletions and successful find operations.