

Computer Science I –Exercise Hash Tables

1) Consider a hash table that uses the linear probing technique with the following hash function $f(x) = (5x+4)\%11$. (The hash table is of size 11.) If we insert the values 3, 9, 2, 1, 14, 6 and 25 into the table, in that order, show where these values would end up in the table?

| | | | | | | | | | | | |
|-------|----|---|---|---|---|---|---|---|---|---|----|
| index | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| value | 25 | 6 | | 2 | | 9 | | | 3 | 1 | 14 |

2) Do the same question as above, but this time use the quadratic probing strategy.

| | | | | | | | | | | | |
|-------|---|----|---|---|---|---|----|---|---|---|----|
| index | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| value | | 14 | 6 | 2 | | 9 | 25 | | 3 | 1 | |

3) Do the question above, but draw a picture of what the hash table would look like if separate chaining hashing was used

| | | | | | | | | | | | | | |
|---|---|----|----|---|---|---|---|--|--|--|--|--|--|
| I | 8 | => | => | 5 | 3 | 9 | 1 | | | | | | |
| V | 3 | 14 | 25 | 9 | 2 | 1 | 6 | | | | | | |

4) Edit the code in `htablelinear.c` so that quadratic probing is the searching strategy used. You will need to modify insert function, then search and then delete. Add the code to your pdf when submitting.

5) **No need to submit, but you can practice:** Try to edit this code so that it uses a dynamically sized array instead of a statically sized one. If you have extra time, use this code to read in a whole dictionary from a file and count how many places have to be checked on average before a word is found or determined to not be in the dictionary.