

## 2) (10 pts) DSN/ALG (Hash Tables)

Consider the following strings and their corresponding hash values, which have been generated by some hash function:

$\text{hash}(\text{"squiggle"}) = 301$

$\text{hash}(\text{"giggle"}) = 174$

$\text{hash}(\text{"haggle"}) = 431$

$\text{hash}(\text{"gaggle"}) = 263$

$\text{hash}(\text{"straggle"}) = 361$

a) (7 pts) Insert the strings above into the following hash table using **quadratic probing**. In doing so, insert them in the order given above (i.e., starting with "squiggle", then "giggle", and so on). Note that the hash table's length is **11** (not 10).

		haggle		squiggle			straggle		giggle	gaggle
0	1	2	3	4	5	6	7	8	9	10

**Grading:**

+3 pts for getting "straggle" in index 7

+4 pts for all the rest being correct (1 pt per item)

b) (3 pts) What is one hash value,  $h$ , between 100 and 500 (inclusively) that would cause a collision to occur in your final table from part (a) of this problem, but which also satisfies all of the following additional restrictions:

$h \% \text{table\_length} \neq \text{hash}(\text{"squiggle"}) \% \text{table\_length}$

$h \% \text{table\_length} \neq \text{hash}(\text{"giggle"}) \% \text{table\_length}$

$h \% \text{table\_length} \neq \text{hash}(\text{"haggle"}) \% \text{table\_length}$

$h \% \text{table\_length} \neq \text{hash}(\text{"gaggle"}) \% \text{table\_length}$

$h \% \text{table\_length} \neq \text{hash}(\text{"straggle"}) \% \text{table\_length}$

Any value  $h$  such that  $h \% 11 = 7$  will do the trick (e.g., 106, 117, 128, and so on).

**Grading:** +3 pts for a correct value. 0 otherwise.