## Hashing PreLab

## The following key-value pairs, all calculate to the same hash index with the hash function shown below:

**Pax 654**

**Eleven 341**

**Angel 70**

**Abigail 867**

**Jack 5309**

Hash function: ***hashCode(key)* = Math.abs((*key.hashCode()* modulo 10) modulo table.length)**

Show the state of the hash table after all pairs are added ***using linear probing*** and ***quadratic probing*** to resolve collisions:

*Linear Probing: Quadratic Probing:*

|  |  |  |
| --- | --- | --- |
| *index* | *key* | *value* |
| a[0] |  |  |
| a[1] |  |  |
| a[2] |  |  |
| a[3] |  |  |
| a[4] |  |  |
| a[5] |  |  |
| a[6] |  |  |
| a[7] | “Pax” | 654 |
| a[8] | “Eleven” | 341 |
| a[9] | “Angel” | 70 |
| a[10] | “Abigail” | 867 |
| a[11] | “Jack” | 5309 |
| a[12] |  |  |
| a[13] |  |  |
| a[14] |  |  |
| a[15] |  |  |
| a[16] |  |  |
| a[17] |  |  |
| a[18] |  |  |
| a[19] |  |  |
| a[20] |  |  |
| a[21] |  |  |
| a[22] |  |  |
| a[23] |  |  |
| a[24] |  |  |
| a[25] |  |  |
| a[26] |  |  |
| a[27] |  |  |
| a[28] |  |  |
| *index* | *key* | *value* |
| a[0] |  |  |
| a[1] |  |  |
| a[2] |  |  |
| a[3] |  |  |
| a[4] |  |  |
| a[5] |  |  |
| a[6] |  |  |
| a[7] | “Pax” | 654 |
| a[8] | “Eleven” | 341 |
| a[9] |  |  |
| a[10] |  |  |
| a[11] | “Angel” | 70 |
| a[12] |  |  |
| a[13] |  |  |
| a[14] |  |  |
| a[15] |  |  |
| a[16] | “Abigail” | 867 |
| a[17] |  |  |
| a[18] |  |  |
| a[19] |  |  |
| a[20] |  |  |
| a[21] |  |  |
| a[22] |  |  |
| a[23] | “Jack” | 5309 |
| a[24] |  |  |
| a[25] |  |  |
| a[26] |  |  |
| a[27] |  |  |
| a[28] |  |  |

Make the following changes to each hash table and show the final results below.

* Replace the value for **Eleven** with **170**
* remove **Pax**
* remove **Angel**
* add the key-value pair **Gino-348**

*Linear Probing: Quadratic Probing:*

|  |  |  |
| --- | --- | --- |
| *index* | *key* | *value* |
| a[0] |  |  |
| a[1] |  |  |
| a[2] |  |  |
| a[3] |  |  |
| a[4] |  |  |
| a[5] |  |  |
| a[6] |  |  |
| a[7] | Gino | 348 |
| a[8] | “Eleven” | 170 |
| a[9] | removed | removed |
| a[10] | “Abigail” | 867 |
| a[11] | “Jack” | 5309 |
| a[12] |  |  |
| a[13] |  |  |
| a[14] |  |  |
| a[15] |  |  |
| a[16] |  |  |
| a[17] |  |  |
| a[18] |  |  |
| a[19] |  |  |
| a[20] |  |  |
| a[21] |  |  |
| a[22] |  |  |
| a[23] |  |  |
| a[24] |  |  |
| a[25] |  |  |
| a[26] |  |  |
| a[27] |  |  |
| a[28] |  |  |
| *index* | *key* | *value* |
| a[0] |  |  |
| a[1] |  |  |
| a[2] |  |  |
| a[3] |  |  |
| a[4] |  |  |
| a[5] |  |  |
| a[6] |  |  |
| a[7] | Gino | 348 |
| a[8] | “Eleven” | 170 |
| a[9] |  |  |
| a[10] |  |  |
| a[11] | removed | removed |
| a[12] |  |  |
| a[13] |  |  |
| a[14] |  |  |
| a[15] |  |  |
| a[16] | “Abigail” | 867 |
| a[17] |  |  |
| a[18] |  |  |
| a[19] |  |  |
| a[20] |  |  |
| a[21] |  |  |
| a[22] |  |  |
| a[23] | “Jack” | 5309 |
| a[24] |  |  |
| a[25] |  |  |
| a[26] |  |  |
| a[27] |  |  |
| a[28] |  |  |