## Hashing PreLab Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

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] | null |  |
| a[1] | null |  |
| a[2] | null |  |
| a[3] | null |  |
| a[4] | null |  |
| a[5] | null |  |
| a[6] | null |  |
| a[7] | Gino | 348 |
| a[8] | Eleven | 341 |
| a[9] | null |  |
| a[10] | Abigail | 867 |
| a[11] | null |  |
| a[12] | null |  |
| a[13] | null |  |
| a[14] | null |  |
| a[15] | null |  |
| a[16] | null |  |
| a[17] | null |  |
| a[18] | null |  |
| a[19] | null |  |
| a[20] | null |  |
| a[21] | null |  |
| a[22] | null |  |
| a[23] | null |  |
| a[24] | null |  |
| a[25] | null |  |
| a[26] | null |  |
| a[27] | null |  |
| *index* | *key* | *value* |
| a[0] | null |  |
| a[1] | null |  |
| a[2] | null |  |
| a[3] | null |  |
| a[4] | null |  |
| a[5] | null |  |
| a[6] | null |  |
| a[7] | Gino | 348 |
| a[8] | Eleven | 341 |
| a[9] | null |  |
| a[10] | null |  |
| a[11] | Angel | 70 |
| a[12] | null |  |
| a[13] | null |  |
| a[14] | null |  |
| a[15] | Abigail | 867 |
| a[16] | null |  |
| a[17] | null |  |
| a[18] | null |  |
| a[19] | null |  |
| a[20] | null |  |
| a[21] | null |  |
| a[22] | null |  |
| a[23] | Jack | 5309 |
| a[24] | null |  |
| a[25] | null |  |
| a[26] | null |  |
| a[27] | null |  |