CS 1.2: Intro to Data Structures & Algorithms

Hash Table Worksheet

Name: _____

Q1: What are the **3 ingredients** necessary to build a **hash table** data structure (with chaining)?

1. A _____ _____ that calculates a fixed number for each input key.
2. An _____ to store several buckets, each with a unique index in range `[0 ... b-1]`.
3. Several _____ _____ structures so we can store multiple entries in each bucket.

Q2: What are the steps required to **add a new entry (key-value pair)** to a hash table?

1. Call the _____ function on the entry's _____ and then use the modulus operator (%) with the number of buckets to calculate the _____ of the bucket the entry belongs in.
2. Get the _____ the entry belongs in at this _____ in the _____ of buckets.
3. Add the entry's _____ and _____ to this _____ using its _____ operation.

Q3: What are the steps required to **retrieve an entry by its key** and **return its value**?

1.
2.
3.
4.

Q4: Draw a diagram of **how a hash table data structure is organized in memory**. It contains the **4 key-value entries** listed below, has exactly **`b=5` buckets** and each bucket is a **linked list**. Label the buckets, their indexes and contents in appropriate places to complete the diagram.

key	hash(key)	value
'tiger'	393	5
'penguin'	642	22
'zebra'	273	8
'unicorn'	821	1