CSE220: Data Structures (Lab)
Fall 2024
Lab Quiz - 04
Duration: 30 Minutes

A

Name:	ID:	Section:

Question 1 [15 Points]

In this task, you are asked to implement a **HashTable** class that stores key-value pairs, where the key is a **string (representing a package ID)** and the value is a **string (representing the package status)**. The class should include a **hash_function** that computes the hash index based on the sum of ASCII values of the first three characters of the key, adding 'X' if the key is shorter than three characters. The **insert()** method should insert a new key-value pair or update the value if the key already exists, using **forward chaining** to handle collisions. **If the key already exists, its value should be updated.**

[You are not allowed to use any built-in functions except len(). Assume the display method is already implemented]

Sample Input:	Sample Output:	Explanation:

ht = HashTable(10)
 	
ht.insert("PKG123", "In Transit")
ht.insert("AB", "Delivered")
ht.insert("PKG456", "Returned")
 	
print("\nHash table after insetons :")
ht.display()
 	
ht.insert("PKG123", "Delivered") # Updating PKG123 status
 	
print("\nHash table after updates:")
ht.display()
	Hash table after insertions:
	Index 6: PKG123 (In Transit)
	PKG456 (Returned)
	
	Index 9: AB (Delivered)
	
	Hash table after updates:
	Index 6: PKG123 (Delivered)
	PKG456 (Returned)
	
	Index 9: AB (Delivered)
		For PKG123,Hash function calculation, P' = 80,'K' = 75,'G' = 71.Total sum = 80 + 75 + 71 = 226. So, index=226%10=6
		For AB ‘A' = 65, 'B' = 66. Since the key is less than 3 characters, the ASCII value of 'X' (88) is added to the sum.Total sum = 65 + 66 + 88 = 219
		So, index = 219 % 10 = 9
		When we try to insert PKG123 again, since the key already exists its value will be updated from In Transit to Delivered.