# CST8130: Data Structures --- Assign #4

# Using ArrayList OR Dyamically Allocated Array with Hashing Data Structure

***DUE: Monday April 8 by 10PM SHARP!***

## Problem Description:

In this Assignment, we will re-write our Router/Routing program (Assignment #1 – dynamically allocated array or Assignment #2 - ArrayList) to handle inserts using a hash algorithm and a collision resolution algorithm.   Modify your code (or my solution) to do the following:

* Declare a dynamically allocated array called **routingTable** of 100 **RoutingTableEntry** objects OR an **ArrayList** of 100 **RoutingTableEntry** objects. HINT: you should know how to do this assignment using both of these structures! But choose one
* When adding an item, use a hash algorithm to calculate the index of where to store the **RoutingTableEntry** in the **routingTable** array and a collision algorithm
  1. the hash algorithm should use the **destinationAddress**  – by adding the four octets together, then taking modulus 100 (so that you make sure the result is a number between 0 and 99).
  2. if there is already a **RoutingTableEntry** in this index position – move to the next sequential element position in the array until you find an empty location (but not past 99! – in this case display error message – **RoutingTableEntry** cannot be added)
* modify search for a **RoutingTableEntry** in the array inventory to be efficient– and display the index of where it is found and the contents, or a message if it is not found
* processing of **Packets** should continue to be as Assignment 1/Assignment2.

BONUS:

1. change the assignment to keep a **LinkedList** of **RoutingTableEntry** objects at each position in the array/ArrayList – and, add the RoutingTableEntry to the Linked List at the index using hash algorithm above. Change the search to look through the appropriate **LinkedList**. (2 marks)

***Submission:***

You must submit to the assignment link in BrightSpace by the due date and time a zip file (named LastnameFirstNameAssign4) containing:

* all source code – ie .java files
* Your test plan – with the changes for this assignment only

Failure to provide any of the above will have an effect on your grade for this assignment. Marking guide will be published shortly.