Data Structures and Algorithms
Hash Tables Assignment

Weighting - 1/4 of C.A. grade (10% of course total)
Due date: Midnight, 28 Oct 2016.
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You have 2 tasks in this assignment, which is to be individual work only:

1. Implement a **double-hashing** hash table in C or C++ with your own hash functions.
   Evaluate it against typical criteria using some test data.
   Write a brief summary.
2. Find an interesting implementation of a hash table.
   Review it in a formal written report.

Deliverables to submit *via* Blackboard:

- A single pdf document (max. 3 pages), written in an appropriate tone and style for a formal technical document.
- Any source code files and headers written, but not any compiled or binary files.
- All files and documents must be named and dated.

Task 1: "My Pet Hash Function": Programming and Evaluation

Start by writing a very simple implementation of a **linear probing** hash function that produces an index into a hash table, given a `char` array string as key, and a table size, *M*. Analyse if this produces fairly unique results, given a series of test strings that you store in the table. **(up to 3/10)**

Upgrade your implementation to support **double hashing**. This means that when your hash function returns a table index that is already in use by another key, instead of trying the next index along, we use another hash function to give us a pseudo-random offset. In a report paragraph or two, explain your **implementation**, **hash function**, table **load**, and **coverage**. **(up to 3/10)**

Task 2: Research and Review

Find an implementation of a hash-table in a project or written work where you can view the source code or documentation. Review the hash table in a written section in your report - explain what type of hash table it is, and why it may or may not be an appropriate choice for the project, considering alternatives. Comment on implementation details, and use code snippets (listings) or algorithm blocks to help the reader clearly understand the hash table. Ideally you will have found some new insight or technique that you want to share with the reader, or have made a professional critique of a work. You must provide appropriate formal reference(s) in the document to the work, and authors, if possible. **(up to 4/10).**

Grading Guide

Basic implementation and review. **4-5**
Capable implementation with good analysis and reasonable report. **6-7**
Depth and understanding and reasoning. Attention to detail. Concise, formal, clear writing. **8-10**