

CSC 323 Algorithm Design and Analysis
Spring 2018
Instructor: Dr. Natarajan Meghanathan

Project 1: Brute Force Algorithm for the Element Uniqueness Problem

Due by: Feb. 8th, 1 PM

In this project, you will implement the brute force algorithm discussed in Module 1 for the "Element Uniqueness Problem." Each of you have been assigned two 'm' values that correspond to the maximum value for an element in the array. The two 'm' values are independent of each other and should be considered separately.

For a particular 'm' value, the values for the array size 'n' are: 0.1m, 0.2m, 0.3m, 0.4m, 0.5m, 0.6m, 0.7m, 0.8m, 0.9m, m. For example, if $m = 100$, the values of the array size 'n' are: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.

As part of your code, you should generate an array of size 'n' whose values are generated randomly in the range $[1..m]$. Your algorithm should keep track of the number of comparisons needed to determine whether the array of random elements (generated as above) is unique or not.

You should run your algorithm/code several times (say, 10000 times using an automated loop) for each (n, m) pair and determine the average number of comparisons.

For each of the two 'm' values (with 'n' varying from 0.1m to m as described above), plot the values for 'n' vs. the average number of comparisons for the n value.

Maximum Possible value (m) of the elements in your arrays:

Student Name	m values	Student Name	m values
Anderson, Leon	100, 1000	Hobson, Antoine	1100, 11000
Baskota, Ujjwal	200, 2000	Junius, Portia	1200, 12000
Boateng, Albert	300, 3000	McGuffee, Justin	1300, 13000
Dagne, Samuel	400, 4000	Moore, Ryun	1400, 14000
Daniel, James	500, 5000	Rogers, Keara	1500, 15000
Davis, Zakeia	600, 6000	Stewart, Timothy	1600, 16000
Epps, Justin	700, 7000	Tadesse, Nebiyou	1700, 17000
Gebre, Amanuel	800, 8000	Tran, Phat	1800, 18000
Groom, Melrondarius	900, 9000	Williams, Anath	1900, 19000
Hailermaiam, Yoseph	1000, 10000		

Submission (through Canvas): Upload the following

Your code (Java/C++/Python)

A word document containing the two Excel plots (as required above for each 'm' value) and your explanation interpreting the results.