CSC 323 Algorithm Design and Analysis
Instructor: Dr. Natarajan Meghanathan
Spring 2017

Project # 2: Binary Search Algorithm to Search for a Value with a Certain Precision

Due: March 2, 2017, 1 PM

Consider a function foo(x) that takes a parameter x and returns false if x is less than a threshold and returns true if x is greater than or equal to the threshold. The value of the threshold (0 < threshold ≤ 1) is input by the user (each student is assigned a threshold). The objective of this project is to develop a binary search algorithm that repeatedly calls the function foo(x) with various candidate values of x until it finds an x value (called the matching x) whose first *p* digits match exactly to the value of the threshold input by the user. For example, if the threshold assigned for the user is 0.8123712 (of precision p = 7 digits), the matching x value would be something like this 0.812371201813221, whose first p = 7 digits match exactly with that of the above threshold. As part of the outputs, you are also required to keep track of the number of iterations of binary search it took to determine the matching x value for the threshold value assigned to you.

Your code should comprise of the following:
(a) the function foo(x) as defined above
(b) the main function with the implementation of the binary search algorithm to compute the matching x value for a threshold and the number of iterations

The input to your code should be the threshold value assigned to you. You could also input another value that you want to use to control the precision of the matching x value.

The output of your code should be the matching x value (in its entirety) and the number of iterations it took to determine the matching x value.

What to submit:
(i) A comprehensive report explaining your design of the binary search algorithm for the above problem as well as the code with (a) and (b) as mentioned above, and a screenshot of the execution of the code for the threshold assigned to you along with the output. E-mail me the entire report at natarajan.meghanathan@jsums.edu
(ii) A video recording in which you explain your design logic and the structure of the code as well as demonstrate the execution of the code for the threshold assigned to you. Upload the video to Google Drive and send the link to my above email address.

Threshold Value assigned for each student

Student Name	Threshold		Student Name	Threshold
Alexander Arrington	0.74987		Kayla Johnson	0.654785
Jaylen Boykin	0.198564		Bria McCutcheon	0.27844
Jason Bruno	0.2874561		Darren McGee	0.8874512
Elbert Buchanan	0.1345		Justin McGuffee	0.258456
Daniel Epps	0.97458		Kayshaunna Williams	0.47856
Jordan Hubbard	0.333125		Michael Wilson	0.012458