Help

## L3 PROBLEM 5 (7/7 points)

For this problem, download intDictTests.py, a file that contains some simulations that will help us examine the properties of hashing.

Read through the extra functions to understand what they do; call the appropriate function with the right parameters to answer the following questions.

1. If our hash table has 1000 buckets and we perform 50 insertions, what is the calculated probability of a collision? Answer to at least 3 decimal places.

   0.712 **Answer:** .712

2. If our hash table has 1000 buckets and we perform 200 insertions, what is the calculated probability of a collision? Answer to at least 3 decimal places.

   0.999 **Answer:** .999

3. If our hash table has 1000 buckets and we perform 50 insertions, perform a simulation to observe the probability of a collision. Run for at least 1000 trials; answer to at least 3 decimal places.

   0.712 **Answer:** .7

   **CORRECT ANSWER**

   0.7 +/- 0.040

4. If our hash table has 1000 buckets and we perform 200 insertions, perform a simulation to observe the probability of a collision. Run for at least 1000 trials; answer to at least 3 decimal places.

   1.0 **Answer:** 1.0

   **CORRECT ANSWER**

   1.0 +/- 0.001

5. Say you're in a classroom with 29 other students (30 total students). What is the calculated probability that two students share the same birthdate? For simplicity, assume there are 365 days in a year and all birthdates are equally probable. Answer to at least 3 decimal places.

   0.706 **Answer:** .706

6. Say you're in a lecture hall with 249 other students (250 total students). What is the calculated probability that two students share the same birthdate? For simplicity, assume there are 365 days in a year and all birthdates are equally probable. Answer to at least 3 decimal places.

   1.0 **Answer:** 1.0

7. What's the largest classroom size where the probability of two students sharing the same birthday is less than 0.99? Hint: either write a function that loops through values and finds this for you, or perform a manual bisection search.

56 **Answer:** 56

Further reading: in this problem we calculated the probability of same birthdays in a very simplistic manner. For more depth on this problem, see this Wikipedia page.

Hint (if you need it): What Functions to Call

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