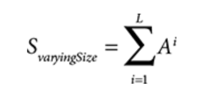
Jackson Warren

Jeremy Bergen

CSCI 370

10/11/21

Week 6 Assignment: 1, 2, and 21 in Book

1. Search Spaces:
   1. 7 long with upper and lower case: Assuming that *S = A^l*, where l is the fixed number of letters, and A = 52 for upper and lower case, we can then do *S = 52^7* to accommodate both upper and lower case. S = 1.02e12.
   2. 7 or shorter, with ASCII: Now, we use to calculate a search space with varying lengths and a max length of *L*. Using ACSII, we say *A = 94*, with *L = 7*. Therefore, S = 6.55e13
   3. 14 long, mixed case: S = 1.05e24 (*Where A = 52 and l = 7*)
   4. 14 or shorter, mixed case: S = 1.07e24 (*Where A = 52 and L = 7*)
2. Comparing two systems:
   1. Both have a max length of 16
   2. System one: Max of 16, ASCII, any length within 16. *A = 94, L = 16*.
      1. S = 3.76e31
   3. System two: Now, I believe it would be the previous search space minus those first 8 letter combinations since it must be over 8 characters long. So, for the second part, *A = 94 and L = 8.*
      1. S2 = 6.16e15 (Search space for the first 8 combinations)
      2. S1 – S2 = 3.76e31
      3. For the record, it did shrink, just very minutely when looking at many combinations.

21. Using EFF with Dice

a. Single Role of 5 dice: Sample Space is 6^5 = 7776

b. 6 roles of 5 dice: We now have these options rolled 6 times, so, it would be 7776^6 = 2.21e23.

c. Now we can do *2.21e23/10e3 = x/2e10* to convert the size in bits.

x = 4.42e29 (Which is much larger than the answer in part b)