

Extra Counting Problems

1. How many different **binary max-heaps** are there that contain exactly the 7 nodes $\{0, 1, 2, 3, 4, 5, 6, 7\}$?
2. How many integer solutions are there for the equation: $x + y + z = 12$, where $x, y, z \geq 2$?
3. How many **binary search trees** have the **pre-order traversal** $[3, 1, 2, 4, 5, 7]$? (Hint: this is a trick question)
4. How many 8 character passwords could you make from the characters $\{a-z\}$, $\{A-Z\}$, $\{0-9\}$ (i.e. all the lowercase letters, uppercase letters, and digits) under each of those restrictions:
 - a. There is at least one lowercase letter, one uppercase letter, and one digit.
 - b. There is no restriction at all.

Which of the cases, in theory, is more favorable to a hacker?

5. How many 6 bit strings contain the following pattern: 1010? (examples: 101010, 010100; non-examples: 110110, 001011)