

1 6.1: Counting (continued)

Passwords

Length 6 to 8, alphanumeric: $P = P_6 + P_7 + P_8 = 36^6 + 36^7 + 36^8$

$$P_6 = (26 + 10)^6 = 36^6$$

If it must contain at least one digit: calculate P_n , but subtract all the possibilities that do not contain at least one digit (i.e, the ones that are all letters). *Inclusion/exclusion*.

$$P_{6*} = P_6 - (26)^6$$

$$P_{7*} = P_7 - (26)^7$$

$$P_{8*} = P_8 - (26)^8$$

Bit strings

Number of bit strings with length 8 that start with a 1 or end with 00 (inclusive OR).

Number of strings that start with 1 + Number of strings that end with 00 – number of strings that start with 1 and end with 00 (to avoid double counting)

$$(1 * 2^7) + (2^6 * 1 * 1) - (1 * 2^5 * 1 * 1)$$

If the OR was exclusive, we would subtract 2^5 twice.

Bit strings of length 4 without consecutive 1s.

$$\{0000, 0001, 0010, 0100, 0101, 1000, 1001, 1010\}$$

Use a tree with tree pruning to find possible strings.