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Individual Assignments #58

Assignment: *5.1: 8, 12, 16, 24, 26, 42, 46, 60*

Q8

26*25*24 = 15600

Q12

$2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0$ +Empty string = 128

Q16

13 possible combinations of at least 3 x's in four digits.

Q24

a) 10*9*8*7 = 5040
b) 10^4/2 = 5000
c) 4

Q26

$26^3*10^3*2 = 35152000$

Q42

A = bit string of length 7, $|A| = 2^7$

B = begins with 2 0's, $|B| = 2^5$

C = ends with 3 1's, $|C| = 2^4$

B + C = 2^5+2^4 = 48

Q46

$|A| = 38$ (CS students including joint students)
$|B| = 23$ (MTH students including joint students)
$|A \cap B| = 7$ (joint students)

$|A| + |B| - |A \cap B| = 38+23-7 = 54$

Q60

$P = n_1$ is first way to do a task and n_2 is a second way.
$Q = n_1n_2$ ways to do the procedure

Let P(m) be product rule for m tasks. The base case m=2 which is the definition of the product rule for two tasks, so that checks out. The inductive case assumes P(m) is true and implies P(m+1). Consider m+1 tasks which can be done $n_1*n_2*\ldots*n_m*n_{m+1}$ ways. By the Product Rule for two tasks the number of ways to do this task it the product of the first m number of ways multiplied by the m+1 # of ways. By induction it is proven.