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Homework 6: Counting

1. 38 Computer Science (including joints), 23 Mathematics (including joints), 7 joint majors?
    a. 38 + 23 - 7 = **54 students**
    b. The joint majors are double counted, so subtract 7 students to account for joint majors
2. Number of possible initials if someone has at least 2 but no more than 5 initials
    a. Assuming repeat characters are allowed
    b. If 2 initials, there are 26^2 possibilities
    c. If 3 initials, there are 26^3 possibilities
    d. If 4 initials, there are 26^4 possibilities
    e. If 5 initials, there are 26^5 possibilities
    f. Add all possibilities: $26^2 + 26^3 + 26^4 + 26^5$ = **12356604 possible initials**
3. Boolean function of n variables returns true or false, where b_i is true or false. Number of distinct functions with n boolean variables?
    a. Each boolean variable can take on two possible values, and there are n of them
    b. Therefore, number of distinct functions with n boolean variables is 2^n.