H.W 1 / /

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1) 250 students we want to know how many ways to choose 2 students:

$$nC_r = \frac{n!}{r!(n-r)!} \Rightarrow \frac{250!}{2!(248)!} \Rightarrow 31125$$

$$= \frac{250 \times 249 \times 248!}{2!(248!)} = \frac{250 \times 249}{2!} = 31125$$

2) 5 bit strings we want how many ways we can form them from 3 0's and 2 1's.

$$2C_2 = \frac{2!}{2!(0!)} = \frac{2}{2} = 1$$

$$3C_3 = \frac{3!}{3!(0!)} = 1$$

So there is only one distinct bit string that can be formed.

3)

| 1 | 0,1 | 0,1 | 0,1 | 1 |
|---|---|---|---|---|

$2 \times 2 \times 2 = 8$

Combination so order does'nt matter

1 0 0 0 1

1 1 1 0 1

1 1 1 1 1

1 0 0 1 1

so the answer is 4

4) Three awards will be given to three different players (Ex: 1st place, 2nd and 3rd). Anyone of the three can take any of the awards but only one award so order doesn't matters so ~~permutations~~ combinations.

~~so $nP_r = \frac{30!}{(30-3)!} = 24360$~~

$$nC_r = 30C_3 = 4060$$

5) 3 out of 6 distinct books

so $$6C_3 = \frac{6!}{3!(3!)} = 20$$

6) Probability of rolling 7 is {} because the highest possible outcome of a fair dice is 6.

7) First we count no. of ~~three~~ ways to select 3 books from 6

so $6C_3 = 20$

then

$2C_1 = 1$ → one way to choose both restricted books

$4C_1 = 4$ → 4 ways to choose another one from the 4 to create a group of 3 books

/ /

$20 - 4 + 1 = 17$

8) 25 total

2 Ahmed, 2 Sally 2 mariam, 2 yousef and 2 Ibrahim

$2^5 = 32$

$22C_9 = 74613$

a) So $32 \times 74613 = 2387616$

b) $2C_1 = 1$

$1 \times 1 \times 1 \times 1 \times 1 \times {}^{19}C_4 = 38760$