

Homework #1-3

1

How many ways can you create a team of 4 out of 7 people?

2

A computer system accepts passwords that are between 5-7 characters in length. Assume each character is an alphabetical letter and that there are 26 letters in the alphabet. How many different password possibilities are there?

3

Peter rolls two dice at the same time. What is the probability that he will roll a double?

Solutions #1

1

$$7C4 = 7C1 * 6C1 * 5C1 * 4C1 / 4! = 35$$

OR

$$7! / (4! * (7-4)!) = 7! / (4! * 3!) = 7*6*5*4 / 4! = 35$$

Choose 1 person out of 7.

Then choose 1 person out of remaining 6.

Then choose 1 person out of remaining 5.

Then choose 1 person out of remaining 4.

Divide by $r!$ if order does NOT matter. Order does NOT matter when creating a team.

Team consisting of A+B is same as B+A

Solutions #2

2

$$26^5 + 26^6 + 26^7$$

5-char password + 6char password + 7 char password

Each set of passwords uses 26 characters in each spot.

First 5-char password has 5 spots.

First spot has 26 possibilities

Second spot has 26 possibilities

Third spot has 26 possibilities

etc...

$$26 * 26 * 26 * 26 * 26 = 26^5$$

Repeat for 6-char password and 7-char password

Add up the possibilities

Solutions #3

3

$$6C1 * 1 / (6^2) = 6/36 = 1/6$$

Choose which value you want the double to be --- out of 6 choose 1 value.

For that value, require that the second dice be that same value. There is only 1 way.

Total, the doubles are 11, 22, 33, 44, 55, 66. Thus $6 * 1 = 6$ possibilities

Total possibilities are 6 on first dice and 6 on second dice. That is $6 * 6 = 6^2 = 36$

Calculate the probability as $6/36$ or $1/6$

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