Answer on Question #48390 – Math - Discrete Mathematics

suppose repetation are not permited the digit is 1,2,3,4,5,7
how many such no are less than 4000?

Solution:

We must break our task into two cases:

Case 1: The first digit is 2.
Case 2: The first digit is 1 or 3.

Case 1: The first digit is 2

We choose the first digit 1 way (as 2).
We can choose the fourth digit 3 ways, as 1,3,5, or 7.
We can choose the second digit any of the 5 remaining digits.
We can choose the third digit any of the 4 remaining digits.

$That's\ 1 \cdot 4 \cdot 5 \cdot 4 \ = \ 80\ ways$

Case 2: The first digit is 1 or 3.

We choose the first digit 2 ways (as 1 or 3)
We choose the fourth digit 3 ways (5,7, or whichever of 1 and 3 that wasn't chosen as the first digit.
We can choose the second digit any of the 5 remaining digits.
We can choose the third digit any of the 4 remaining digits.

$That's\ 2 \cdot 3 \cdot 5 \cdot 4 \ = \ 120\ ways$

Total number of ways: $80 + 120 \ = \ 200$

Answer: 200