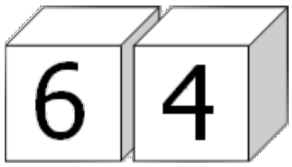
Cube digit pairs

Problem 90 (http://projecteuler.net/problem=90)

Each of the six faces on a cube has a different digit (0 to 9) written on it; the same is done to a second cube. By placing the two cubes side-by-side in different positions we can form a variety of 2-digit numbers.

For example, the square number 64 could be formed:



In fact, by carefully choosing the digits on both cubes it is possible to display all of the square numbers below one-hundred: 01, 04, 09, 16, 25, 36, 49, 64, and 81.

For example, one way this can be achieved is by placing `{0, 5, 6, 7, 8, 9}` on one cube and `{1, 2, 3, 4, 8, 9}` on the other cube.

However, for this problem we shall allow the 6 or 9 to be turned upside-down so that an arrangement like `{0, 5, 6, 7, 8, 9}` and `{1, 2, 3, 4, 6, 7}` allows for all nine square numbers to be displayed; otherwise it would be impossible to obtain 09.

In determining a distinct arrangement we are interested in the digits on each cube, not the order.

```
{1, 2, 3, 4, 5, 6} is equivalent to {3, 6, 4, 1, 2, 5}
{1, 2, 3, 4, 5, 6} is distinct from {1, 2, 3, 4, 5, 9}
```

But because we are allowing 6 and 9 to be reversed, the two distinct sets in the last example both represent the extended set `{1, 2, 3, 4, 5, 6, 9}` for the purpose of forming 2-digit numbers.

How many distinct arrangements of the two cubes allow for all of the square numbers to be displayed?

Solution

In [1]:
```
from itertools import combinations, starmap

nc = lambda x: [6 if z == 9 else z for z in x]
sqn = [(0,1), (0,4), (0,6), (1,6), (1,8), (2,5), (3,6), (4,6)]

total = 0

for cube1, cube2 in combinations(map(nc,combinations(range(10),6)),2):
    if all((ten in cube1) and (one in cube2) or (one in cube1) and (ten in
        total += 1

print(total)
```

```
1217
```