Problem34

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1 Problem 34

1.1 Digit factorials

145 is a curious number, as $1! + 4! + 5! = 1 + 24 + 120 = 145$.

Find the sum of all numbers which are equal to the sum of the factorial of their digits.

Note: As $1! = 1$ and $2! = 2$ are not sums they are not included.

[ ]:
```
import math

#pre-populate a list of the factorials of every digit
fac_list = []
for n in range(10): fac_list.append(math.factorial(n))

def SumOfFactorials(num):
    fac_sum = 0
    for d in str(num): fac_sum += (fac_list[int(d)])
    return fac_sum

#Set a search limit based on the smallest int of the form 9999...
#that is smaller than the sum of the factorials of its digits
limit = 9
e = 1
while limit < SumOfFactorials(limit):
    limit += 9*10**e
    e += 1

print("limit = ", limit)

for n in range(3, limit):
    fac_sum = SumOfFactorials(n)
    if fac_sum == n: print(fac_sum)
```

```
limit =  9999999
145
40585
```