

Probelm48

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1 Problem 48

1.1 Self powers

The series, $1^1 + 2^2 + 3^3 + \dots + 10^{10} = 10405071317$.

Find the last ten digits of the series, $1^1 + 2^2 + 3^3 + \dots + 1000^{1000}$.

```
[ ]: ## Making the assumption that as the numbers get near 1000 they will be too big  
## So just keep the last 10 digits
```

```
max_power = 1000  
max_digits = 10  
sum_of_powers = 0  
  
for x in range(1, max_power + 1):  
    current_prod = 1  
    for y in range(x):  
        current_prod = current_prod * x  
        current_prod = int(str(current_prod)[-max_digits: ])  
    sum_of_powers += current_prod  
  
sum_of_powers = str(sum_of_powers)[-max_digits: ]  
print(sum_of_powers)
```

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```
[ ]: ## However, looks like just doing and summing the powers works fine, and is  
↪faster...
```

```
prod = 0  
for x in range(1, 1001):  
    prod += x**x  
prod = str(prod)[-10:]  
print(prod)
```

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