1.1) 设1234的2乘积为 M_2. 则

$M_2 = 1\times234 + 12\times34 + 123\times4$

$= 1134$

2) 设 C[i][j] 表示从第i位到第j位组成的十进制数

M[i][j]表示前i位分成j段的最大乘积，即前i位分成j段且n-i位分成k-j段且 $1\le j\le i$

则 $M[i][j] = \max_{k\le r<j}\{M[r][j], M[r][j-1]\times C[r+1][i]\}$

特别地 $M[i][1] = C[1][i]$

伪代码如下：

Input: P、n、k

Output: M[n][k]，P的最大k乘积

```
for i=1 to n
    for j=1 to n
        C[i][j] = the number of i+1+2...j
```

⇒

```
for i=1 to n
    t0 = P mod 10
    C[i] = t0 × 10^(i-1)
    P = P % 10
```

```
for i=1 to n
  M[i][1] = C[1][i]

for j=1 to n
    for j = k-n+j to i
      for r=1 to i-1
```

$< M[i][j] = -\infty$

$M[i][j] = \max\{M[i][j], M[i][j-1] \cdot C[i+1][j]\}$

endfor

endfor

endfor

return $M[1][k]$.

2. 将这些区间看成是点的坐标.

① 将点按 x 坐标排序

② 找出"极大点",即从右往左扫描过的点没有比对该点的点

③ 排除极大点所的点即为所求区间.

Input: a set of intervals on a number axis. $S = \{(x_1,y_1)(x_2,y_2)\cdots(x_n,y_n)\}$

Output: a set of intervals contained by other intervals in S. (P)

sort all intervals in S, x in asending order and y in descending order

$y_{max} = -\infty$

for $i = 1$ to n.

if $y_i > y_{max}$: $y_{max} = y_i$ // means (x_i, y_i) is a maximum point.

else put (x_i, y_i) in P.

~~Output~~ return P.

3. 证明：对于所有 $A_{n\times n} * B_{n\times n}$，可以构造

$$\begin{pmatrix} A & 0 \\ 0 & B \end{pmatrix} \times \begin{pmatrix} B & 0 \\ 0 & A \end{pmatrix}$$

$$= \begin{pmatrix} AB & 0 \\ 0 & BA \end{pmatrix}$$