

# DP

**Manufacturing Problem**——装配线呀嘛装配线，我家有条装配线

```
FASTEST-WAY(a, t, e, x, n)
  f1[1] = e1 + a(1,1)
  f2[1] = e2 + a(2,1)
  for j = 2 to n
    do if f1[j-1] + a(1,j) <= f2[j-1] + t(2,j-1) + a(1,j)
    then f1[j] = f1[j-1] + a(1,j)
        l1[j] = 1
    else
        f1[j] = f2[j-1] + t(2,j-1) + a(1,j)
        l1[j] = 2

    if f2[j-1] + a(2,j) <= f1[j-1] + t(1,j-1) + a(2,j)
    then f2[j] = f2[j-1] + a(2,j)
        l2[j] = 2
    else
        f2[j] = f1[j-1] + t(1,j-1) + a(2,j)
        l2[j] = 1

  if f1[n] + x1 <= f2[n] + x2
  then final = f1[n] + x1
      l_fin = 1
  else
      final = f2[n] + x2
      l_fin = 2
```

**MATRIX-CHAIN**——矩阵链乘！乘！乘！乘！

$$m[i, j] = \begin{cases} 0 & \text{if } i = j \\ \min_{i \leq k < j} \{ m[i, k] + m[k + 1, j] + p_{i-1}p_kp_j \} & \text{if } i < j \end{cases}$$

MATRIX-CHAIN-ORDER(p)

n = length[p] - 1

for i=1 to n

do m[i,i] = 0 #最底层首先初始化为0

for l=2 to n #l代表链长

do for i=1 to n-l+1

do j = i+l-1

m[i,j] = MAX #无穷

for k=1 to j-1

do q = m[i,k]+m[k+1,j]+p[i-1]\*p[k]\*p[j]

if q<m[i,j]

then m[i,j] = q

s[i,j] = k

return m and s