栈与队列

进制转换

04-C

Hickory, Dickory, Dock

The mouse ran up the clock

wan, twan, tetbera, metbera, pimp,

setbera, letbera, bovera, dovera, dick,

wanadick, twanadick, tetberadick, metberadick, pimpdick,

setberadick, letberadick, boveradick, doveradick, bumfit,

wanabumfit, ...

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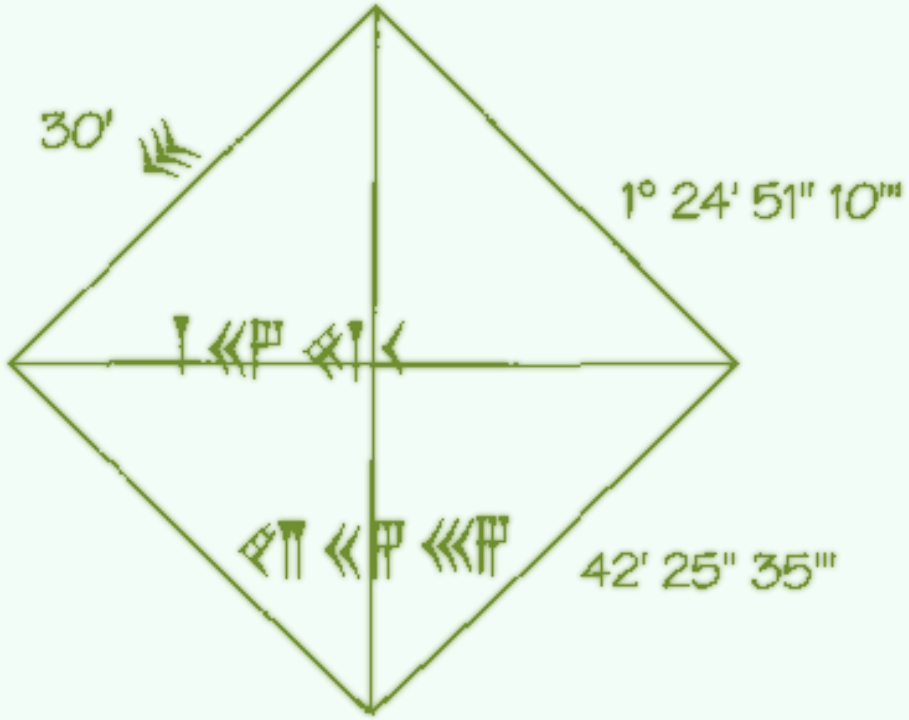
进制转换

- 给定任一10进制非负整数，将其转换为λ进制表示形式
  - $12345_{(10)} = 30071_{(8)}$
  - printf("%d | %I64d | %b | %o | %x" , n);
- 巴比伦楔形文字（Babylonic cuneiform）中的60进制...
  - 1°24'51''10'''
  - = 1 + 24/60 + 51/60^2 + 10/60^3
  - = 1.41421296296296... //正方形的对角线
- 误差 ~ |1°24'51''10''' - sqrt(2)|
  - < 0.000,000,6 = 0.6 x 10^{-6} //即便边长为1km，误差亦不足1mm

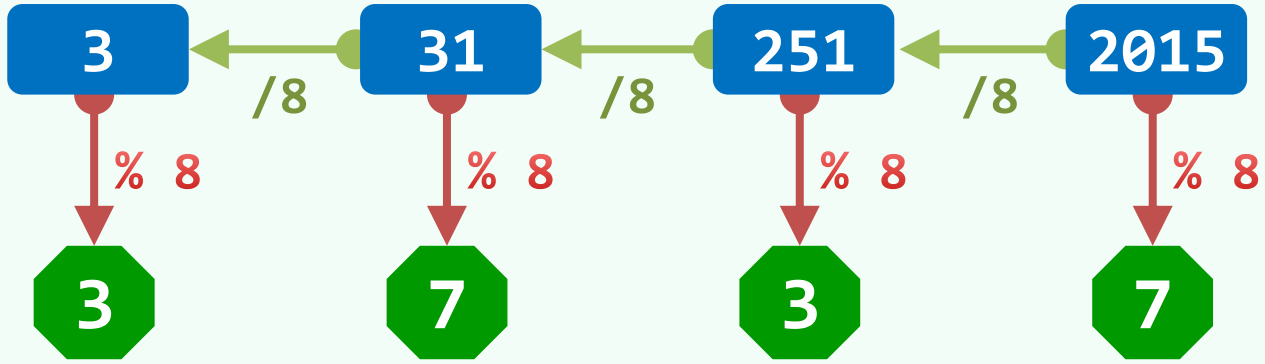


短除法：整商 + 余数

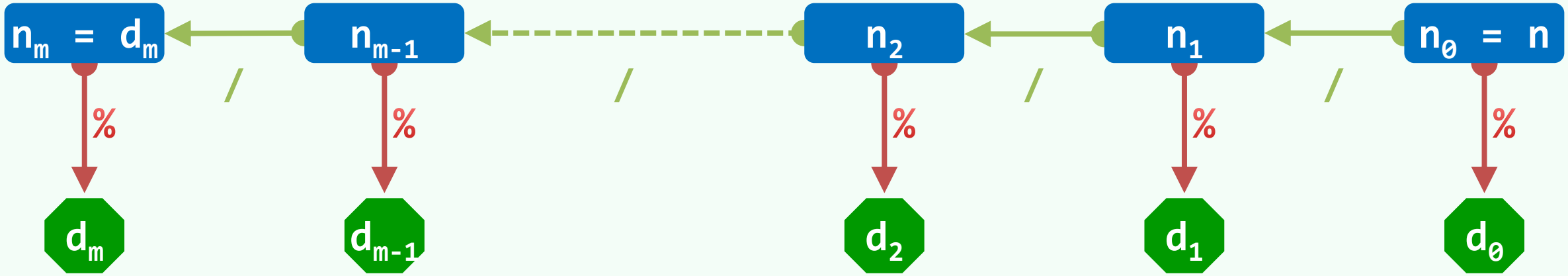
❖ 设：$n = (d_m \dots d_2 d_1 d_0)_\lambda = d_m \cdot \lambda^m + \cdots + d_2 \cdot \lambda^2 + d_1 \cdot \lambda^1 + d_0 \cdot \lambda^0$

令：$n_i = (d_m \dots d_{i+2} d_{i+1} d_i)_\lambda$

❖ 则有：$n_{i+1} = n_i \,/\, \lambda$ 和 $d_i = n_i \,\%\, \lambda$



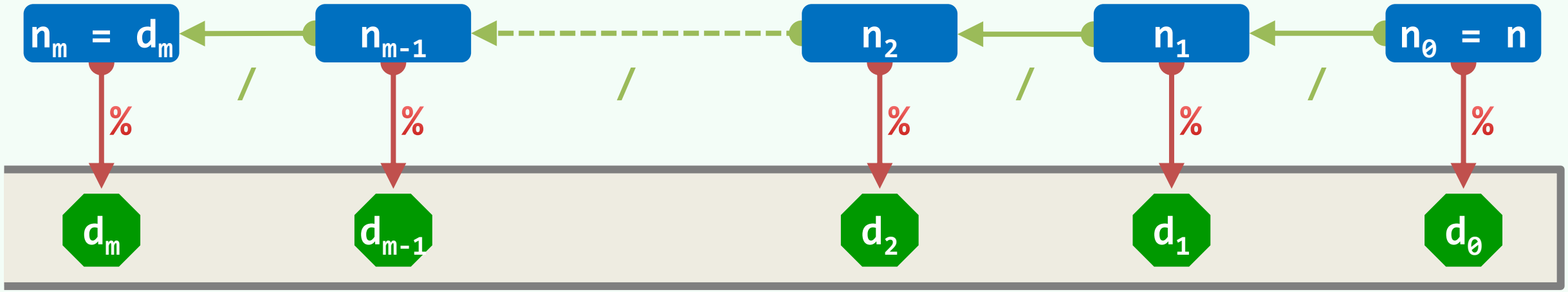
❖ 如此对λ反复整除、留余，即可自低而高得出λ进制的各位



难点 + 算法

❖ 位数m并不确定，如何正确记录并输出转换结果？具体地

- 如何支持足够大的m，同时空间也不浪费？
- 自低而高得到的数位，如何自高而低输出？



❖ 若使用向量，则扩容策略必须得当；若使用列表，则多数接口均被闲置

❖ 使用栈，既可满足以上要求，亦可有效控制计算成本

实现

```
❖void convert( Stack<char> & S, __int64 n, int base ) {
    char digit[] = "0123456789ABCDEF"; //数位符号，如有必要可相应扩充
    while ( n > 0 ) { //由低到高，逐一计算出新进制下的各数位
       S.push( digit[ n % base ] ); //余数（当前的数位）入栈
       n /= base; //n更新为其对base的除商
    }
  } //新进制下由高到低的各数位，自顶而下保存于栈S中
❖main() {
    Stack<char> S; convert( S, n, base ); //用栈记录转换得到的各数位
    while ( ! S.empty() ) printf( "%c", S.pop() ); //逆序输出
  }
```