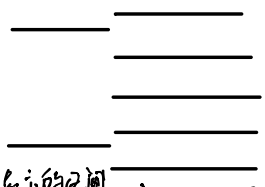
Ex 6.1

worst case: 要表示的区间处在一个 binary 区间内



要表示的区间　binary 区间.

可以用其中一个把区间表示.

即 $\log\left(1/P(x|H)/4\right) = \log\left(\frac{1}{P(x|H)}\right) + \log 4$

Ex 6.3

standard method. 每次生成 $1 \sim 2^{32}$ 之间的随机数.

$\therefore 32 \times 1000$

Arithmetic coding. $H_2(0.01) = 0.081$

有 2 bits 的 overhead.

$\therefore 0.081 \times 1000 + 2$

Ex 6.4.

If there exists an uniquely decodeable code that can shorter some strings without lengthening some others.

Then $|\text{codes}| < |\text{strings}|$. violet the unique.

Ex 6.5

λ	0	00	000	0000	001	00000	000000
0	1	2	3	4	5	6	7
000	001	010	011	100	101	110	111
(,0)	(1,0)	(10,0)	(11,0)	(,0,1)	(100,0)	(110,0)	

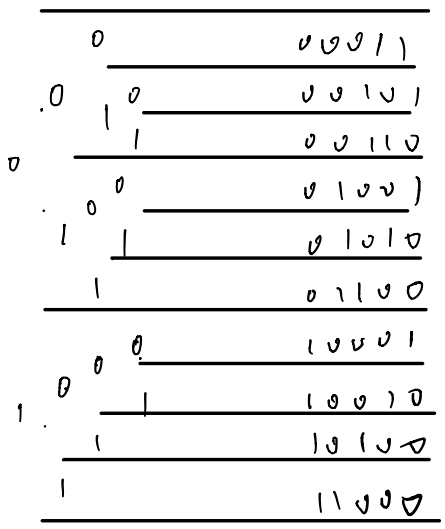
basic: 0 10 100 110 101 10001100

Ex 6.6

λ	0	1	00	001	000	10	0010	101	0000	01
0	1	00	01	000	10	110	111	1000	1001	1010
(,0)	(0,1)	(01,0)	(11,1)	(011,0)	(010,0)	(100,0)	(110,1)	(0101,0)	(0001,1)	

01 00 001 000 10001 0 101 0 0 001

Ex6.7



Ex6.8

$\log_2 \left(\binom{N}{k}\right)$

参阅表6.7

Ex6.9 Entropy $0.01 \log 100 + 0.99 \log \frac{1}{0.99} = 0.0809$

Expected Length $= 1$.

factor $= 12.4$

Ex6.10. It requires N bits. At every step, the probability of a 1 is f. the probability of a 0 is $1-f$

Ex6.11

λ	0	1	10	001	000	0010	101	0000
00	001	010	011	100	101	110	111	1000
	(,0)	(0,1)	(010,0)	(11,1)	(11,0)	(100,0)	(011,1)	(01,0)

0.0.1.0.1.0.1.1.1.1.0.0.1.0.0.1.0.0.0.0.1.1.1.1.0.0.1

在x6.12

当 000 001 010 011 100 一个prefix已经加入dic

接下来的prefix不可能是 1.1.0.1.0.1.1.1.