Xueming Yin

CSCI 1300 chapter 3 exercise

**2**. a. The total number of gifts given on Day 12 is 1+2+…+11+12, which use Gauss’s formula is n (n+1)/2=12(12+1)/2=78

b. Partridges: 1 × 12 = 12

Doves: 2 × 11 = 22 use the formula

Hens 3 × 10 = 30 n (n+1) (n+2)/6

Calling birds: 4 × 9 = 36 = 12\*13\*14/6

Golden rings: 5 × 8 = 40 = 364

Geese: 6 × 7 = 42

Swans: 7 × 6 = 42

Maids: 8 × 5 = 40

Ladies: 9 × 4 = 36

Lords: 10 × 3 = 30

Pipers: 11 × 2 = 22

Drummers: 12 × 1 = 12

Total: 364

**4**. a. Third 86/2 = 43

Fourth 43/2 = 21 and 1 left over

Fifth 22/2 = 11

Sixth 11/2 = 5 and 1 left over

Seventh 6/2 = 3

Eighth 3/2 = 1 and 1 left over

Final 2/2 = 1

The total number of matches is 171+85+43+21+11+5+3+1+1=341

b. Since there is only one winner which means other players are all losers, so the number of losers is342-1=341, and it is also the total number of matches.

c. The first algorithm is clarity and correct, but it’s not elegance and efficiency. The second algorithm is more clarity, elegance and efficiency. Sometimes change the way of thinking of computation can make the algorithm more efficient.

**7**. a. For the sequential search algorithm, the average time use is

32000000/2 \* 1/12000 = 1333.333s

b. The time use for binary search is 25s

Because 2^25 = 33554432

**8**. After n is qualify the equation 2n-3 = (5n+5)/3, the second algorithm is faster

So n=14

**37**. After n qualify equation 100\*n^2 = 0.01(2^n), the 100n^2 instruction become more efficient

So n≈22.238

**38**. a. Since the algorithm is order of magnitude n, when n=100 use 10 seconds

So when n=100\*5=500, use time is 10\*5=50 seconds

b. The algorithm is order of magnitude n^2, and 100\*5=500

so when n=500 the time use is 5^2\*10=250 seconds

Challenge work

1. The first verse is

1>Old MacDonald had a farm, E-L-E-L-O.

2>And on that farm he had a cow, E-L-E-L-O.

3>With a moo-moo here and a moo-moo there,

4>Here a moo, there a moo, everywhere a moo,

5>Old MacDonald had a farm, E-L-E-L-O

For every verse the line 1. 2. 5 are instant, total syllables is 37

2.3.4 line total syllables is 22

For every one more verse, add 22 syllables

n verse add n\*22 syllables

so the total syllables for n verse is

(37+1\*22)+(37+2\*22)+…+(37+n\*22)=37n+22n(n+1)/2