Scenarios

* Notation
  + *() contains a distribution of card counts*
  + *– separates runs from sets*
  + *, list of counts in same suit in ascending order*
  + *| list of counts in distinct suits (runs only)*

1. 1 Run
   1. All same suit: (10)
2. 2 Runs
   1. All same suit: (7,3), (6,4), (5,5), (4,6), (3,7)
   2. Two suits: (7|3), (6|4), (5|5)
3. 3 Runs
   1. All same suit: (4,3,3), (3,4,3), (3,3,4)
   2. Two suits: (4,3|3), (3,4|3), (3,3|4)
   3. Three suits: (4|3|3)
4. 1 Run / 1 Set
   1. Set does not include run suit: (7 – 3)
   2. Set does include run suit: (7low – 3), (7high – 3), (6low – 4), (6high – 4)
5. 2 Runs / 1 Set
   1. Runs are same suit, not included in set: (4,3–3), (3,4–3)
   2. Runs are same suit, included in set:
      * (4 low,3 low –3), (4 low,3 high –3), (4 high,3 high –3)
      * (3low,4 low –3), (3 low,4 high –3), (3 high,4 high –3)
      * (3 low,3 low –4), (3 low,3 high –4), (3 high,3 high –4)
   3. Runs are different suits, first included in set:
      * (4low|3–3), (4high|3–3), (3low|4–3), (3high|4–3)
   4. Runs are different suits, both included in set:
      * (4low|3 low –3), (4high|3 low –3), (4low|3 high –3), (4high|3 high –3)
      * (3low|3 low –4), (3high|3 low –4), (3high|3 high –4)
6. 1 Run / 2 Sets
   1. Run suit not in either set: (4–3,3)
   2. Run suit included in one set *(\* indicates set that contains run suit)*
      * (4 low–3\*,3), (4 high–3\*,3), (4 low–3,3\*), (4 high–3,3\*)
      * (3 low–4,3), (3 high–4,3), (3 low–3,4), (3 high–3,4)
   3. Run suit included in both sets:
      * (4 low–3,3), (4 mid–3,3), (4 high–3,3), (3 low–4,3) , (3 mid–4,3), (3 high–4,3)
7. 3 Sets
   1. Suit is irrelevant: (4,3,3), (3,4,3), (3,3,4)

# Some Common Occurrences

But first, a couple quick summation formulas:

General “slop” equation

The number of the configurations for a given row is a function of the amount of “slop,” i.e. the number of cells not allocated to blocks (runs/sets) or required whitespace.

s

l

o

p

**Let S = slop** (in the figure above, that would be 5)

The first block can start in any of (1+S) positions (j=1,…,S+1)

If applicable, the second block can start in any of (2+S-j) positions (k=1,…2+S-j)

If applicable, the third block can start in any of (3+S-j-k) positions

**Single Block Configurations:**

**Two Block Configurations:**

**Three Block Configurations:**

A row with a single run of length n

**configurations: 14-n**

*S = 13-n*

A row with two runs of lengths n and m

**configurations: (3,3): 28, (3,4): 21, (3,7): 6**

Let N = n+m+1 (required whitespace). S = 13-N. Config = (14-N)(15-N)/2

A row of three runs

**configurations: 4**

N must be 3 + 3 + 4 = 10. S = 1 (two required whitespace)

Slop space can appear in one of 4 places

A row of one run of length n + 1 set *(no space required)*

**configurations: 7:21, 6:28, 5:36, 4:45, 3:55**

S = 12-n. Config = (13-n)(14-n)/2

A row of one run of length n + 1 set *(space required)*

**configurations: 6:21, 5:28, 4:36, 3:45**

S = 11-n. Config = (12-n)(11-n)/2

A row of one run of length n + 2 sets

**configurations: 3:165, 4:120**

S = 11-n. Config = (12-n)(13-n)(14-n)/6

A row of two runs of lengths 3 and 4 + 1 set of 3 (outside runs)

**configurations: 35**

S=4. Config = (5)(6)(7)/6

A row of two runs of lengths 3 and 4 + 1 set of 3 (inside runs)

**configurations: 56**

S = 5. Config = (6)(7)(8)/6

A row of two runs of lengths 3 + 1 set of 4 (outside runs)

**configurations: 35**

*Whitespace is necessary to avoid double counting (R4S3 or R3S4)*

S=4. Config = (5)(6)(7)/6

A row of two runs of lengths 3 + 1 set of 4 (inside runs)

**configurations: 35**

*Whitespace is necessary to avoid double counting (R4S3R3 or R3S3R4 or R3S4R3)*

S=4. Config = (5)(6)(7)/6

# One Run 16

## All Same suit 16

4 config x 4 suits

# Two Runs 2490

## All same suit 120

6 config x 4 suits = 24

6 config x 4 suits = 24

6 config x 4 suits = 24

6 config x 4 suits = 24

6 config x 4 suits = 24

## Two suits 2370

(7 x 11 config) x (4 x 3 suits) = 924

(8 x 10 config) x (4 x 3 suits) = 960

( 9 x 9 config) x ( 4 x 3 / 2 suits) = 486

# Three Runs 23472

## All same suit 48

4 config x 4 suits = 16

4 config x 4 suits = 16

4 config x 4 suits = 16

## Two suits 8904

(21 x 11 config) x (4x3 suits) = 2772

(21 x 11 config) x (4x3 suits) = 2772

(28 x 10 config) x (4x3 suits) = 3360

## Three suits 14520

(10 x 11 x 11 config) x (4 x 3 x 2 / 2 suits) = 14520

# 1 Run / 1 Set 1036

## Set does not include run suit 364

\* 7 config x 13 ranks x 4 suits = 364

## Set does include run suit 672

21 config x (4x3 suits) = 252

21 config x (4x3 suits) = 252

*In the following two cases, the space is necessary to avoid double counting with 4.1*

21 config x 4 suits = 84

21 config x 4 suits = 84

# 2 Runs / 1 Set 40188

## Runs are same suit, not included in set 2184

\* 21 config x 13 ranks x 4 suits = 1092

\* 21 config x 13 ranks x 4 suits - 1092

## Runs are same suit, included in set: 3444

35 config x (4x3 suits) = 420

56 config x (4x3 suits) = 672

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56 config x (4x3 suits) = 672

35 config x (4x3 suits) = 420

*In the following three cases, the spaces are necessary to avoid double counting with 5.1*

35 config x 4 suits = 140

35 config x 4 suits = 140

35 config x 4 suits = 140

## Runs are different suits, one included in set: 8360

11x45 config x 4 suit = 1980

11x45 config x 4 suit = 1980

\* 10x55 config x 4 suit = 2200

\* 10x55 config x 4 suit = 2200

## Runs are different suits, both included in set: 23652

330 config x (4x3x2 suits) = 7920

9 positions (j) for set

(j) positions for run of 4

(1+j) positions for run of 3

56 config x (4x3x2 suits) = 1344

6 positions (j) for set

(j) positions for run of 4

(7-j) positions for run of 3

56 config x (4x3x2 suits) = 1344

330 config x (4x3x2 suits) = 7920

385 config x (4x3/2 suits) = 2310

10 positions (j) for set

(j) positions for run of 4

(j) positions for run of 3

84 config x (4x3/2 suits) = 504

7 positions (j) for set

(j) positions for run of 4

(8-j) positions for run of 3

385 config x (4x3/2 suits) = 2310

# 1 Run / 2 Sets 41880

## Run suit not in either set 3120

\* 10 config x (13x12/2 rank) x 4 suits = 3120

## Run suit included in one set 18240

120 config x (4x3 suit) = 1440

8 positions (j) for first set

(j) positions for run

(9-j) positions for second set

\* 420 config x (4x3 suit) = 5040

9 positions (j) for first set

(10-j) positions for run

(13-j) positions for second set

\* 420 config x (4x3 suit) = 5040

(mirror image of prior case)

120 config x (4x3 suit) = 1440

(mirror image of first case)

165 config x 4 suit = 660

9 positions (j) for first set

(j) positions for run

(10-j) positions for second set

495 config x 4 suit = 1980

10 positions (j) for first set

(11-j) positions for run

(13-j) positions for second set

495 config x 4 suit = 1980

(mirror image of prior case)

165 config x 4 suit = 660

(mirror image of first 3-run case)

## Run suit included in both sets 20520

120 config x (4x3 suit) = 1440

120 config x (4x3 suit) = 1440

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120 config x (4x3 suit) = 1440

120 config x (4x3 suit) = 1440

120 config x (4x3 suit) = 1440

165 config x (4x3 suit) = 1980

165 config x (4x3 suit) = 1980

165 config x (4x3 suit) = 1980

165 config x (4x3 suit) = 1980

165 config x (4x3 suit) = 1980

165 config x (4x3 suit) = 1980

# 3 Sets 13728

## Suit is irrelevant 13728

286 config x (3 choices for S4) x (4x4 suit) = 13728

11 positions (j) for first set

(12-j) positions (k) for second

(13-j-k) positions for third set

Overcounting

The following scenarios can lead to overcounting

(4.1)

will also be counted as one of these

(5.1.1)

will also be counted as one of these

(5.1.2)

will also be counted as one of these

(5.3.3)

will also be counted as one of these

(5.3.4)

will also be counted as one of these

(6.1.1)

will also be counted as one of these

(6.2.2)

will also be counted as one of these

(6.2.3)

will also be counted as one of these