

1) 4 Beads

① 1/3 → 1

0XXX

② 2/2 → 2

00XX

0X0X

③ 3/4

000XXXX 3=(3)

0X00XXX 3=(1,2)

0XX00XX

0X0X0XX 3=(1,1,1)

2) 5 Beads

① 1/4 → 1

0XXXX

② 2/3 → 2

00XXX

0X0XX

5) 8 Beads

① 1/7 → 1

0XXXXXXX

② 2/6 → 4

00XXXXXX

0X0XXXXX

0XX0XXXX

0XXX0XXX

3) 6 Beads

① 1/5 → 1

0XXXXX

② 2/4 → 3

00XXXX

0X0XXX

0XX0XX

③ 3/5 → 5

000XXXXX 3=(3)

0X00XXXX 3=(1,2)

0XX00XXX

0X0X0XXX 3=(1,1,1)

0XX0X0XX

④ 4/4 → 8

0000XXXX 4=(4)

0X000XXX 4=(1,3)

0XX000XX

00X00XXX 4=(2,2)

00XX00XX

00X0X0XX 4=(2,1,1)

00X0XX0X

0X0X0X0X 4=(1,1,1,1)

4) 7 Beads

① 1/6 → 1

0XXXXXX

② 2/5 → 3

00XXXXX

0X0XXXX

0XX0XXX

6) 9 Beads

① 1/8 → 1

0XXXXXXXX

② 2/7 → 4

00XXXXXXXX

0X0XXXXXX

0XX0XXXXX

0XXX0XXXX

③ 3/6 → 7

~~000XXXXXXXX~~ 3=(3)

00X0XXXXX 3=(2,1)

00XX0XXXX

~~00XXX0XXXX~~
0X0X0XXXX 3=(1,1,1)

0XX0X0XXX

0XX0XX0XX

④ 4/5 → 10

~~0000XXXXX~~ 4=(4)

000X0XXXX 4=(3,1)

~~000X0XXXX~~
00X00XXXX 4=(2,2)

~~00XX00XXXX~~
00X0X0XXX 4=(2,1,1)

00X0X0XXX

00X0XXXXX

~~00XX0X0XXX~~

0X0X0X0XX 4=(1,1,1,1)

7) 10 Beads

① 1/9 → 1

0XXXXXXXXXX

② 2/8 → 5

00XXXXXXXXX

0X0XXXXXX

0XX0XXXXX

0XXX0XXXX

0XXXX0XXXX

③ 3/7 → 8

~~000XXXXXXXX~~ 3=(3)

00X0XXXXX 3=(2,1)

00XX0XXXX

~~00XXX0XXXX~~
0X0X0XXXX 3=(1,1,1)

0X0XX0XXX

0X0XX0XXX

~~0XXX0XXXX~~

④ 4/6 → 16

~~0000XXXXX~~ 4=(4)

000X0XXXX 4=(3,1)

000XX0XXX

~~000X00XXXX~~
00X00XXXX 4=(2,2)

00XX00XXX

~~00XXX00XXX~~

00X0X0XXX 4=(2,1,1)

00X0XX0XXX

00X0XXX0XX

00X0XXX0X

00X0X0XXX

~~00XX0XX0XX~~

0X0X0X0XXX 4=(1,1,1,1)

OXOXOXOX

OXOXOXOX

⑤ 5/5 → 16

0000XXXX

$S=(5)$

0000X0XXX

$S=(4,1)$

0000X0XXX

000X00XXX

$S=(3,2)$

000X00XXX

000X0X0XX

$S=(3,1,1)$

000X0XX0X

000X0XX0X

000X0X0XX

00X00X0XXX

$S=(2,2,1)$

00X00X0XX

00X00X0XX

00X00X0XX

00X0X0X0XX

$S=(2,1,1,1)$

00X0X0X0X

0X0X0X0X0X

$S=(1,1,1,1,1)$

*n = number of a colour / *-n = number of another colour.

* = number of beads	n/*-n	1/*-1	2/*-2	3/*-3	4/*-4	5/*-5
4	1	2				
5	1	2				
6	1	3	3			
7	1	3	4			
8	1	4	5	8		
9	1	4	7	10		
10	1	5	8	16	16	

For example: 10 beads

① I divided 10 beads into two colours (R=red, B=blue).

(R, B) = (1, 9) (2, 8) (3, 7) (4, 6) (5, 5)

But (6, 4) (7, 3) (8, 2) (9, 1) are counted the same, so they should not be repeated.

② (1, 9) → RBBBBBBBBBB

(2, 8) → I have put blue beads between two red beads.
The number of blue beads that goes between the red beads change.

RRBBBBBBBB

RBR 7Bs

RBBR 6Bs

RBBBR 5Bs

RBBBBR 4Bs

(3, 7) → I have put blue beads between three red beads.
The number of blue beads that goes in between the red beads change.

(RRR) : RRR + 7B

(RR) (R) : RRBR + 6B

B B RRBBR + 5B

RRBBBR + 4B

(R) (R) (R) : RBRBR + 5B

B B B (RBRBBR + 4B

RBRRBBR + 3B

RBBRBBR + 3B

I used the same method as the on above for (4, 6) and (5, 5).

* 4 Red Beads : (RRRR) / (RRR)R / (RR)RR / (R)RRR

5 Red Beads : (RRRRR) / (RRRR)R / (RRR)RR / (RR)RRR / (R)RRRR