CASE 1: FIRST WEIGHING LEANS LEFT

- **CASE 1A:**

Weighing #1: Comparing (1 2 3 4) with (5 6 7 8)
==========
(1 2 3 4) > (5 6 7 8)
The suspect is either heavier in group (1 2 3 4) or lighter in group (5 6 7 8)

Take the 1st halves of groups (1 2 3 4) and (5 6 7 8) and two more balls: an unknown like (7) and a known standard weighted like (9)...
...to form the groups (1 5 6) and (2 7 9)

Weighing #2: Comparing (1 5 6) with (2 7 9)
==========
(1 5 6) > (2 7 9)
The suspect is either a heavier (1) or a lighter (7)

Weighing #3: Comparing (1) with (9)
==========
If (1) > (9), then (1) is heavier than the rest
If (1) = (9), then (7) is lighter than the rest

- **CASE 1B:**

Weighing #1: Comparing (1 2 3 4) with (5 6 7 8)
==========
(1 2 3 4) > (5 6 7 8)
The suspect is either heavier in group (1 2 3 4) or lighter in group (5 6 7 8)

Take the 1st halves of groups (1 2 3 4) and (5 6 7 8) and two more balls: an unknown like (7) and a known standard weighted like (9)...
...to form the groups (1 5 6) and (2 7 9)

Weighing #2: Comparing (1 5 6) with (2 7 9)
==========
(1 5 6) = (2 7 9)
The suspect is either a lighter (8) or a heavier out of (3 4)

Weighing #3: Comparing (3) with (4)
==========
If (3) > (4), then (3) is heavier than the rest
If (3) < (4), then (4) is heavier than the rest
If (3) = (4), then (8) is lighter than the rest

- **CASE 1C:**

Weighing #1: Comparing (1 2 3 4) with (5 6 7 8)
==========
(1 2 3 4) > (5 6 7 8)
The suspect is either heavier in group (1 2 3 4) or lighter in group (5 6 7 8)

Take the 1st halves of groups (1 2 3 4) and (5 6 7 8) and two more balls: an unknown like (7) and a known standard weighted like (9)...
...to form the groups (1 5 6) and (2 7 9)

Weighing #2: Comparing (1 5 6) with (2 7 9)
==========
(1 5 6) < (2 7 9)
The suspect is either a heavier (2) or a lighter out of (5 6)

Weighing #3: Comparing (5) with (6)
==========
If (5) < (6), then (5) is lighter than the rest
If (5) > (6), then (6) is lighter than the rest
If (5) = (6), then (2) is heavier than the rest

CASE 2: FIRST WEIGHING LEANS RIGHT

- **CASE 2A:**

```
Weighing #1: Comparing (1 2 3 4) with (5 6 7 8)
===============================================
(1 2 3 4) < (5 6 7 8)
The suspect is either lighter in group (1 2 3 4) or heavier in group (5 6 7 8)

Take the 1st halves of groups (1 2 3 4) and (5 6 7 8) and two more persons: an unknown like (3) and a known
standard weighted like (9)...
...to form the groups (1 2 5) and (3 6 9)

Weighing #2: Comparing (1 2 5) with (3 6 9)
===============================================
(1 2 5) < (3 6 9)
The suspect is either a heavier (6) or a lighter out of (1 2)

Weighing #3: Comparing (1) with (2)
===============================================
If (1) < (2), then (1) is lighter than the rest
If (1) > (2), then (2) is lighter than the rest
If (1) = (2), then (6) is heavier than the rest
```

- **CASE 2B:**

```
Weighing #1: Comparing (1 2 3 4) with (5 6 7 8)
===============================================
(1 2 3 4) < (5 6 7 8)
The suspect is either lighter in group (1 2 3 4) or heavier in group (5 6 7 8)

Take the 1st halves of groups (1 2 3 4) and (5 6 7 8) and two more balls: an unknown like (3) and a known
standard weighted like (9)...
...to form the groups (1 2 5) and (3 6 9)

Weighing #2: Comparing (1 2 5) with (3 6 9)
===============================================
(1 2 5) = (3 6 9)
The suspect is either a lighter (4) or a heavier out of (7 8)

Weighing #3: Comparing (3) with (4)
===============================================
If (7) > (8), then (7) is heavier than the rest
If (7) < (8), then (8) is heavier than the rest
If (7) = (8), then (4) is lighter than the rest
```

- **CASE 2C:**

```
Weighing #1: Comparing (1 2 3 4) with (5 6 7 8)
===============================================
(1 2 3 4) < (5 6 7 8)
The suspect is either lighter in group (1 2 3 4) or heavier in group (5 6 7 8)

Take the 1st halves of groups (1 2 3 4) and (5 6 7 8) and two more balls: an unknown like (3) and a known
standard weighted like (9)...
...to form the groups (1 2 5) and (3 6 9)

Weighing #2: Comparing (1 2 5) with (3 6 9)
===============================================
(1 2 5) > (3 6 9)
The suspect is either a heavier (5) or a lighter (3)

Weighing #3: Comparing (3) with (9)
===============================================
If (3) < (9), then (3) is lighter than the rest
If (3) = (9), then (5) is heavier than the rest
```

CASE 3: FIRST WEIGHING BALANCES

- **CASE 3A:**

```
Weighing #1: Comparing (1 2 3 4) with (5 6 7 8)
===============================================
(1 2 3 4) = (5 6 7 8)
Since the groups are equal, the suspect is one of the other group (9 10 11 12)

Weighing #2: Comparing (9 10 11) with a standard weighted group like (1 2 3)
===============================================
(9 10 11) = (1 2 3)
The suspect is 12, not knowing its status

Weighing #3: Comparing (12) with (1)
===============================================
If (12) < (1), then (12) is lighter than the rest
If (12) > (1), then (12) is heavier than the rest
```

- **CASE 3B:**

```
Weighing #1: Comparing (1 2 3 4) with (5 6 7 8)
===============================================
(1 2 3 4) = (5 6 7 8)
Since the groups are equal, the suspect is one of the other group (9 10 11 12)

Weighing #2: Comparing (9 10 11) with a standard weighted group like (1 2 3)
===============================================
(9 10 11) > (1 2 3)
The suspect is heavier and among (9 10 11)

Weighing #3: Comparing (9) with (10)
===============================================
If (9) > (10), then (9) is heavier than the rest
If (9) < (10), then (10) is heavier than the rest
If (9) = (10), then (11) is heavier than the rest
```

- **CASE 3C:**

```
Weighing #1: Comparing (1 2 3 4) with (5 6 7 8)
===============================================
(1 2 3 4) = (5 6 7 8)
Since the groups are equal, the suspect is one of the other group (9 10 11 12)

Weighing #2: Comparing (9 10 11) with a standard weighted group like (1 2 3)
===============================================
(9 10 11) < (1 2 3)
The suspect is lighter and among (9 10 11)

Weighing #3: Comparing (9) with (10)
===============================================
If (9) < (10), then (9) is lighter than the rest
If (9) > (10), then (10) is lighter than the rest
If (9) = (10), then (11) is lighter than the rest
```