

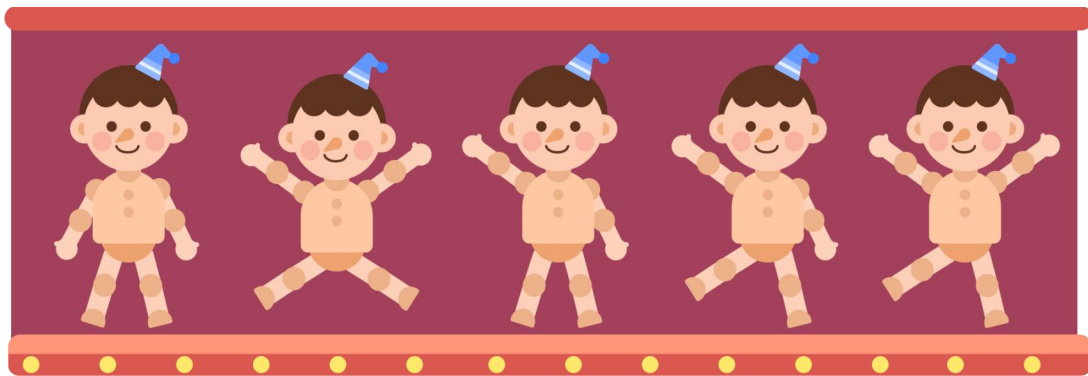
Part A: Questions 1 – 6

Part A: Questions 1–6

Multiple Choice Questions (3 points each)

1. Dancing Puppet

A child has choreographed a dance for a puppet, consisting of five moves. Each move involves changing the position of either a leg or an arm. However, the order of the five dance positions has been scrambled. Carefully observe to find the correct third move in the dance sequence.



(A)



(B)



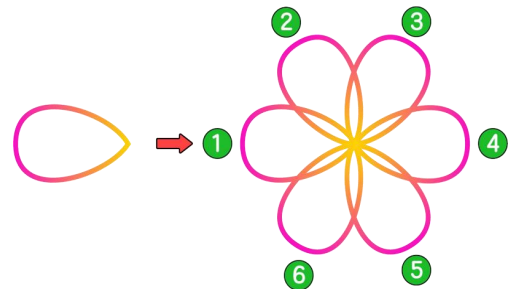
(C)



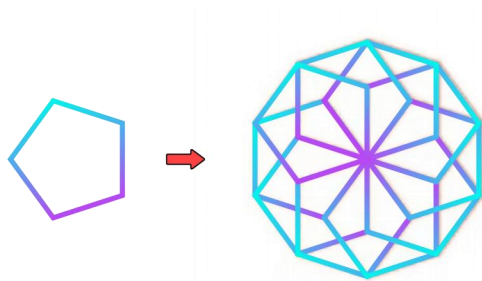
(D)

2. Fascinating Repetitions

Repeating shapes can create beautiful patterns. For example, the flower below is created by repeating a shape six times.



In the next image, a pattern is created by repeating pentagons. How many pentagons were repeated to create this pattern?



- (A) 6
- (B) 8
- (C) 10
- (D) 12

3. Decoding the Password

The ADFGVX cipher can convert the 26 letters and numbers 0-9 into coded messages. For instance, the code "AA" represents the intersection of row A and column A in the grid, which is "d." Similarly, "FD" represents the intersection of row F and column D, which is "b."

	A	D	F	G	V	X
A	d	h	x	m	u	4
D	p	3	j	6	a	o
F	i	b	z	v	9	w
G	1	n	7	0	q	k
V	f	s	l	y	c	8
X	t	r	5	e	2	g

What word does this code represent?

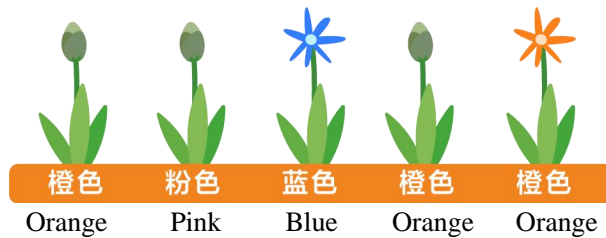


- (A) live
- (B) luck
- (C) love
- (D) long

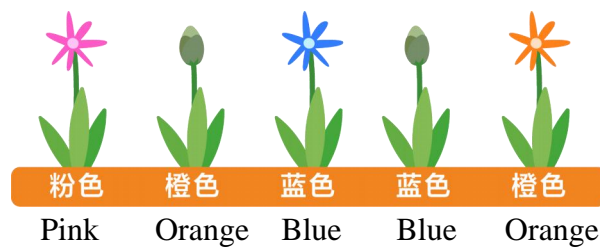
4. Colorful Flowers

A child is playing a game to guess the colors of flowers. There are five flowers, each of which can be blue, orange, or pink. If the child guesses correctly, the flower blooms; if incorrect, it stays closed. Below are the results of two guessing attempts.

- The first guess



- The second guess



What are the colors of the five flowers?

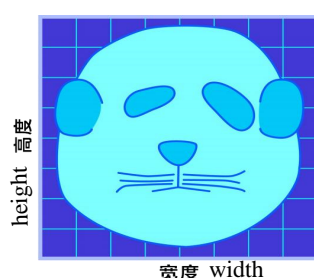
- (A) Blue Pink Blue Orange Orange
- (B) Pink Blue Blue Blue Orange
- (C) Pink Blue Blue Pink Orange
- (D) Pink Pink Blue Pink Orange

5. Animal Recognition

A wild life research center has invented a machine that identifies animals based on facial characteristics, as shown in the table below (whisker width is the combined width of the left and right whiskers).

Characteristics	Rabbit	Beavers	Bear	Cat
Ear length	1/2 of Head Height	1/4 of Head Height	1/4 of Head Height	1/2 of Head Height
Whiskers width	Equals to Head width	1/2 of Head width	1/2 of Head width	Equals to Head width
Head width	1/2 of Head Height	1/2 of Head Height	Equals to Head Height	Equals to Head Height

Given the following facial features, which animal will the machine identify?



- (A) Rabbit
- (B) Beaver
- (C) Bear
- (D) Cat

6. The Best Seats

Three friends, Xiaomi, Xiaoli, and Xiaoke, are planning to watch a movie and use the cinema's ticketing system to choose seats. The marked seats indicate those already sold.



The friends have the following preferences:

- Xiaomi: "I want to sit on the right side."
- Xiaoli: "I want all three of us to sit together in a row."
- Xiaoke: "I don't want to be too close to the screen, so not in the first three rows."

For example, choosing seats G3, G4, and G5 would make Xiaomi unhappy; D7, D9, and D10 would make Xiaoli unhappy; and A7, A8, and A9 would make Xiaoke unhappy.

How many seating arrangements can satisfy all their wishes?

(A) 3

(B) 4

(C) 5

(D) 6

Part B: Questions 7–9

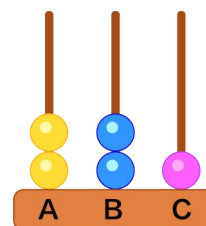
Part B: Questions 7–9

Each main question has three sub-questions, worth 2 points each.

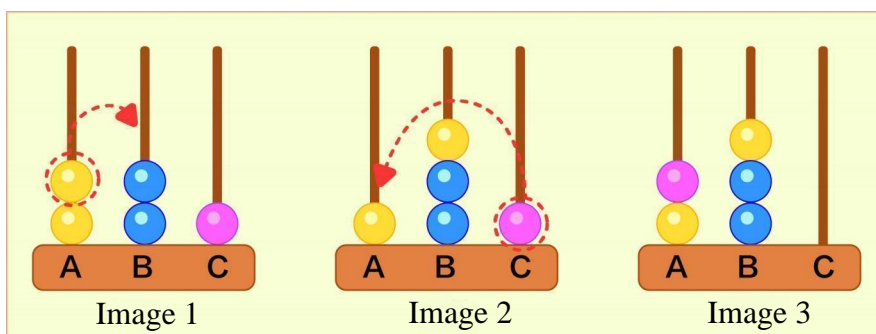
Each answer is an integer between 0 and 99.

7. Bead Game

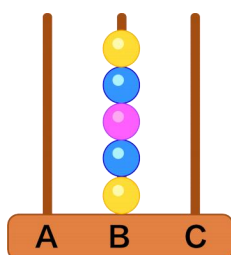
There are three pillars, A, B, and C, with three beads of different colors on them, as shown in the diagram. You can move beads from one pillar to another, but only one bead at a time.



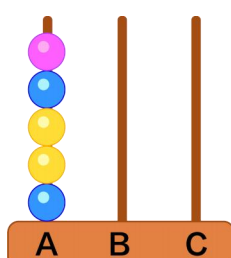
For example, moving from Image 1 to Image 3 requires two moves.



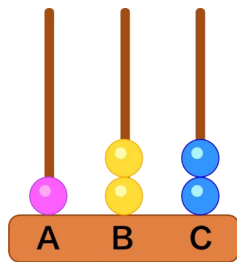
Question 1: What is the minimum number of moves required to reach the configuration in the diagram?



Question 2: What is the minimum number of moves required to reach the configuration in the diagram?



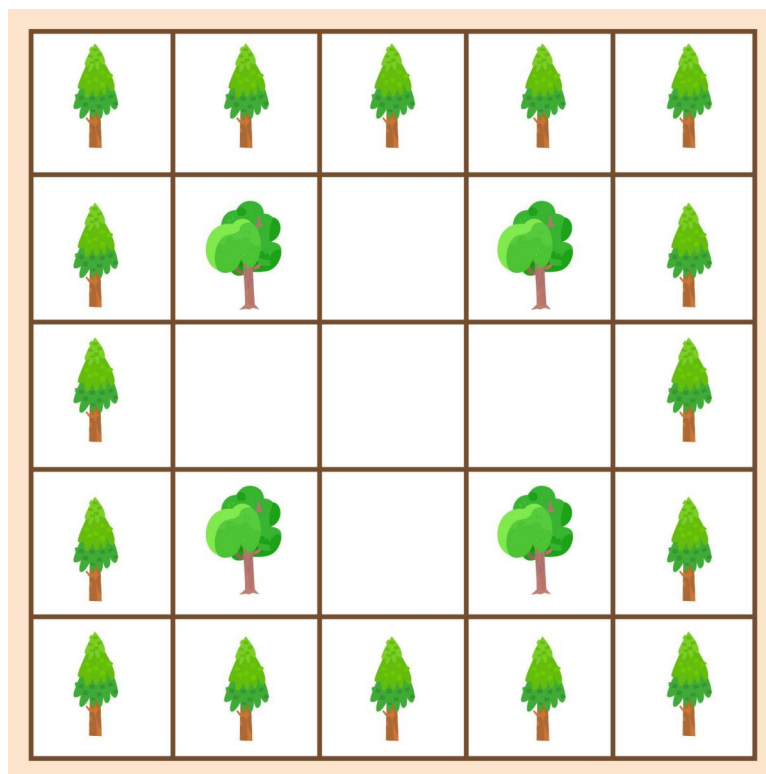
Question 3: What is the minimum number of moves required to reach the configuration in the diagram?



8. Protecting Rare Trees

To protect rare Metasequoia trees, a rule has been established: each square plot is surrounded by cypress trees, and the Metasequoia trees are planted in the top - left corner, with spaces left between them in each row and column.

The following example shows a 5×5 plot.

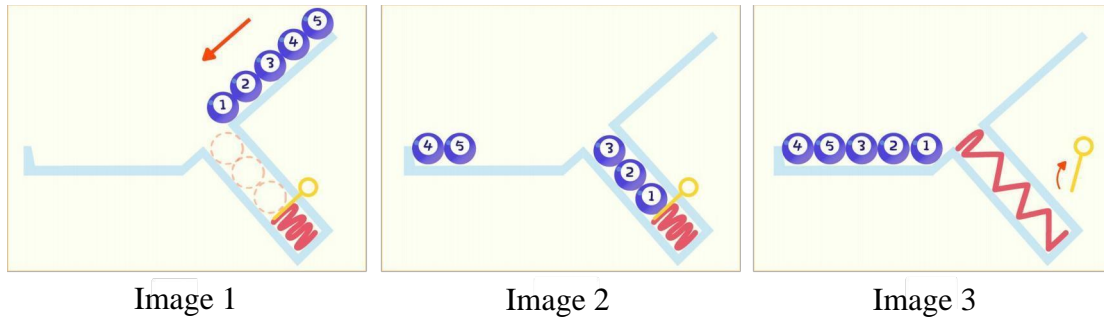


- Question 1: How many cypress trees are needed for a 7×7 plot?
- Question 2: How many cypress trees are needed to plant five rows of Metasequoia trees?
- Question 3: How many cypress trees are needed to plant 16 Metasequoia trees?

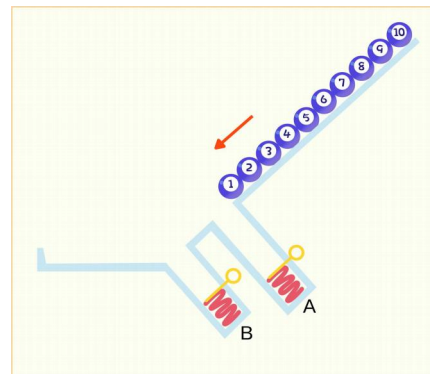
9. Rolling Balls

Numbered balls roll down a ramp and fall into holes. If there's enough space, the balls stay in the hole; if a hole is full, the balls roll to the platform on the left. After all balls have fallen, they can be bounced out of the holes.

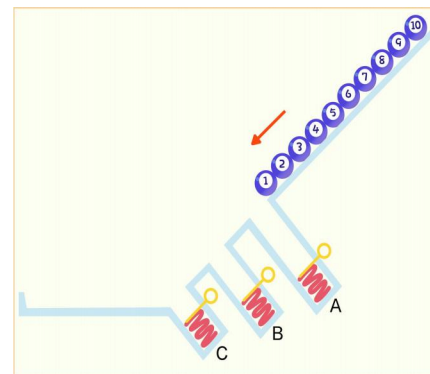
The diagrams show an example with five balls.



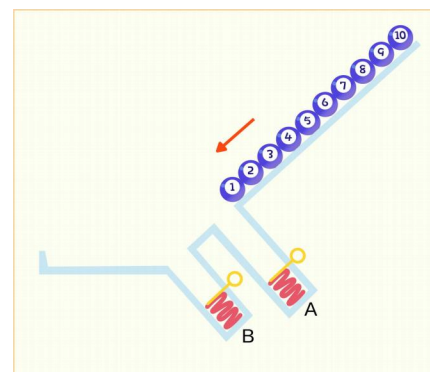
Question 1: For 10 balls, with Hole A holding 3 balls and Hole B holding 2 balls, which number is the last ball on the left platform?



Question 2: For 10 balls, with Hole A holding 3 balls, Hole B holding 2 balls, and Hole C holding 1 ball, what number is the sixth ball from the left on the platform?



Question 3: For 10 balls, with Hole A holding 3 balls and Hole B holding 2 balls, and ejecting balls from Hole B first, then Hole A, which number is the last ball on the platform?

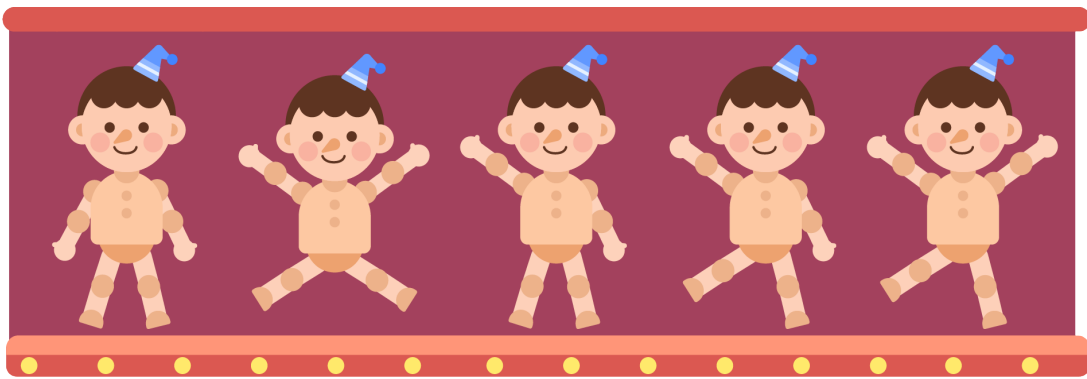


Part A: Questions 1–6

单选题 (每题 3 分)

1. 跳舞的木偶

小朋友给木偶编排了一套舞蹈，这套舞蹈一共有五个动作。在每两个相邻的动作之间，要么改变一条腿的位置，要么改变一只手臂的位置。但现在这五个动作的顺序混乱了，请你仔细观察，找到该舞蹈的第三个动作。



(A)



(B)



(C)

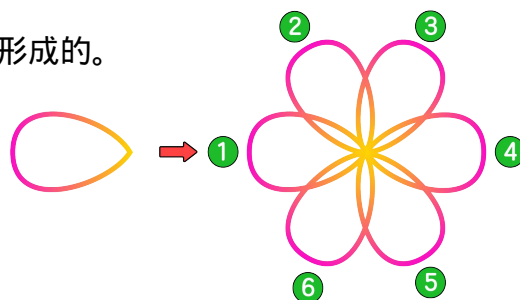


(D)

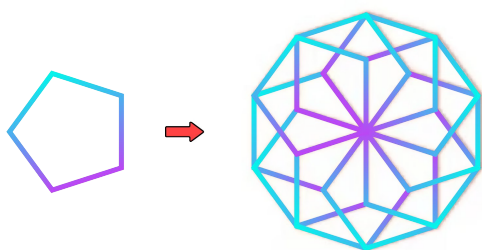
2. 奇妙的重复

反复画同样的图形可以创造出美丽的图案。

例如：如图所示的花朵是通过将一个图形重复六次而形成的。



下面这个图形是通过反复画五边形创造出来的。你能观察出来，它是通过重复画了几个五边形创造出来的吗？



(A) 6

(B) 8

(C) 10

(D) 12

3. 破解密码

ADFGVX 密码可以将 26 个英文字母与数字 0-9 转换成密码信息。例如：AA 这个密码就代表横向的 A 和纵向的 A 交叉方格的 d，而 FD 这个密码则代表横向 F 和纵向 D 交叉方格的 b。

	A	D	F	G	V	X
A	d	h	x	m	u	4
D	p	3	j	6	a	o
F	i	b	z	v	9	w
G	1	n	7	0	q	k
V	f	s	l	y	c	8
X	t	r	5	e	2	g

那么，**VF AV VV GX** 这个密码所代表的单词是？

(A) live

(B) luck

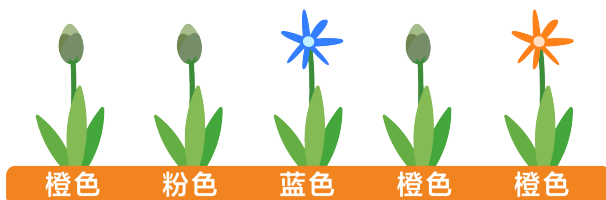
(C) love

(D) long

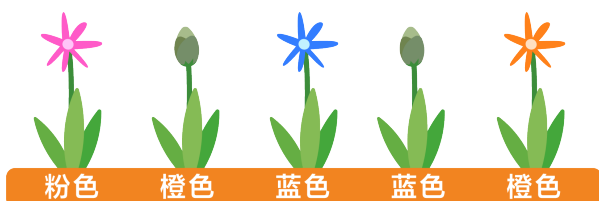
4. 色彩绚丽的花朵

小朋友在玩猜花朵颜色的游戏。五朵花的颜色可以是蓝色、橙色、粉色中的任意一种。猜对了，花朵就会绽放；猜错了，花朵则不会绽放。以下是小朋友两次猜测和尝试的结果。

· 小朋友第一次猜测结果如下：



· 小朋友第二次猜测结果如下：



请问，这五朵花分别是什么颜色？

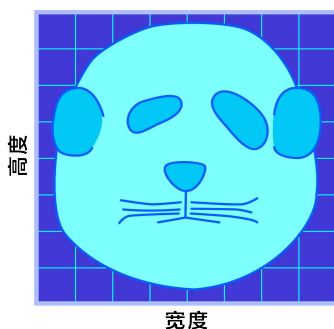
- (A) 蓝粉蓝橙橙 (B) 粉蓝蓝蓝橙 (C) 粉蓝蓝粉橙 (D) 粉粉蓝粉橙

5. 动物识别

野生动物基地发明了一台智能机器，该机器可以通过动物面部的基本特征数据进行识别。特征识别见下图。（胡子的宽度是左右两边胡子宽度的总和）

动物特征	兔子	海狸	熊	猫
耳朵的长度	头高的一半	头高的四分之一	头高的四分之一	头高的一半
胡子的宽度	与头的宽度相等	头宽的一半	头宽的一半	与头的宽度相等
头部的宽度	头高的一半	头高的一半	头高相等	与头的高度相等


现在要辨认的动物面部特征如下：



请问，智能机器将识别该动物为下列哪一种？

- (A) 兔子 (B) 海狸 (C) 熊 (D) 猫

6. 最佳座位

小米、小丽和小可三个好朋友相约看电影，她们通过电影院的购票系统选择座位。下图中标记为  的座位表示已经售出，无法选择。



小米、小丽和小可有以下偏好。

- 小米：“我想坐在右侧。”
- 小丽：“我希望我们三个并排挨着坐一起。”
- 小可：“我不想太靠近屏幕！我们不要坐在前三排。”

例如：如果她们选择座位 G3、G4 和 G5，那么小米就会不高兴；
 如果她们选择座位 D7、D9 和 D10，那么小丽就会不高兴；
 如果她们选择座位 A7、A8 和 A9，那么小可就会不高兴。
 为了满足她们三人的偏好，请问选择座位的方式有多少种？

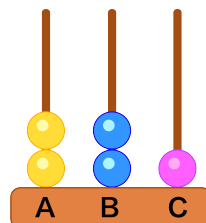
- (A) 3 (B) 4 (C) 5 (D) 6

Part B: Questions 7–9

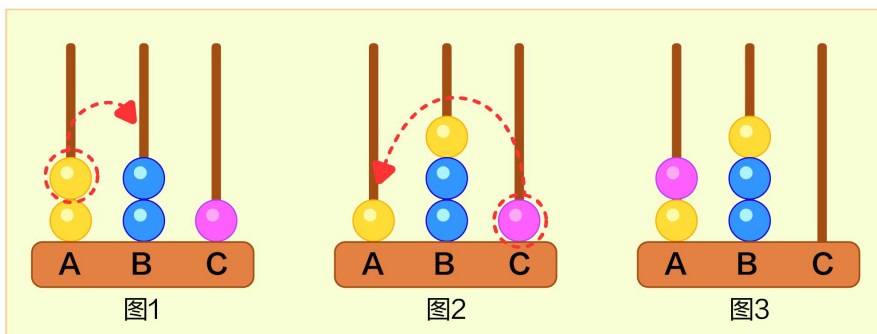
每一个大题有三个小题，每题 2 分。
每小题的答案都是一个介于 0-99 的整数。

7. 串珠游戏

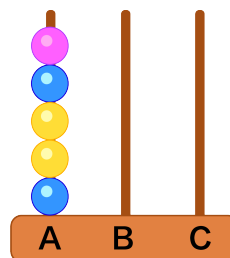
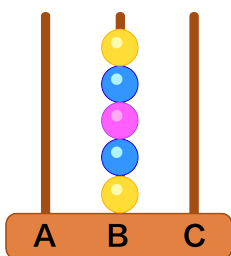
现有三根柱子 A、B、C，上面放着三种不同颜色的珠子（如右图所示）。我们可以把珠子从一根柱子移到另一根柱子上，但是每次只能移动一个珠子。



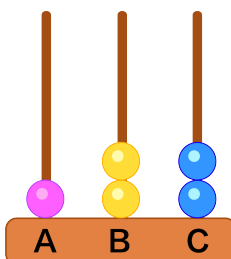
例如：从图 1 变为图 3，需要移动两次珠子。



问题 1：要得到下图最少需要移动几次珠子？ 问题 2：要得到下图最少需要移动几次珠子？



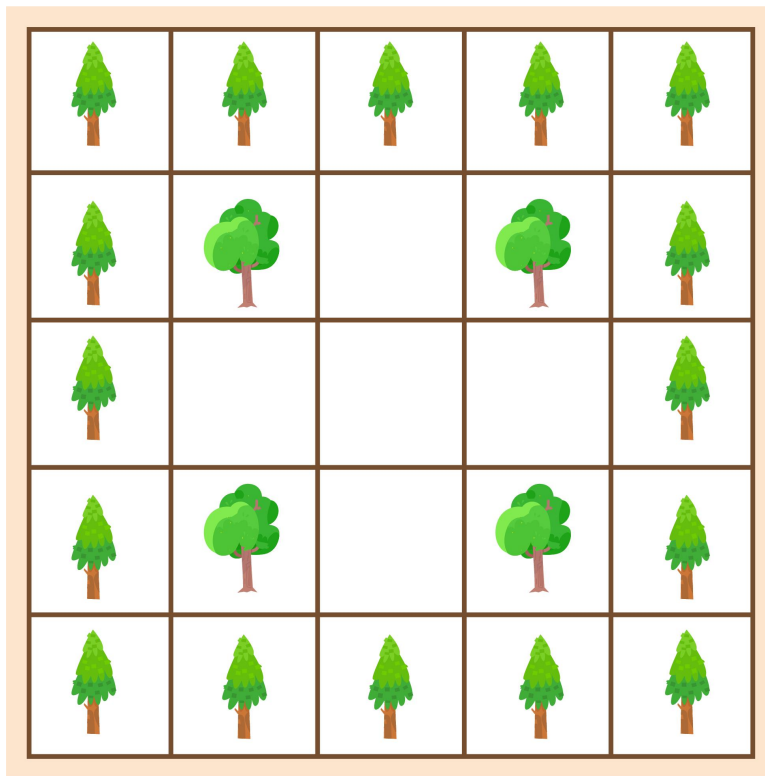
问题 3：要得到下图最少需要移动几次珠子？



8. 保护珍惜树木

为了保护珍惜树木水杉，需遵循如下种植规则：在种植区域的四周，每个正方形地块要种植柏树对水杉进行保护，在柏树所构成的区域内的左上角种植第一棵水杉，每行每列水杉之间都彼此留有一个空白区域。

下图展示了 5×5 区域内树木的种植情况。



问题 1：在 7×7 的区域内种植水杉，需要多少棵柏树？

问题 2：种植 5 行水杉需要多少棵柏树？

问题 3：种植 16 棵水杉需要多少棵柏树？

9. 滚动的小球

带有编号的球沿着斜坡滚动，最终落入下方的孔洞中。若孔洞内尚有空间，球便会掉入孔洞中；若孔洞内已满，球则会滚向左侧平台。待所有球都滚落后，将球全部从孔洞中弹出。

下图 1-3 展示了 5 个球滚落时的情景。

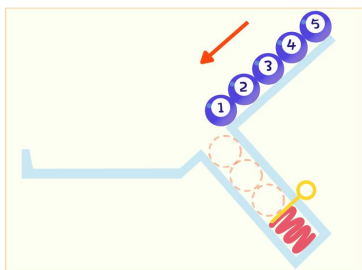


图1

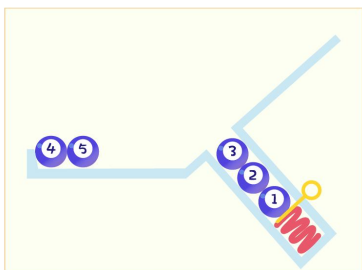


图2

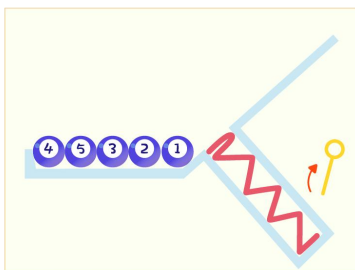
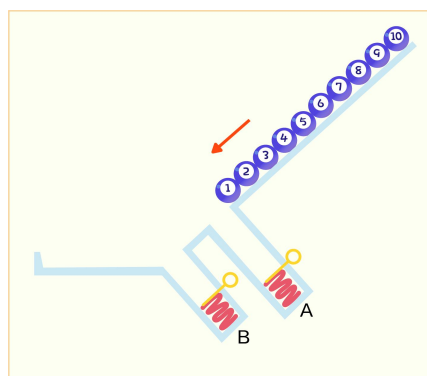
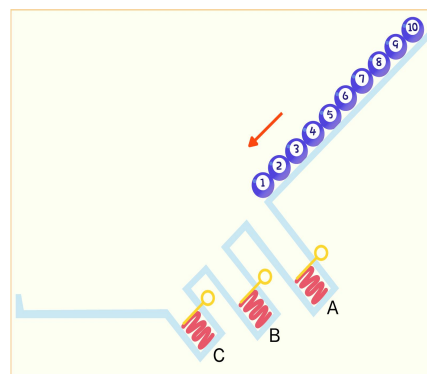


图3

问题 1：如图所示，10 个球滚落下来，孔 A 可容纳 3 个球，孔 B 可容纳 2 个球。所有球停止滚动后，按照 A、B 的顺序将孔洞中的球弹出，使球全部滚动到左边平台。请问左侧平台上的最后一个球的编号数字几？



问题 2：如图所示，10 个球滚落下来，孔 A 可容纳 3 个球，孔 B 可容纳 2 个球，孔 C 可容纳 1 个球。所有球停止滚动后，按照 A、B、C 的顺序将孔洞中的球弹出，使球全部滚动到左边平台。请问左侧平台从左到右第六个球的编号是数字几？



问题 3：如图所示，10 个球滚落下来，孔 A 可容纳 3 个球，孔 B 可容纳 2 个球。所有球停止滚动后，按照 B、A 的顺序将孔中的球弹出，使球全部滚动到左侧平台。请问左侧平台最后一个球的编号是数字几？

