Lecture 1: Cascading Formation

To get a high score in the 2048 game, you must first have a big picture. If the numbers are arranged chaotically and irregularly, they often get stuck after playing 512. Only by arranging the numbers in an organized manner can we make full use of the space. Here we introduce a basic stacking formation, which is to stack the numbers layer by layer in order of size.

1-1

Figure 1-1 is a standard cascading formation. In the cascading formation, the largest number is placed at a corner, all large numbers occupy one edge, and the remaining numbers are arranged in descending order. In actual play, players can place the maximum number on any corner and the large number on any side according to their preferences. By default, in this case, the maximum number is placed in the lower left corner, and all large numbers are placed beside it to the right.

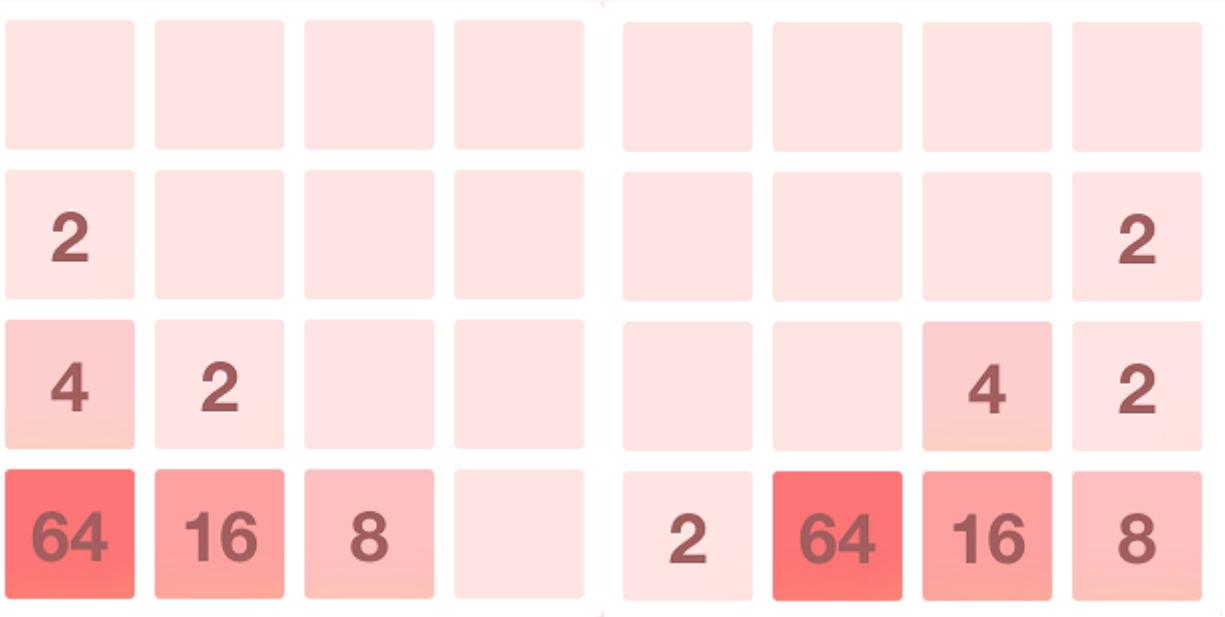
In the standard stacked formation, the row occupied by all the large numbers is called the first layer, also known as the bottom layer. The row adjacent to the bottom layer is called the second layer, and the remaining two rows are sequentially arranged as the third layer and the fourth layer. The fourth layer is also called the top layer. Each layer has 4 positions, the position aligned with the maximum number of the bottom layer is called position 1, the position next to position 1 is called position 2, and the remaining two positions are position 3 and position 4. Sometimes, the formation will be disrupted due to some special circumstances but the positions are numbered according to the standard formation before the disruption.

In the figure 1-1, the order of the numbers of layers 1 and 2 is the same. The minimum number of layer 1 (512) is twice the maximum number of layer 2 (256). This arrangement is called Z-connection. The order of the numbers of layers 2 and 3 is reversed. The minimum number of layer 2 (32) is twice the maximum number of layer 3 (16). This arrangement is called S-connection. S-shaped connection and Z-shaped connection have their own advantages and disadvantages, which will be discussed in depth later. In this situation, as long as you press down, you can put two 2s into 4, and then continue to the right to make 32 on the third layer, then press down and continue to the right, you can make 512 on the second layer, and finally make 8192. Of course, before this, there will be many special situations that may disrupt the formation. Later, we will introduce in detail how to avoid or resolve various special situations.

Lecture 2: Backfilling

How to maintain formation in the game? The bottom of our formation is in the bottom row. The way to maintain the formation is to swing left and right, pile down, and don't move up. Of course, to say not to move up is just not to move up in normal circumstances. In some special cases, you have to move up one or two steps.

The first step in forming a formation is to pile up to the left and down, and pile up the numbers in the lower left corner.



2-1 **2-2**

In the case of Figure 2-1, you cannot go left or go down. If you go to the right, there may be the situation in Figure 2-2. The number here is relatively small, so it doesn't matter. As long as the new numbers are piled up in the lower left corner, it can become 4, 8, 16, and then finally 64, and then you can merge it with the 64 on position 2 to make 128 in the lower left corner.

2-3

After the maximum number is placed in the lower left corner, to prevent it from shifting, fill the bottom layer as much as possible. If there is a gap in the bottom layer, it is possible the maximum number may shifted, and then the corner is occupied by the small number. The largest number occupies the corner, and then the bottom row becomes your first layer. In the situation in Figure 2-3, go down, so that the bottom layer is full, and there is no need to worry about the maximum number getting shifted when moving either left or right.

2-4

In Figure 2-4, press down to make 16, and then go left to make 32. However, this choice is a bad habit, as it will leave a gap at the bottom layer. Occasionally if used once or twice, it may not be a problem, as long as a new number in the right column fills the bottom layer immediately, but frequent use can easily cause the maximum number to be shifted. This picture should move left and right first, make up 16 and then merge down.

2-5

In Figure 2-5, the same method can be used between the second and third layers. Move left and right first, and after merging 16 on the third layer, merge down. When the bottom filling method is used, the first layer is filled first, then the second layer is filled, and the layers are filled below, so as to maximize the protection of the formation. The bottom filling method has another advantage. It was originally a problem of four rows of space. After the first floor was filled, it was reduced to three rows of space. When the second floor was filled, it was reduced to two rows of space.

Lecture 3: Filling sequence and safe filling.

Fill the number down by the bottom filling method, and it will not be chaotic when filling in a certain order. There is a more reasonable sequence: under the premise of not exceeding the safety bottom, the big number is filled first if it meets the double relationship, and the small number is filled if it does not meet the double relationship.

3-1

The bottom layer of Figure 3-1 is 1024, 256, 64, 32. Among them, 32 and 64 satisfy the double relationship, and priority is given to 64. If 32 is filled first, it has been analyzed before, then 32 becomes 64, and there is a gap when moving left and right

that may destroy the formation. Can you fill in 256 first? Under normal circumstances, it is recommended to fill in 64 first. 256 and 64 do not satisfy the double relationship. If you fill in 256, the second row will produce a number larger than 64, and the more ideal formation is that the number of the second row is as much as possible. If the first row is small, fill in the small tiles of the first row first to get an ideal formation. Fill in 64 and then fill in 32 to get 1024, 256, 128, 64, then you can fill in 256.

3-2

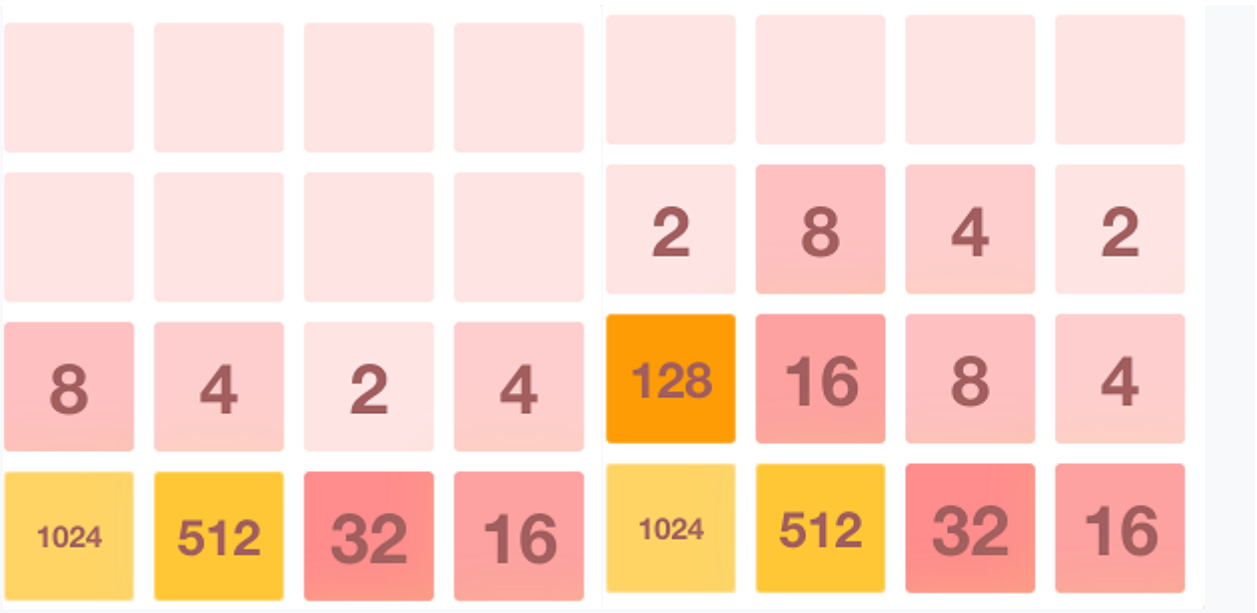
There is a limit to filling in the bottom. As shown in Figure 3-2, can you use 3 rows of space to make a 1024 fill? Not that simple! Even if the technology is very strong, there are risks. Occasional use may be okay once or twice. Repeated use will definitely cause accidents. Can you fill in 64 with two rows of space? We will introduce the two-row 64 (upper two rows) format in the back. No matter how high the technology of two-row 64 is, 100% success cannot be guaranteed. For beginners,

it is recommended not to take this risk. Two-row 32 is safe. If you use two rows to make 64 or three rows to make 1024, in the event of an accident, you may directly declare failure. Generally, you only do this when you are close to making 16384. Although empty squares may be created when 32 is merged and then you merge it with 64 on the second layer, but most of the cases are not fatal. Just fill in the smaller tile one at a time is better. It is safer to make 32 in a 2x4 space than making 64. It is also risky to make 512 in a 3x4 space, and it is often used when you are close to making 8192. For beginners, it is recommended that you merge when you have 256. Although 256 will appear when the bottom layer has 512, but most of the cases are not fatal.

There are many ways to use two rows of space to make 32 at the 2nd or 3rd position. It is recommended that players play freely. If it is really difficult, you can refer to the two-row 32 set used when you are close to making 8192 in the following strategy.

Lecture 4: Preventing Disaster

After the beginner understands the basic idea of the layered formation, it is very simple to make 2048, and if the player plays carefully and guards against mistakes, he can make 4096 also.



4-1 **4-2**

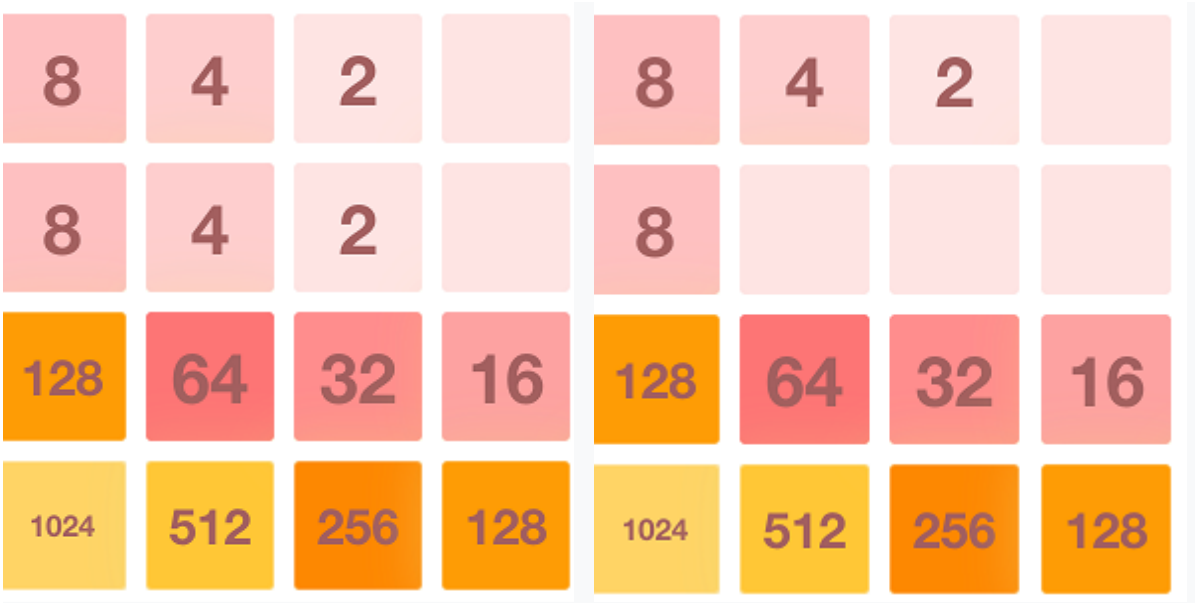
In Figure 4-1, the bottom two layers are completely filled, and the top two layers are completely empty. The adjacent numbers are not the same. At this time, the three directions cannot be moved and can only be moved up. Figure 4-2, the bottom three layers are filled, the top layer is completely empty, the adjacent numbers are different, and they cannot move in all three directions, and can only move up. Such a situation where two or three rows are filled and the adjacent numbers are different, and the player is forced to move in one direction is called the disaster of extinction. Once the disaster of extinction occurs in the game, the bottom layer will be occupied by a small tile, causing the formation to be destroyed. If it is not handled properly, it will soon be lost. The more critical the moment, the more serious the consequences of the disaster. At any stage of the game, if you neglect to prevent it, there may be a disaster. There are many types of situations after the disaster. The situation is complicated, and there is no simple and general solution.

Faced with this potential risk, prevention is generally the priority. In fact, as long as the awareness of prevention is maintained at all times, the disaster of extinction is not as terrible as you think. You are familiar with some common situations that may lead to extermination. Try to avoid it. As long as your luck is not particularly bad,

you will not encounter disasters. Many catastrophes are caused by improper downward movements.

The probability of a catastrophe is not high, but the number of down moves in a round is very large. If you do not pay attention to prevention, the catastrophe of the catastrophe will inevitably occur.

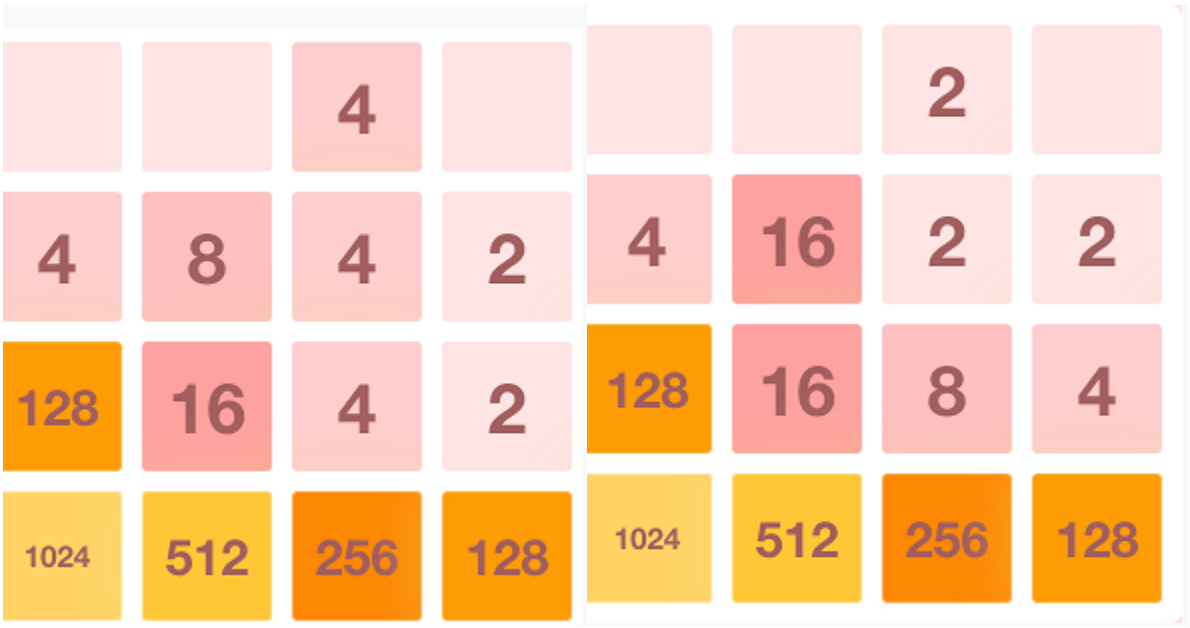
4-3 **4-4**



4-5 **4-6**

Figure 4-3. After moving down, there is a three-to-one situation. If there is a new 2 on the third layer, it will be destroyed. Figure 4-4. After moving down, there is also a lack of three. If there is a new 4 on the third layer, the disaster will be struck. The probability of 4 is smaller than that of 2, but there is still a risk. If it is encountered, it is very troublesome. This risk can be avoided. Figures 4-5 and 4-6 are also common situations that can lead to disasters. These situations will not appear passive when moving from side to side, but accidentally moving down would invite a disaster of extinction. It is not bad luck but more that the awareness of prevention is very bad.

Sometimes, when the numbers of the second and third layers are merged to create a new vacancy, there may be a situation where three are missing, and these situations should also be guarded against.



4-7 **4-8**

Figure 4-7. After moving down, 2 and 2 are merged, and 4 and 4 are merged, just forming a three-miss-one situation, there may be a disaster. Figure 4-8. After moving down, the merger of 16 and 16 is also a three-to-one situation, and the disaster of extinction may also occur. Don't rush down these two situations.

The two-row extinction disaster has a lower probability of occurrence than the three-row extinction disaster, and the principle of prevention is the same, that is, to avoid the formation of three missing one.

4-9 **4-10**

As shown in Figure 4-9, this situation moves down one step. Unlike the three missing one situations listed earlier, it seems that there will be no disaster. But sometimes accidents happen, and a 2 comes out, forming the situation in Figure 4-10. Move one more step to the right, and the new number appears on the third layer, so the disaster of extinction occurs. In this case, the probability is small, but it is better to avoid it as much as possible.

In order to prevent the disaster of extinction after multiple steps, there is a simple way to avoid one.

If there is a number on the top layer, there will be no disaster.

4-11

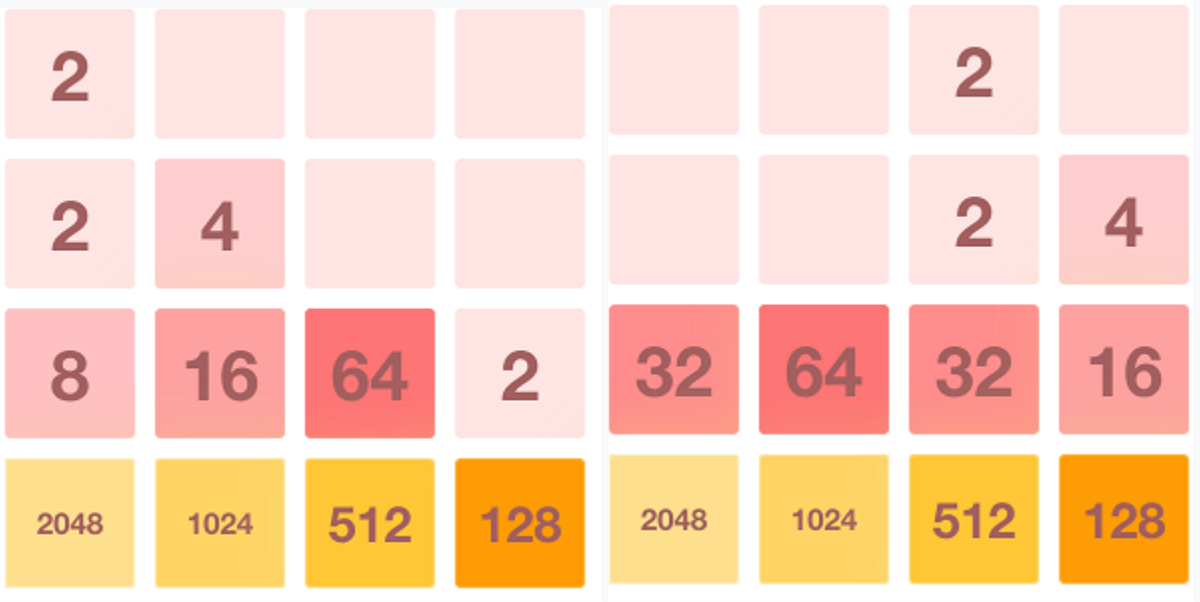
Looking at Figure 4-11 again, this situation is filled with just three rows after moving down. The new figures can only appear on the top layer. This situation can be safely moved down. The situation where just three rows fill up after moving down can always ensure that there is a number on the top layer, which can prevent the disaster of topping out, and is a good choice in most cases.

There may be many situations in which disasters may occur, and it is impossible to list them all here. It is not necessary to list all the situations. The most important thing is to master the methods and understand the laws. The disaster prevention can be summed up as the following mantra: be careful when moving down, and prevent three missing ones. Leave a number on the top layer and never destroy the top.

Lecture 5: Connection and Return

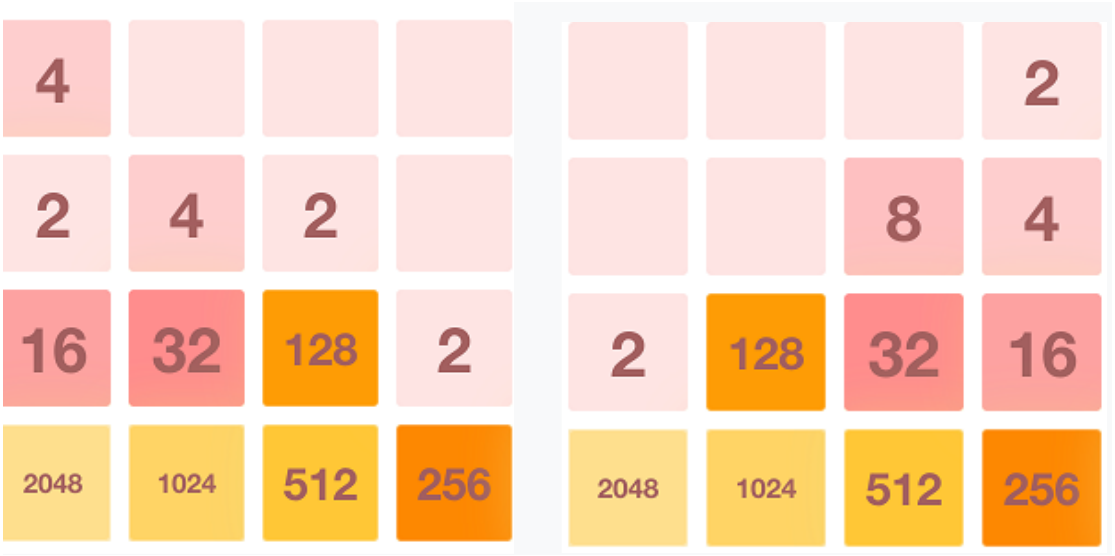
As mentioned earlier, the connection methods in the standard stacked array are S-shaped connection and Z-shaped connection. When using the bottom filling method to fill in the bottom 2 or 3 position, it is always easy to align the same number by swinging left and right, and then fill it in. When filling the number 4 position of the bottom layer, the connection problem is involved, and sometimes a large number shift occurs. The situation of large number shift is inevitable, but most of the cases can be resolved. Faced with this problem, the main focus is to reduce the risk.

Reasonably choose the connection method and use the return transmission skillfully, which can reduce the risk of formation damage and easily score higher scores.



5-1 **5-2**

As shown in Figure 5-1, the bottom 4th position is 128, which is small and suitable for S-shaped connection. When the bottom 4th position number is below 128, it is usually appropriate to use an S-shaped connection. Even if a large number in the second layer is forced to move to the left and there is a 2 in the 4th position, it does not matter. It is easy to fill it in and then fill it in again. The S-shaped connection in Figure 5-1 has a small trick after the large number shift occurs. Fill the 8 of the number 1 position to 16 and then move to the left to make a grid on the right. If it can not be processed into the situation in Figure 5-2, you can also use the two rows of 32 fixed processing (in the top two rows) introduced later.



5-3 **5-4**

Figure 5-3 uses the S-shaped connection to fill the bottom 4th position of the 256. After the merger there will be a large number of shifts. If you use the method described above, you can free up two positions on the right side of 128, and then use two rows of 32 fixed solutions. If there is another accident during the processing, 128 is forced to move to the right, and only one position can be freed on the right. At this time, if you want to fill in 256, you need to use two upper rows of 64 formulas.

Figure 5-4. Using the Z-shaped connection to fill the bottom 256, 128 is forced to the left. Compared with the S-shaped connection of the figure, this case does not need to process the number on the left of 128, just fill in the right and then use two rows of 32 formulas.

5-5

Figure 5-5 is an embarrassing situation, where 32 was merged at the 3rd position on the third layer, resulting in 256 not being made at the 4th position. This situation often occurs because of the habitual filling of 32. It can be avoided as long as the timely synthesis of 16 on the third layer can be avoided. There is no special skill. As long as you are careful, it is absolutely no problem. When the number is small, this kind of situation is more likely to occur, and it is not suitable to use the Z-shaped connection.

The conventional idea of a stacked formation is to swing left and right, pile down, and don't move up. The return technique breaks the conventional thinking and can handle many formations that are not arranged according to the standard formation. Returning is the technique of moving the numbers from the lower layer to the upper layer to realize the combination of large numbers. There are many places that can be used for postbacks, which will be further introduced later, let's look at two simple cases first.

5-6 **5-7**

In Figure 5-6, the bottom layer has 512 and 256, satisfying the double relationship. The second layer has 256 in position 3, the bottom layer 256 is in position 4. In this case, as long as the left three columns are stuck, and then move up, the bottom layer 256 will move to the third layer, and then move down to move it to the second layer, then two 256 can be in the second The layers are merged into 512. Then fill 512 back to the bottom to make 1024, a complete return process is completed.

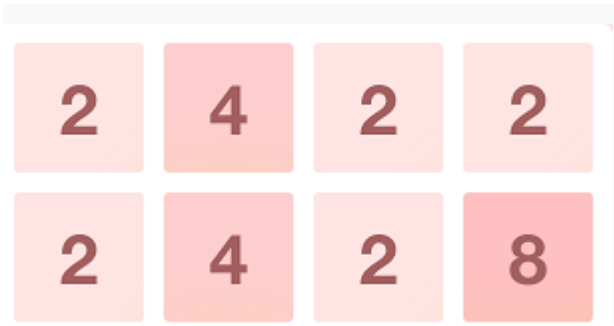
Figure 5-7 is an extended form of Figure 5-6. Move 128 up to the second layer, and then merge it with 128 and 256 next to it to 512, and then fill it back to the bottom layer to make 1024.

Lecture 6: Two Rows of 32 Formulations (1)

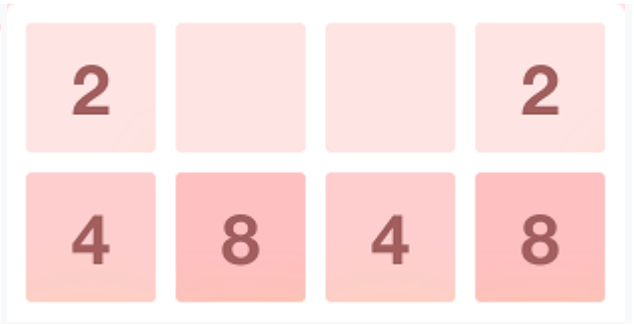
When you are getting close to completing 8192, it is inevitable that you use two upper rows to make 32. If not handled properly, you may have to make 64 in the upper two rows. The prerequisite for being able to make 8192 regularly is to be able to make 32 in the upper two rows and not to make fatal mistakes at critical moments.

6-1

Going to the situation in Figure 6-1, the bottom layer and the second layer have been connected with a Z shape. As long as 32 is at the 4th position of the third layer, 8192 can be successfully made. The computer exhaustively concluded that the success rate of using the best decision to make 32 from 4 in two upper rows from scratch is as high as 99.5%.



6-2



6-3

Figure 6-2 is an ideal formation. The third layer is 2,4,2,8. After adjusting the top layer and filling it down, the third layer becomes 4,8,4,8. Usually if the third layer is 4,8,4,8, you can declare success. In Figure 6-3, making tiles to the right will ensure that No. 4 position will make 32, while to the left there is a small probability of death.

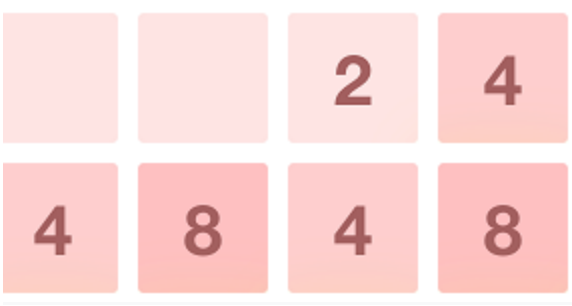
6-4

6-5

Moving to the right continuously, if there is a top 4,2,4 situation similar to Figure 6-4, just move one step to the left and then fill down to get 4 8s, and then make 32. If there are 3 top 4 positions in Figure 6-5, just move one step to the right and then fill down to get 8, 8, 16, which makes 32.

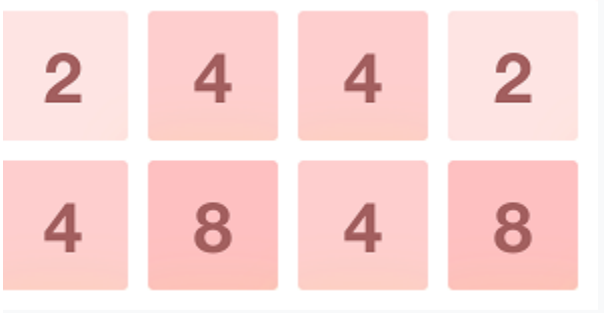
6-6

In Figure 6-6, 2,4,4 appears on the top layer, and you should move to the left at this time. Only this step can ensure that there is no accident. After moving to the left, if it is 4, it is very easy to do. 4 out at the 3rd position can be directly filled down and that makes 32. If 4 out at the 4th position, then move left to move it to the 3rd and then down. If it is 2, you can move down first, and the third layer gets 4, 16, 4, 8, as long as you put another 4 on the top layer and put it in position 3.



6-7 **6-8**

Looking at the situation in Figure 6-7, you can only move to the left. If you go out of 4, you will have a situation similar to Figure 6-6. Move left 2 to form the situation in Figure 6-8. At this time, you can only move right, otherwise if you get a 4, the game is over.



6-9

The correct way to move in Figure 6-9 is to go down. If the top layer is 4, then lower right and right can make 32. If it is 2, go to the right one step first. The new number can only be in the first column, if it is 4, put it in the third layer and you can directly make 32. After the second, the first layer is full, there are two cases, which are very easy to deal with.

6-10 **6-11**

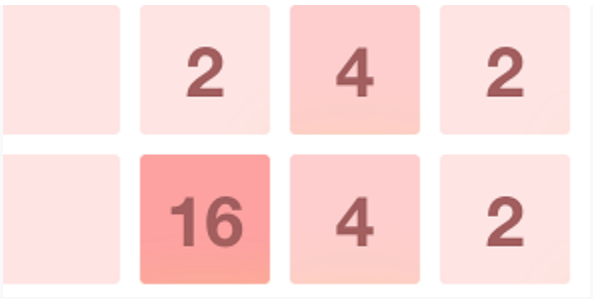
In Figure 6-10 and Figure 6-11, you can make 32 by putting 8 on the top layer and placing it at position 3.

Lecture 7: Two Rows of 32 Formulations (2)

At the 3rd floor, the 4th position is 32, and we cannot expect to get out of 4,8,4,8 every time. Here is another way.

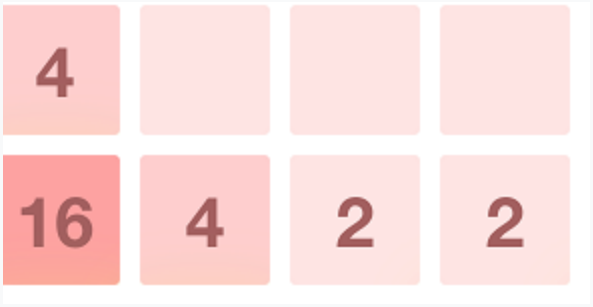
7-1 **7-2**

Figure 7-1, first down then left, if there is a situation similar to Figure 7-2, move to the right.



7-3

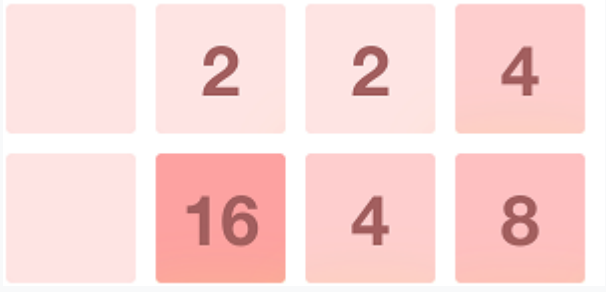
In the situation in Figure 7-3, 16 is in position 2; 4 and 2 are in positions 3 and 4. After moving down, you can make 32 with a 4 in the top 4 position. Only in extreme cases, you will not succeed.



7-4

In the situation in Figure 7-4, in the case of no. 4 position, the success rate of right-to-bottom is the highest. In this way, extreme situations can be avoided to the greatest extent, and the following changes may occur in subsequent situations.

7-5



7-6

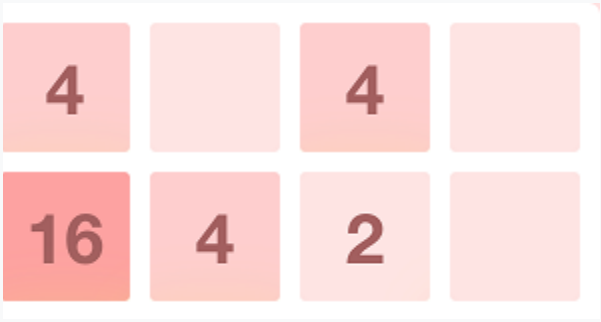
In the case of Figure 7-5, first move down to fill the third layer, and then put a 4 on the top layer and put it on the 3rd position. The situation in Figure 7-6 is even simpler. Make 4 to the right and fill it down.

7-7

The luck in Figure 7-7 is not very good. In case of encounter, we can only move to the left and pray for a new 2 on the top layer, and then move to the right to succeed.

Lecture 8: Two Rows of 32 Formulations (3)

No matter how perfect the formula is, it is not omnipotent. Two rows of 32 always have an inevitable 0.5% mortality rate. Sometimes bad luck will increase the risk, but if handled properly, there is still a chance.



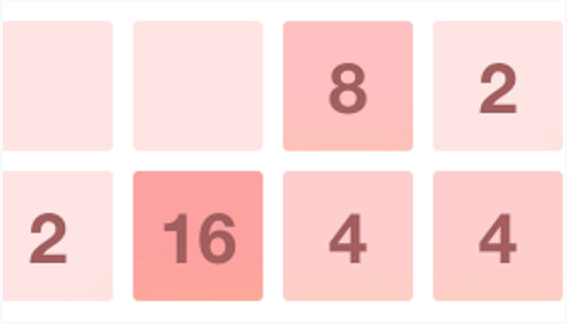
8-1

Figure 8-1 is a case of bad luck, the new 4 is in the top 3 position. If you are in position 4, just move down and fill in 4 and 2 to fill in. If you are in position 2, you can change the third layer to 16, 8, and 4, the success rate is also very high. However, don’t panic if you are in position 3, move to the left and see the situation.

8-2

After moving to the left, if there is a new 2 on the third layer, it is of course the best, so that the right and the bottom right will make 32.

The new 2 is on the top layer, and it may form a situation similar to Figure 8-2 after moving to the right. At this time, move down, if the new number is not in the top 4 position, you can immediately move right to make 32. If a 2 is placed at the top of the 4th position, the situation in Figure 8-3 is formed.



8-3

8-4

Figure 8-3 usually has the chance of a final return. Move to the right first, then if you can go to the situation in Figure 8-4, you can pass it back. The success rate is still relatively high.

8-5

In Figure 8-5, move the 32 of the second layer up to the third layer, then move right and fill 8 to the third layer, you can spell out 64 and fill it back to the second layer. Some small branches of this formula have a better solution, and they are not listed here one by one. When studying the formulation, the main branch strives for the highest success rate, and the secondary branch itself has few opportunities, only for greater versatility. After all, you are spending a lot of thought on it for a very small success rate.

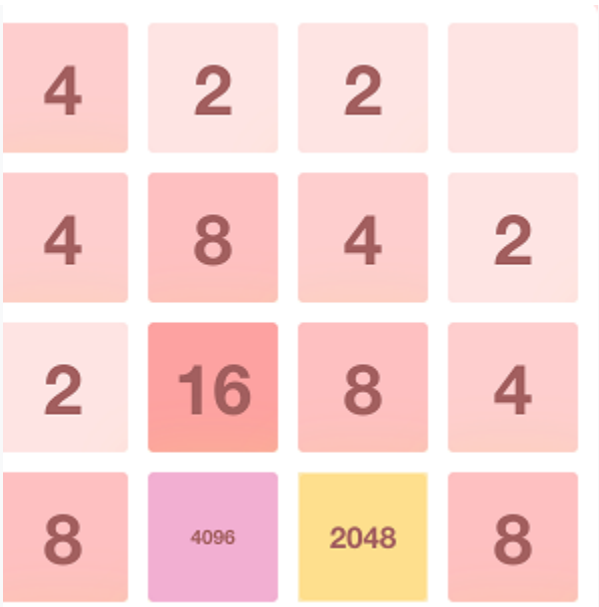
Lecture 9: Draw at the bottom of the well

When the bottom row is displaced, this is how you get back to the default position. Although the flexibility of the formation is not as good as the return, there is a high

probability of returning to the default arrangement when there are few large numbers.

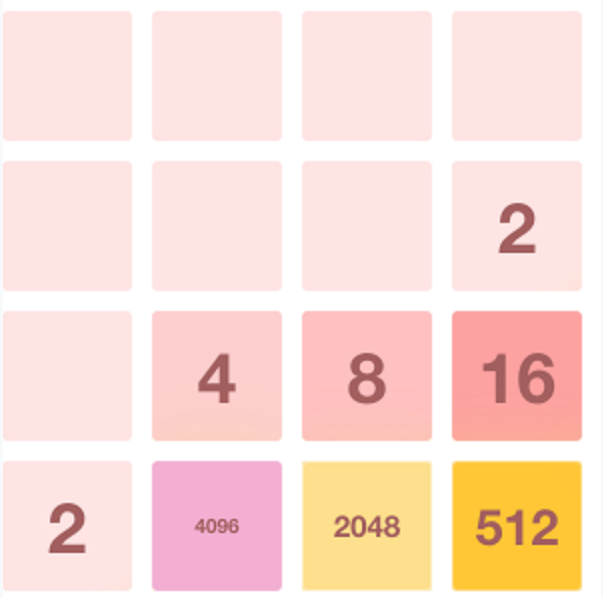
9-1

In Figure 9-1, 4096 deviates from position 1, and to position 2, the other numbers on the disk are very small. In this case, you can find an opportunity to block the second column, and keep the same number in the first column. At this time, it is possible to move up to make room in the bottom position 1, and then move left to return 4096 to position 1. Sometimes, the new numbers after the move up occupy the bottom 1st position, and there is no chance to put 4096 back until the first column is completely stuck. At this time, you can readjust and look for opportunities to rearrange again. You will succeed if you try it a few times.



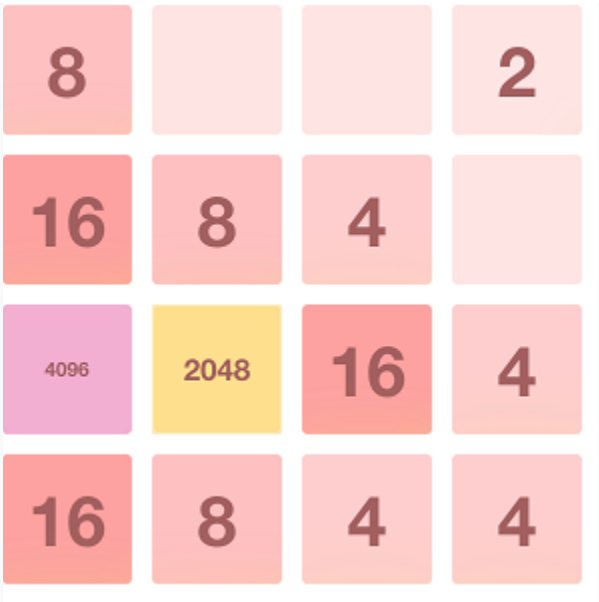
9-2

Figure 9-2 is an extension of Figure 9-1, where there are two large numbers, 4096 moved to position 2, and 2048 moved to position 3. In this case, the second and third columns must be stuck at the same time. After moving up, if the new number does not occupy the bottom position 1, then 4096 and 2048 can be put back. The success rate of two-number bottom high tiles is lower than one number, and it may take more attempts to succeed. In this picture, even if 4096 and 2048 cannot be put back to position 1 and position 2, you can consider moving them to positions 3 and 4.



9-3

Figure 9-3 has three large numbers 4096, 2048, and 512. In the figure, 4096 deviates from the 1st position. If you sort the disk according to the previous ideas, you will be stuck in the right 3 columns. However, in this situation, rearranging the bottom tiles is not recommended, and the success rate of stuck 3 columns is very low, and the risk is very large. It is recommended to use the ocean-to-sea introduction described later.



9-4

Figure 9-4 is another form of your base tiles getting shifted. First adjust the two large numbers 4096 and 2048 to the second layer, positions 1 and 2, find a chance to block the second layer and give the bottom floor the opportunity to free up two squares. If the new digits are not blocked in the bottom 1 and 2 after continuously moving to the right, then moving down can make the two large numbers return to the same position.

9-5

In the situation shown in Figure 9-5, 4096 and 2048 are placed in the same column. In this situation, you can find the opportunity to block the second layer, while keeping the same number on the bottom layer. Sometimes you may encounter unsatisfactory situations. The new numbers just block the bottom 1 position. At this time, you can find a way to convert to the situation in Figure 9-4 and use the bottom row to create an empty square.

Lecture 10: Crossing the Ocean

Floating across the ocean is a return strategy for dealing with non-standard bottom arrangements.

10-1

Crossing the ocean is generally used before the completion of the two-row set. The critical step is to look at the situation and ensure that the required numbers can be merged after moving up. In the situation shown in Figure 10-1, go up first and then right, and then you can make 64 on the third layer, then make 1024 on the second layer and put it into position 4, and all the big numbers are cleaned up at once. At this time, you can choose to put 8192 in the lower right corner to continue the game, or you can consider using the bottom of the well to make 8192 return to the lower left corner.

10-2

Figure 10-2 is similar to Figure 10-1. Here, 2048 is moved up to the second layer. After making 512 in the second layer, you can make 2048 in the bottom 2 position, and then find a chance to fill in 2048 to make 8192, and then Use the bottom of the well to make 8192 return.

Lecture 11: Key Decisions

Some methods for dealing with large number shifts in layer 2 have been introduced above. In the case where the number is not particularly large, a wasted grid can still be resolved. However, when you close to making 16384, wasting any square is fatal. Under the premise of following the bottom-filling sequence and paying attention to the second layer in time, the shift of the maximum number of the second layer can be mostly avoided, but there are still cases of displacement. Reasonable choice of connection method and bottom filling sequence can reduce risks in special situations.

11-1

11-2

After the bottom layer spelled out 8192, 4096, 2048, and 1024, it has entered the stage of getting close to making 16384. Before making 512, it is recommended to use the arrangement shown in Figure 11-1, and then use two rows of 32 to spell out 512 and put it into position 4. If there is a large number of shifts, the general arrangement is as shown in Figure 11-2, and then use the two rows of 64 fixed to spell out 512.

11-3

Looking again at Figure 11-3, the value of the layer 2 security bottom is mentioned above. However, when 32, 64, 256, and 512 are spelled out in the late stage, 64 should be filled first. If this situation is filled with 32 first, it will lead to a very small number of the 1st position in the second layer and a large number in the third and

fourth layer. There is a risk of runaway. The risk of runaway is much higher than the two rows of 64 formulas. The correct order here is to fill in 64 and then 32, and finally use two rows of 64 fixed sprints 16384.

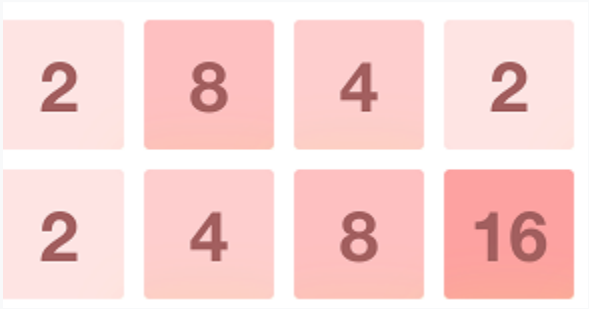
11-4

Sometimes there is inevitably a shift of 512. Don’t worry too much. You can go to the situation shown in Figure 11-4 first, and then use the return 64 format described later to spell out 16384. The S-shaped connection is used in the late stage to make it easier to return in special circumstances. If you return 64 from position 1 to position 4, it will affect the underlying position 1, and return 64 from position 4 to position 1. No effect on the bottom layer.

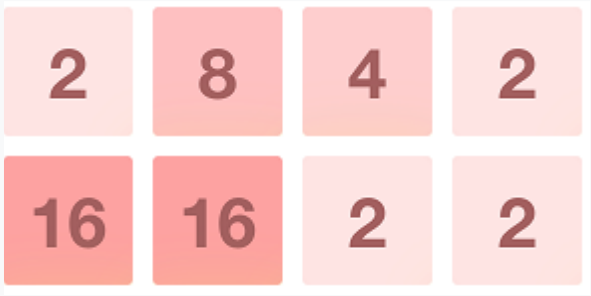
Lecture 12: Two Rows of 64 Formulations (1)

When preparing to make 16384, it is inevitable to use two rows of 64 sets. In special cases, it may be necessary to use the return 64 sets. The pre-requisite for being able to make 16384 steadily is to be familiar with the two-row 64 format and not to make fatal mistakes at critical moments. The computer exhaustively concluded that the success rate of using the best decision to make 64 in two rows of space from scratch

is 97.6%, and the success rate of making 64 from 2 is 99.1%. As long as it is not particularly bad luck, there is generally no problem. The formula written in the strategy guide defaults to making 64 at position 1, and the worry about making 64 at position 2 is less than that at position 1, and you can also refer to the method of making 64 at position 1. There may be many special situations in the two-row fight 64, which cannot be enumerated one by one. Pay attention to flexible conversion.

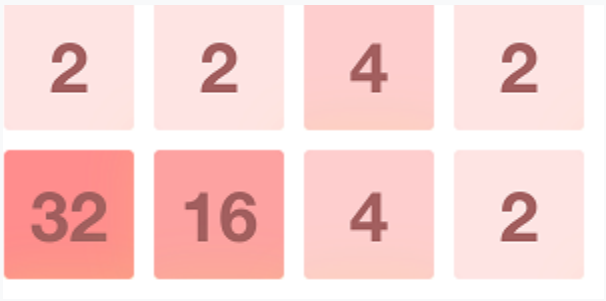


12-1



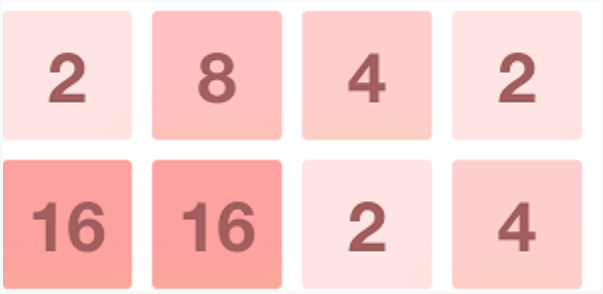
12-2

Figure 12-1 is a move with a high success rate. After moving down two steps to the left, the situation of Figure 11-2 is generally formed. Figure 12-2 Go one more step to the left, then no matter what number you get, you can make 8 at the 2nd floor of the third layer through the down or left.



12-3

As long as the situation in Figure 12-3 is formed, 32 and 16 have been fixed in positions 1 and 2, 4 and 2 in positions 3 and 4 are aligned, and after filling in, you can make 64 with another 4.



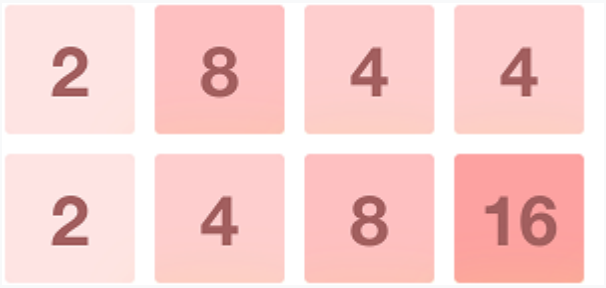
12-4

The new figure in Figure 12-4 is not as regular as in Figure 12-2, this kind of game still has to be left first and then down.

12-5 **12-6**

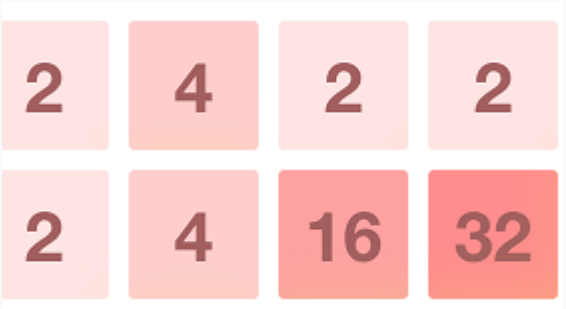
Figure 12-4 will generally be converted to a situation similar to Figure 12-5, and then going right and down, it will generally be converted to a 12-6 situation.

Figure 12-6. As long as you fill in 4 and then 8 in position 2, you can spell 64. There is a 4 buffer in the bottom row, 4,2,4 stuck in position 4, yet the success rate is still very high, and the row with buffer will be detailed later.



12-7

In Figure 12-7, the original formula is 2,8,4,2, and now a 4 suddenly appears. The risk of this situation is greater than those of the previous situation. If the method of stacking to the left is also used, the probability of runaway is high. Generally, go down and then right twice in succession, and then try to arrange it as shown in Figure 12-8.



12-8

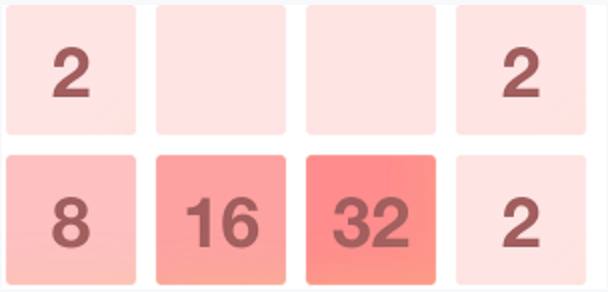
Figure 12-8 is similar to Figure 12-3, as long as you add another 4 on the top layer to make 64.

12-9

The situation in Figure 12-9 can not pile up to the left 32, the basic idea is to follow the situation in Figure 12-8 as much as possible.

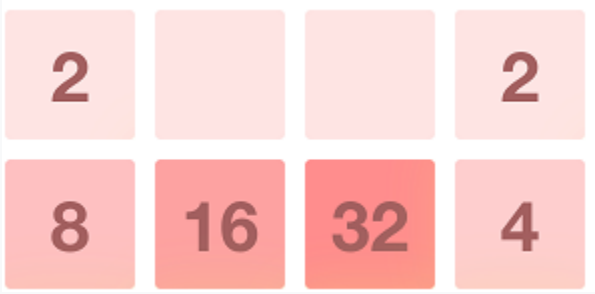
Lecture 13: Two Rows of 64 Formulations (2)

When spelling 64, if the third layer cannot form an ideal arrangement, it is possible to use a row of spaces to spell 8, and there is no rule to avoid the risk of 424 stuck. The probability of a 4 at a critical moment is only 0.1. If you respond appropriately, you can minimize your risk.



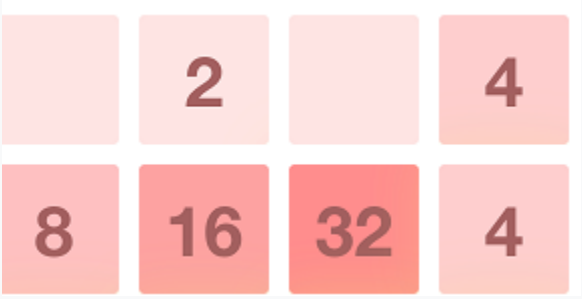
13-1

Unless there is a combination of 4,4,4,2,2 or 2,2,4 in the top layer, there is a risk of 4,2,4 stuck in a row of spells. In the situation in Figure 13-1, subconsciously fill in the lower right corner with 4.



13-2

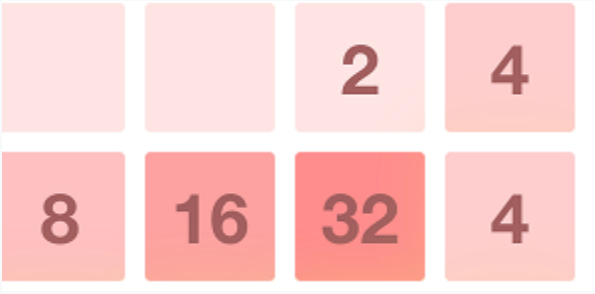
In Figure 13-2, it feels almost the same from left to right. In-depth calculation will find that the success rate of going right is higher. The choice to the right is more flexible, and the buffer can be used more effectively.



13-3

13-4

Figure 13-3 obviously chooses the right. If you put out 2 directly to spell out 8, then out of 4 will form a situation similar to that shown in Figure 13-4. You can only use the buffer down and try to fight for 8 in the top row.



13-5

In Figure 13-5, it is possible to choose left intuitively, and after in-depth calculations, it is found that the success rate under selection is higher. In fact, when trying to make 8 in the top row, it is taboo to move 2 to the corner and 4 to the side. Unreasonable 2,4,2 or 2,4,4 arrangement may be fatal.

13-6 **13-7**

Figure 13-6 is another situation where the left and right choices are similar. In-depth calculations will find that it is better to choose the right, mainly to avoid the situation of Figure 13-7. Figure 13-6 may appear in Figure 13-7 when the choice is not right, and after using the buffer, there may be a 2,4,2 situation again.

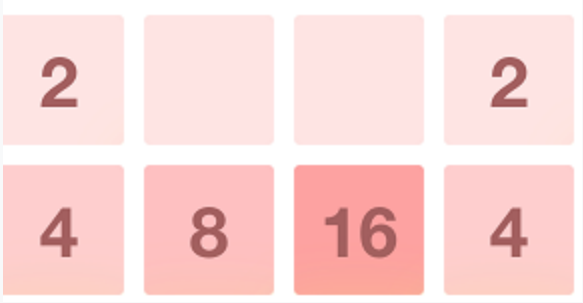
13-8 **13-9**

Figure 13-8, according to the idea of retaining the buffer, first right and then down. The situation in Figure 13-9 may be entangled, and in-depth calculations show that

the success rate of going to the right is higher. On the surface, if you go right, you may die in one step, with a success rate of 90%. No matter what the number is, you will not die immediately after walking to the left, but in fact, there is only 86.8% success rate to the left.

Lecture 14: Two Rows of 64 Formulations (3)

In the previous section, we introduced the formula for placing 16 in position 4. Let's take a look at the situation in which 16 is placed in position 3.



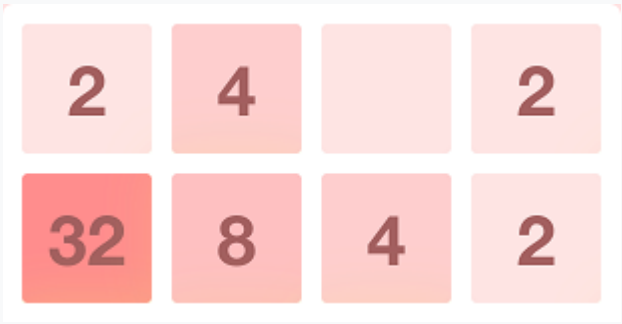
14-1

14-2

Figure 14-1 puts 16 on the 3rd position, which is also a fixed formula with a relatively high success rate. This situation goes first to the right. If it goes out to 2 and then to the left, it can generally be organized into the situation shown in Figure 14-2. The basic idea is the same as the first fixed formula above, with 32 stacked on the left.

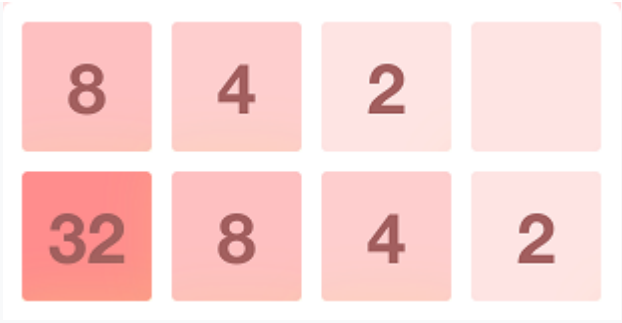
14-3 **14-4**

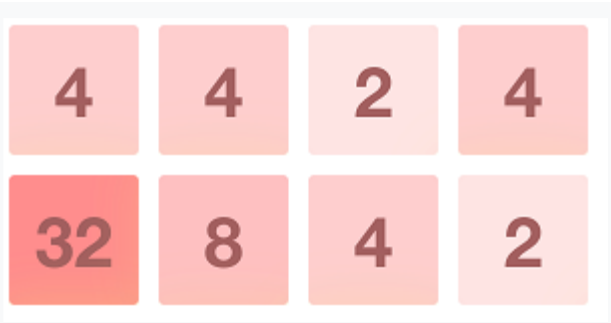
Figure 14-3 is the same as the previous introduction after going to the left. If you choose to go down, the change is the same as in Figure 14-4, and the success rate to the left is slightly higher. Figure 14-4 can only go down, if you go to the left, in case of a 4 on the top 3, it is very bad situation.



14-5 **14-6**

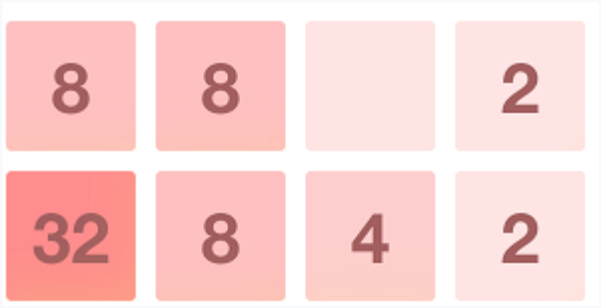
As long as it is not bad luck, Figure 14-4 can generally be organized into the situation in Figure 14-5. Going to the right again, you should go to the left when forming the situation in Figure 14-6.





14-7 **14-8**

If the situation in Figure 14-7 appears, it means that it has been successful. The situation in Figure 14-8 cannot go to the left, only to the right, as long as it is not first out 2 then out 4 can guarantee success.



14-9 **14-10**

If the situation in Figure 14-9 appears, you can only go to the left. In the next step, if you make a 4 then right and then left will guarantee to spell 64, if you make a 2 at the 3rd position, then go down, then fill in 4 and then 8 will also guarantee to spell 64. If the 2 out of the 4th position forms the situation in Figure 14-10, then you can only go to the left. As long as it is not an extreme situation, you can always move the top layer 16 to the 2nd position and put the 3rd layer 2nd position into 16.

There are many changes in the two-row 64 format, which are not listed here. The basic ideas are similar. The core idea is to fix the third layer as much as possible and handle 2 and 4.

Lecture 15: Back to 64 fixed formula (1)

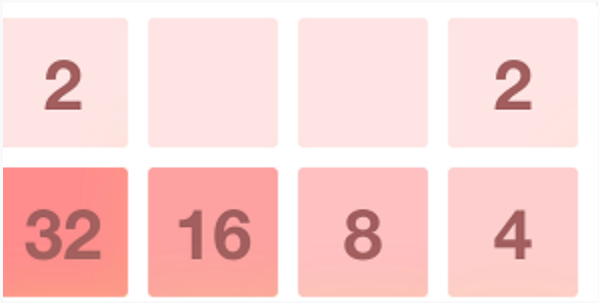
When there is a 512 shift in the second layer, it is necessary to use the return 64 format. Let's first look at a classic situation that uses the return 64 format.

15-1

In Figure 15-1, the numbers have been gathered together. After going up, 64 moves to the third layer, and at the same time, an 8 is spelled out at the top 4 position. Going to the left, 8 will move to the 3rd position, and then you can spell 128 at the 1st position of the third layer, and finally spell out 16384.

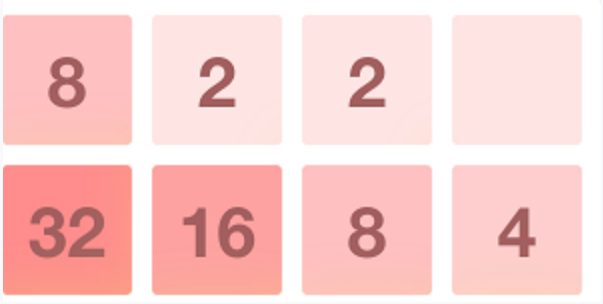
The basic idea of the 64-pass fixed format is similar to the two-row 64 fixed format, which is to adjust it at the last critical moment so that the side columns can move up and merge the numbers smoothly. The risk of the 64-pass fixed-form is more than that of the two-row 64 fixed-form, the success rate is slightly lower, the success rate

of the theoretical best move is 94.5%, and it can still be stable under the premise of mastering the method.



15-2

Figure 15-2 is a common situation. It is obvious that going to the right is the most straightforward without considering the return, but when using the return, the situation should go to the left. If there is no 4, then the standard situation of 2244 will be formed after the right and left. If 4 occurs during the move, try to arrange as follows.



15-3

Figure 15-3 goes straight up, and then continues to the right, moving 8 to position 3.

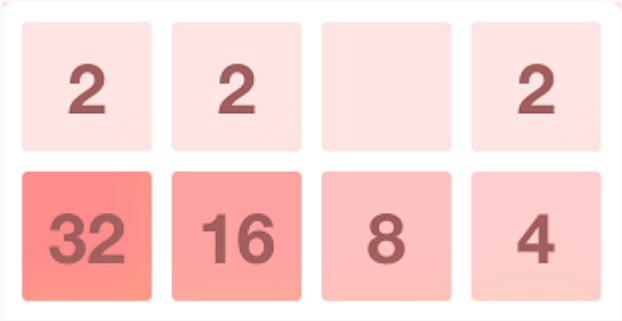
15-4

Sorting it into Figure 15-4 is a bit risky, but it can only be sorted this way when you are unlucky. If you only want to avoid the risk of short-term stuck and cause the return failure, the score will not be much higher.

15-5

15-6

Figure 15-5 and Figure 15-6 both go down and then left, as long as there is no accident, they can pass back up.



15-7

15-8

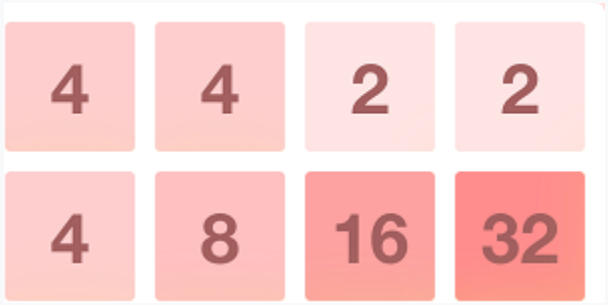
Let's take a look at the situation of three 2s on the top floor. If the top 4 position is empty, you can go straight up. If you still get 2 at the 4th position, the situation in Figure 15-8 is formed. At this time, the success rate of going right is higher, and then going down is generally the following two situations.

15-9

15-10

Figure 15-9 goes directly to the top, and Figure 15-10 goes to the left first, then both cases can guarantee a successful return.

15-11



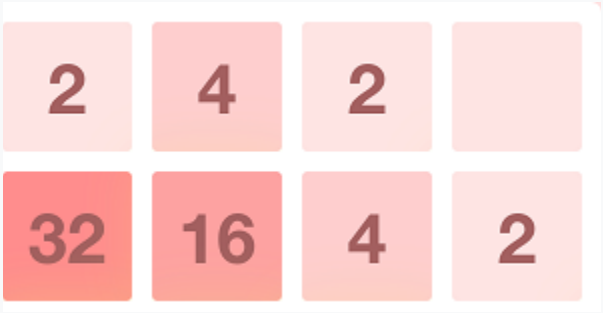
15-12

The situation where 32 is in position 3 is the same as that shown in Figure 15-2, except that the risks are greater. After going to the position shown in Figure 15-11, then go to the right. As long as the new number is not 4, it will return successfully. In the case of 32 in position 4, it is necessary to follow the situation in Figure 15-12

as much as possible. Afterwards, as long as the new number is 2, you can go back to the right and then back up.

Lecture 16: Back to 64 fixed formula (2)

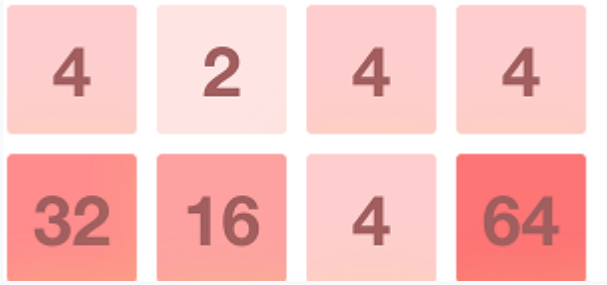
The return 64 format mentioned above is a more general routine. Here are two special cases. When these two cases occur, there are better choices.



16-1

Figure 16-1, according to the conventional routine will choose to go to the right, but in fact, direct upward is a better choice, direct upward can ensure the success of the return. After mentioning 64 to the third layer and taking a step to the right, there are two cases.

16-2

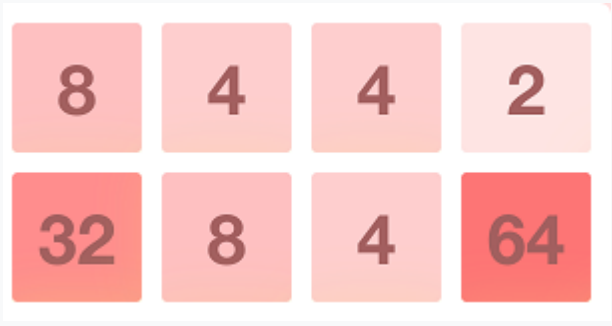


16-3

Figure 16-2, fill down first, then no matter what number you put out, you can make sure to spell 8 in the top 3 position. Figure 16-3. After filling down, pay attention to 2 if you go out. At this time, go to the left and then right to ensure that the top 3 position spells out 8, otherwise there is a small chance of stuck.

16-4

Figure 16-4 is also a situation that can ensure the success of the return after going up. After mentioning 64 to the third layer and taking a step to the left, there are two cases.

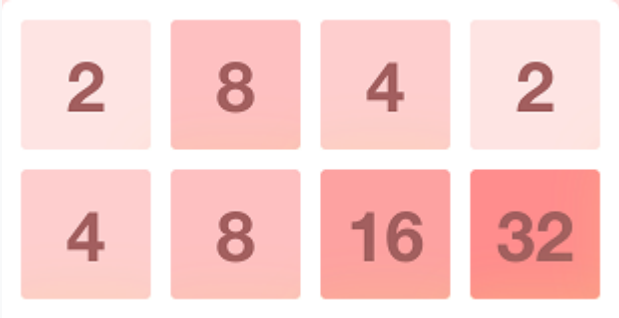


16-5 **16-6**

In Figure 16-5, go down first and then left, and then you can always block the third layer and spell out 16 to fill in the second position. In Figure 16-6, first go to the right to form 848, then fill down, and then move the 8 on the top layer to position 3 and fill down to succeed.

Lecture 17: Two rows of 128 sets

Under normal circumstances, less than two rows of 128 sets are used. This set is a necessary skill for sprinting 32768, or a life-saving straw for handling extreme situations. The success rate of making perfect moves in making 128 at the 1st position is only 78.2%, as long as a 4 appears when it is inappropriate, it may lead to failure. In general, placing 64 in position 1 and position 4 are almost the same. If you accidentally shift 64, the chance is very small of making 128.



17-1 **17-2**

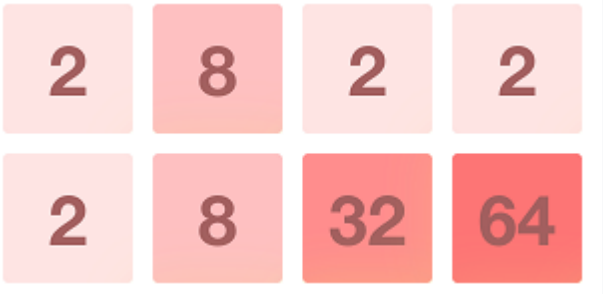
Figure 17-1 is a more general way of tackling the problem. The merging and blocking the third layer is used to avoid 64 getting shifted. If you are ready to go to Figure 17-1, the 4 in the upper right corner will be arranged into the situation of Figure 17-2, and then the third layer will be stuck while merging, to avoid 64 getting shifted.

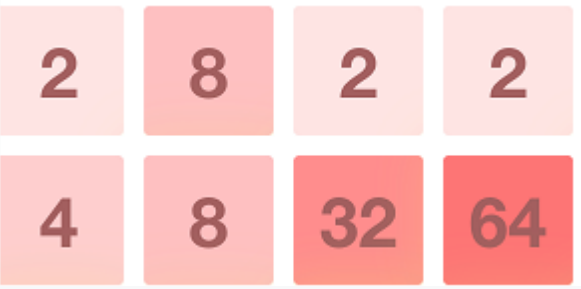
17-3

After spelling out 64, try to go as far as possible in Figure 17-3 and then fill down.

17-4 **17-5**

Then try to arrange it as shown in Figure 17-4, if there is a 4 in the upper right corner, it will be organized as shown in Figure 17-5.





17-5 **17-6**

Finally, don't rush to merge the 2 on the top layer, and fill it down when forming Figure 17-5 or Figure 17-6. The 2 in the first position of layer 3 is also reserved as much as possible, and the success rate in Figure 17-5 is higher than that in Figure 17-6. The final key moment is to fight for 8 in the top row without buffers. It's all about being lucky then.