Report for Etude 10 Pushing Buttons

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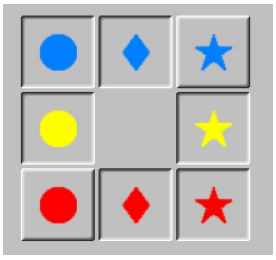
When you push a button, you push it down, but the button next to it and the button of the same color are raised, so you can't push all the buttons down. To solve this etude, we need to find a button that when the last button is pressed, all the buttons that are adjacent to it and of the same color can be pressed under its influence.

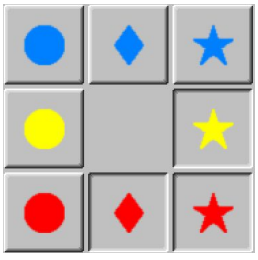
Here is the solutions for puzzles 8,17, and 24.

Puzzle 8:



Solution: 3 moves

The least moves that we found in this puzzle is 3. At the beginning, when we pressed the first button, we tried many methods, and the results we got were not the best. And we found the best way to solve this problem is to keep all stand out buttons connected together as much as possible, and then find the one that can push all the buttons at once. There are two buttons to press first, we prefer red so we decided to start with red. And then we try to push the red rhombus, we got two lines of stand out buttons connected with a blue circular.



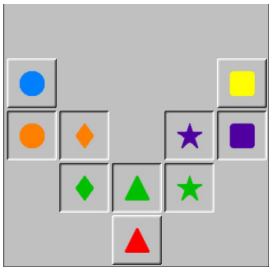
Finally, we push the blue circular and we got completed. Red(circular) → red(rhombus) → blue(circular).

We found some other ways that comes up 3 moves as well.

1) Red(circular) → yellow(circular) → red(star)
2) Red(circular) → red(star) → yellow(circular)

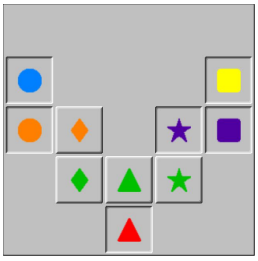
3) Blue(star) → red(star) → blue(rhombus)
4) Blue(star) → blue(rhombus) → red(star)
5) Blue(star) → yellow(star) → blue(circular)

Puzzle 17:



Solution: 10 moves

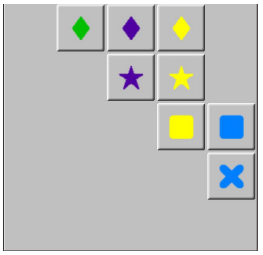
The least moves that we found in this puzzle is 10. At the beginning of this puzzle, we found there is 28 moves to get completed. And we don't think it is the best solution for this puzzle, so we try to solve it again. Our idea is to start from the side. We found that during the whole process, we'd better be able to gather all the buttons together and find the one that will push all the remaining buttons. And finally we have the shape in the picture below, we can just push the green rhombus and we will get completed.



Finally, we found the solutions for solving this puzzle.

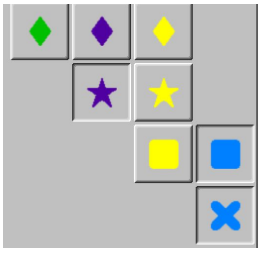
1) Red(triangle) → yellow(square) → purple(square) → yellow(square) → purple(star) → blue(circular) → orange(circular) → orange(rhombus) → orange(circular) → green(rhombus)
2) Red(triangle) → yellow(square) → purple(square) → purple(star) → purple(square) → blue(circular) → orange(circular) → blue(circular) → orange(rhombus) → green(star)
3) Red(triangle) → blue(circular) → orange(circular) → blue(circular) → orange(rhombus) → yellow(square) → purple(square) → purple(star) → purple(square) → green(star)

Puzzle 24:



Solution: 6 moves

The least moves that we found in this puzzle is 6. Because of the last puzzle we decided to start with one of the button on the side which is blue(×). And we try to make a connection like puzzle 8, two lines of stand out buttons connected with a button in the line. We found we can push the green rhombus and push twice purple star, then we have two lines of stand out buttons connected with a yellow rhombus button.



And that's totally 6 moves. Blue(×) → green(rhombus) → purple(star) → purple(rhombus) → purple(star) → yellow(rhombus)

The other solutions we found for puzzle 24 also need 6 moves are:

1) Blue(×) → green(rhombus) → yellow(star) → yellow(rhombus) → yellow(star) → purple(rhombus)
2) Blue(×) → yellow(star) → green(rhombus) → yellow(rhombus) → purple(rhombus) → yellow(star)