Conveyor / Elevator challenges

Advanced Scratch rules of thumb

(a) Use only one “forever” loop per sprite, often only one per project.
(b) Do not use “if touching” or “if touching color” or “if touching edge” (use coordinate comparisons instead); do not use “if on edge bounce”.
(c) Use variables to keep track of the “state” of the game.
(d) Do not use the “move” functions (use “change x/y by” or “goto x y” instead).

1. Modify the CheckGround function so the cat lands positioned on the ground, instead of overlapping it.

2. In the “conveyor” sprite script, make the “conveyor” sprite move back and forth across the screen. To do this:
   - Make a variable called “conveyor direction” and be sure to make it “for this sprite only”.
   - Make a “forever” loop:
     - Move the platform to the right if “conveyor direction” is “right” and to the left if “conveyor direction” is “left”. When the conveyor gets to one side or the other, change the direction. (Do not use “if touching edge” to do this. Do it by checking coordinates.)
     - You should be able to drag the “conveyor” to any y coordinate on the screen (up or down) and it should still move back and forth correctly.

2b. Make the “elevator” sprite move up and down. Use the same ideas as you used for the “conveyor” sprite.

2c. Make a new sprite called “boxer”. It is kind of a combination of the “conveyor” and the “elevator”. It moves to the right, and then when it gets to a certain x coordinate it starts moving up, and then when it gets to a certain y coordinate it starts moving left, and then when it gets to a certain x coordinate it starts moving down, and then when it gets to a certain y coordinate it starts moving right again and repeats the box pattern forever.

2d. Make a new sprite called “diamond”. It is like “boxes” except it moves in a diamond pattern. It starts by moving down and to the right, then it moves up and to the right, then it moves up and to the left, then it moves down and to the left, then it repeats the pattern.

2e. Make it so when you are moving the cat left or right, if it gets to the left or right edge of the screen it “wraps around” and comes out the other side.

3. In the cat script, write the function CheckConveyorLanded that makes it so if the cat lands on the conveyor it stops the fall. To do this:
   - Check that the cat is in the air.
   - Check that the cat's x position is between the ends of the conveyor.
   - Check that the cat's y position is above the conveyor.
   - Check that the cat's “proposed y” is *not* above the conveyor.

- If all of those are true:
    1. Set the cat's y so its feet are on the conveyor.
    2. Set “landed on” to “conveyor”.

4. Make it so if the cat is on the conveyor, the cat moves along with the conveyor. To do this, the conveyor sends “carry cat left” and “carry cat right” messages to the cat when it moves left or right.

5. Make it so that if the cat “hits” the conveyor from the bottom, it starts falling and does not move through the conveyor from the bottom.

6. Write the function CheckConveyorFellOff so that if the cat is on the platform and “walks off” the side of the platform, it starts falling.

7. Make the “elevator” sprite work like the “conveyor” sprite. The cat can land on it, move up and down with it, walk off it, etc.

7b. Make it so the cat can land on the “boxer” and be carried around by it, similar to the “elevator” and the “conveyor”.

7c. Make it so the cat can land on the “diamond” and be carried around by it, similar to the “elevator” and the “conveyor”.

Advanced: Make it so that if the cat “hits” the conveyor on the side, it is stopped and doesn't move though the conveyor from the side.

Advanced: Use cloning to create multiple platforms and multiple elevators (and multiple boxers and multiple diamonds).