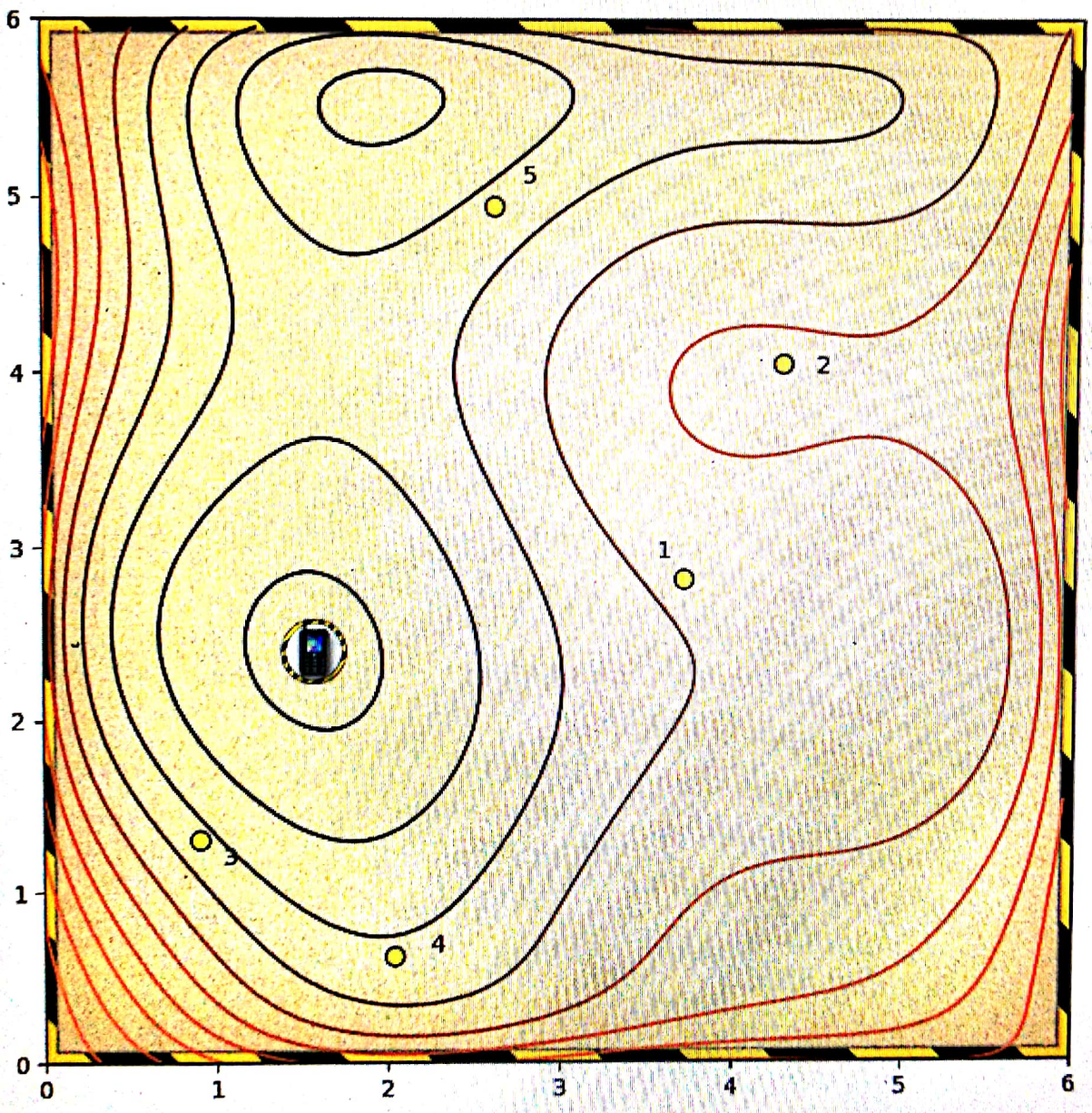
Optimisation scenarios

LATEST SUBMISSION GRADE

100%

1. Given the following contour plot,



Which starting points (from 1 to 5) are likely to converge to the global minimum (shown by the mobile phone) when using a steepest descent algorithm?

- [x] Starting point 1

- [x] Starting point 1

  ✓ **Correct**

  In this case, the algorithm descends smoothly down the slope.

- [ ] Starting point 2
- [x] Starting point 3

  ✓ **Correct**

  In this case, the algorithm descends smoothly down the slope.

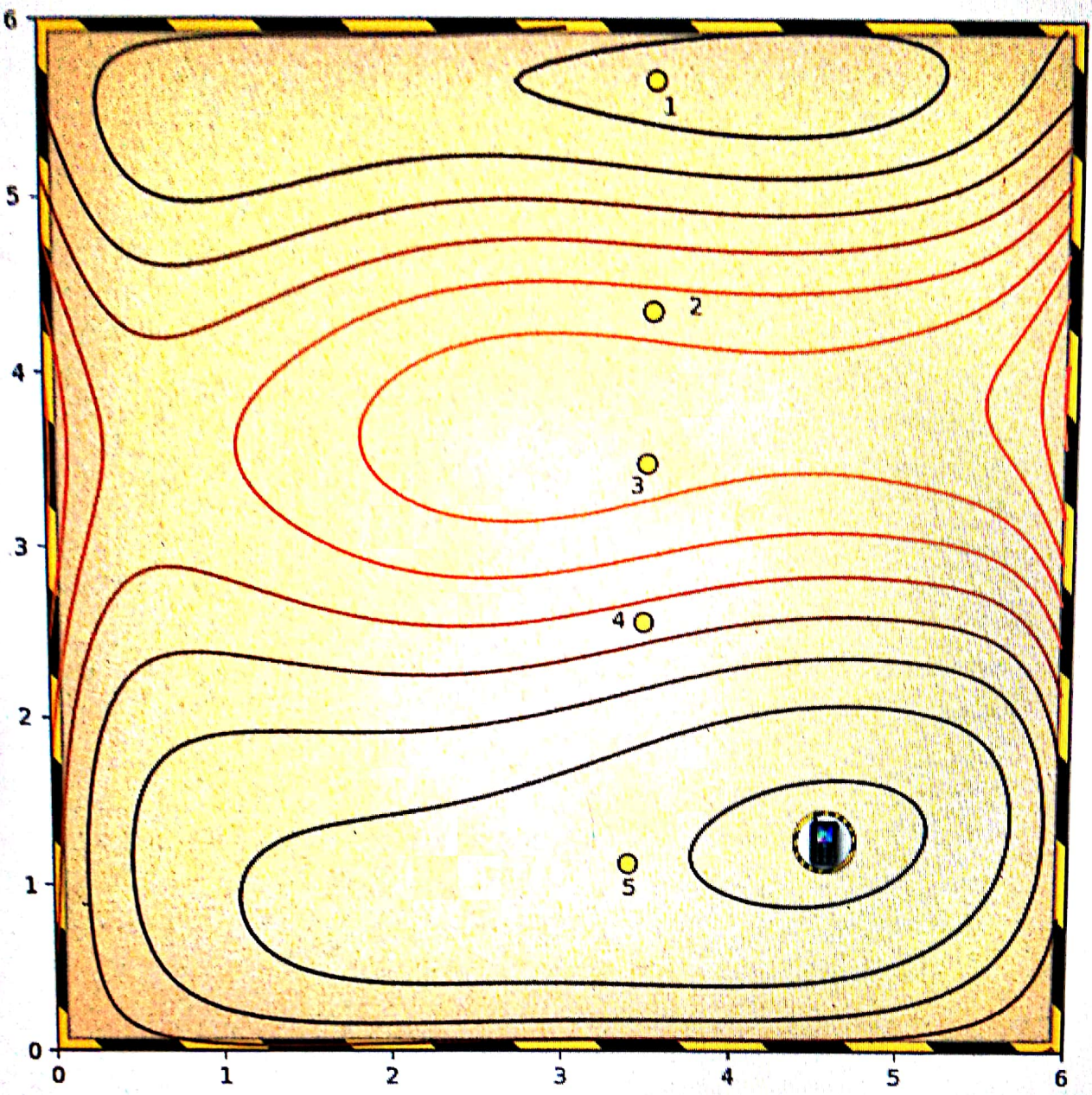
- [x] Starting point 4

  ✓ **Correct**

  In this case, the algorithm descends smoothly down the slope.

- [ ] Starting point 5
- [ ] None of the above

2. Again, which starting points converge to the global minimum?



- [ ] Starting point 1
- [ ] Starting point 2
- [x] Starting point 3

✓ **Correct**

This should converge to the global minimum.

☑ Starting point 4

✓ **Correct**

This should converge to the global minimum.

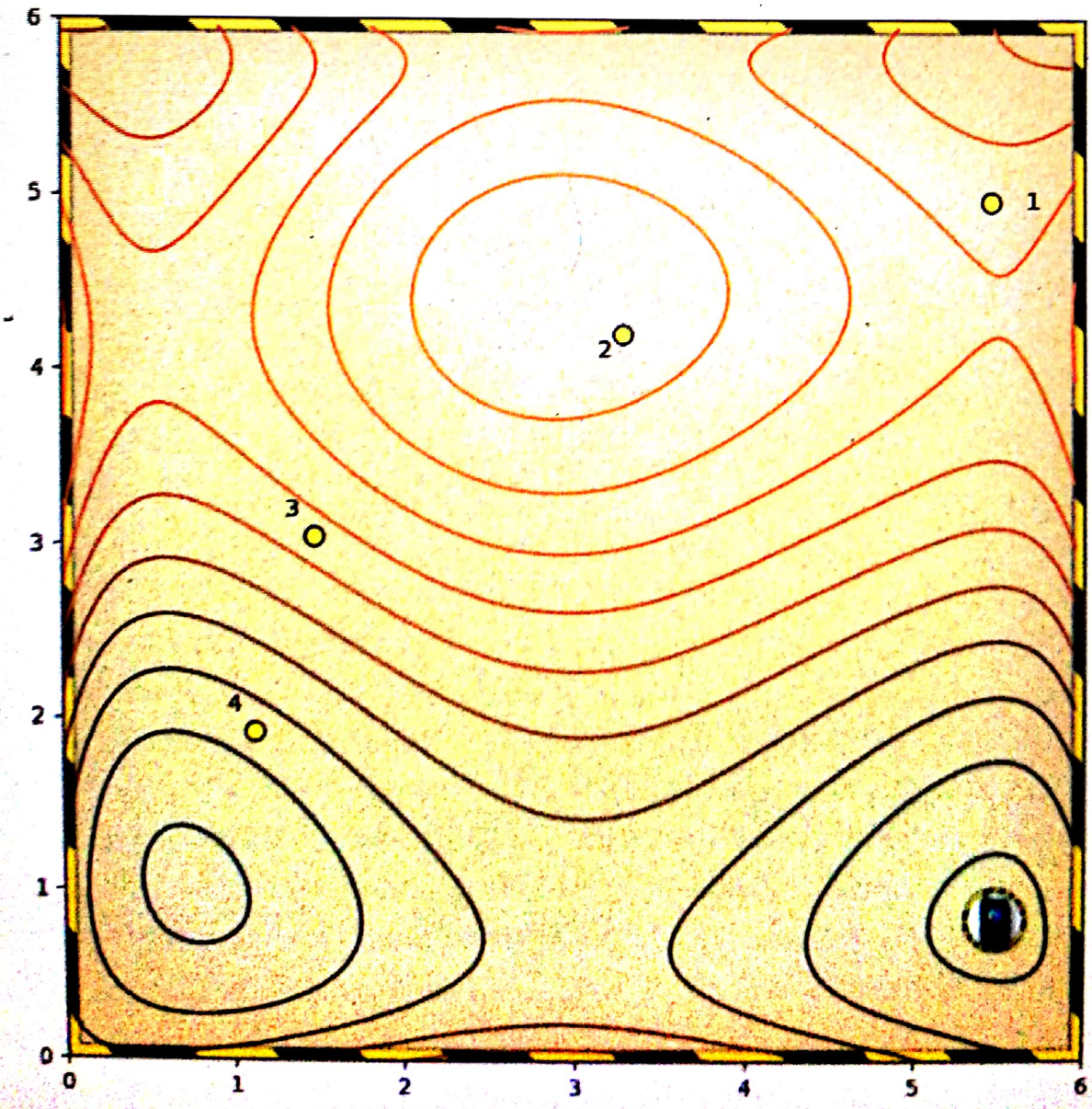
☑ Starting point 5

✓ **Correct**

This should converge to the global minimum.

☐ None of the above

3. Which starting points converge to the global minimum?



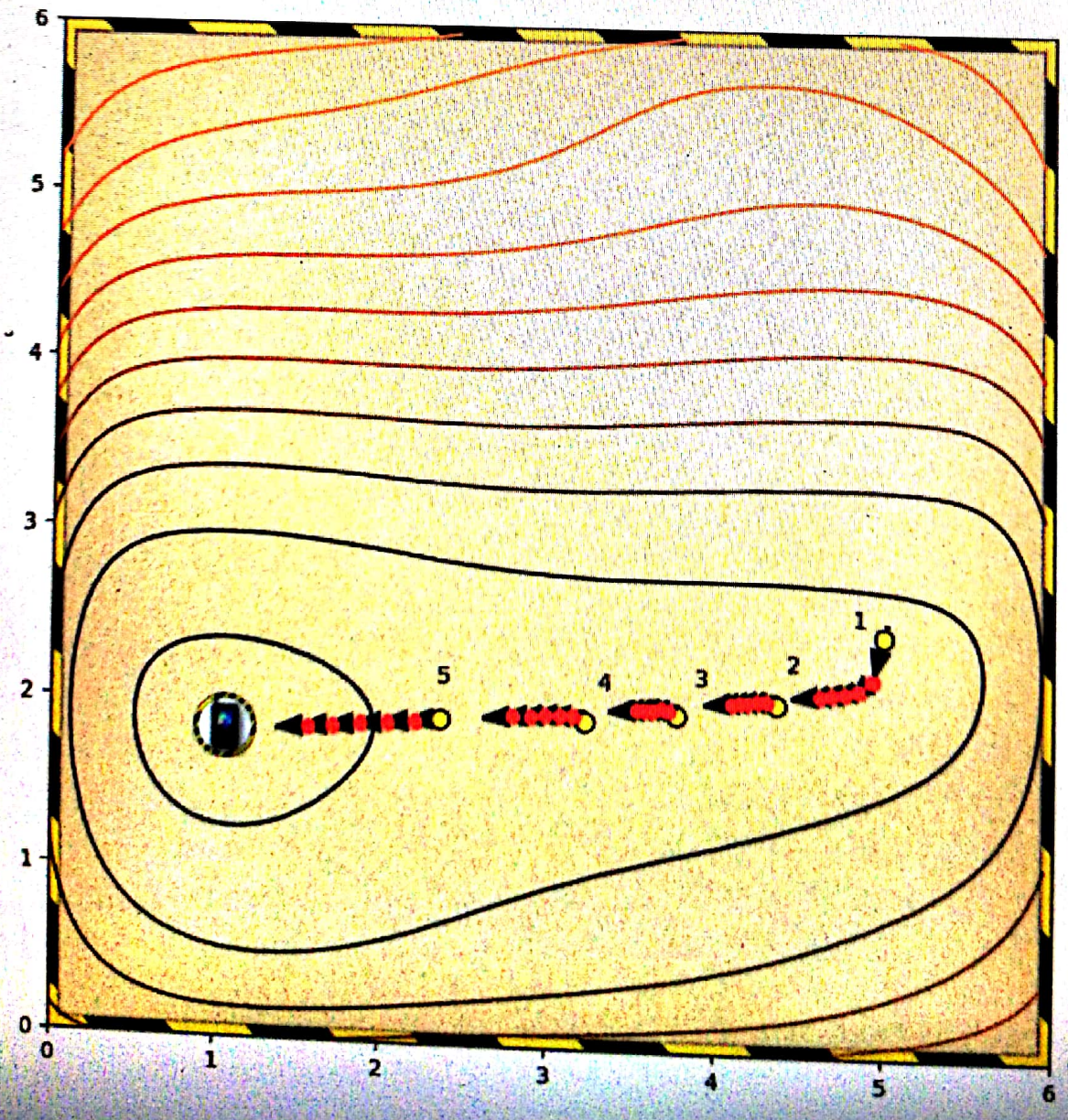
- [ ] Starting point 1
- [x] Starting point 2

✓ **Correct**

From here, the algorithm will descend the hill to the global minimum.

- [ ] Starting point 3
- [ ] Starting point 4
- [ ] None of the above

4. What's happening in this gradient descent?



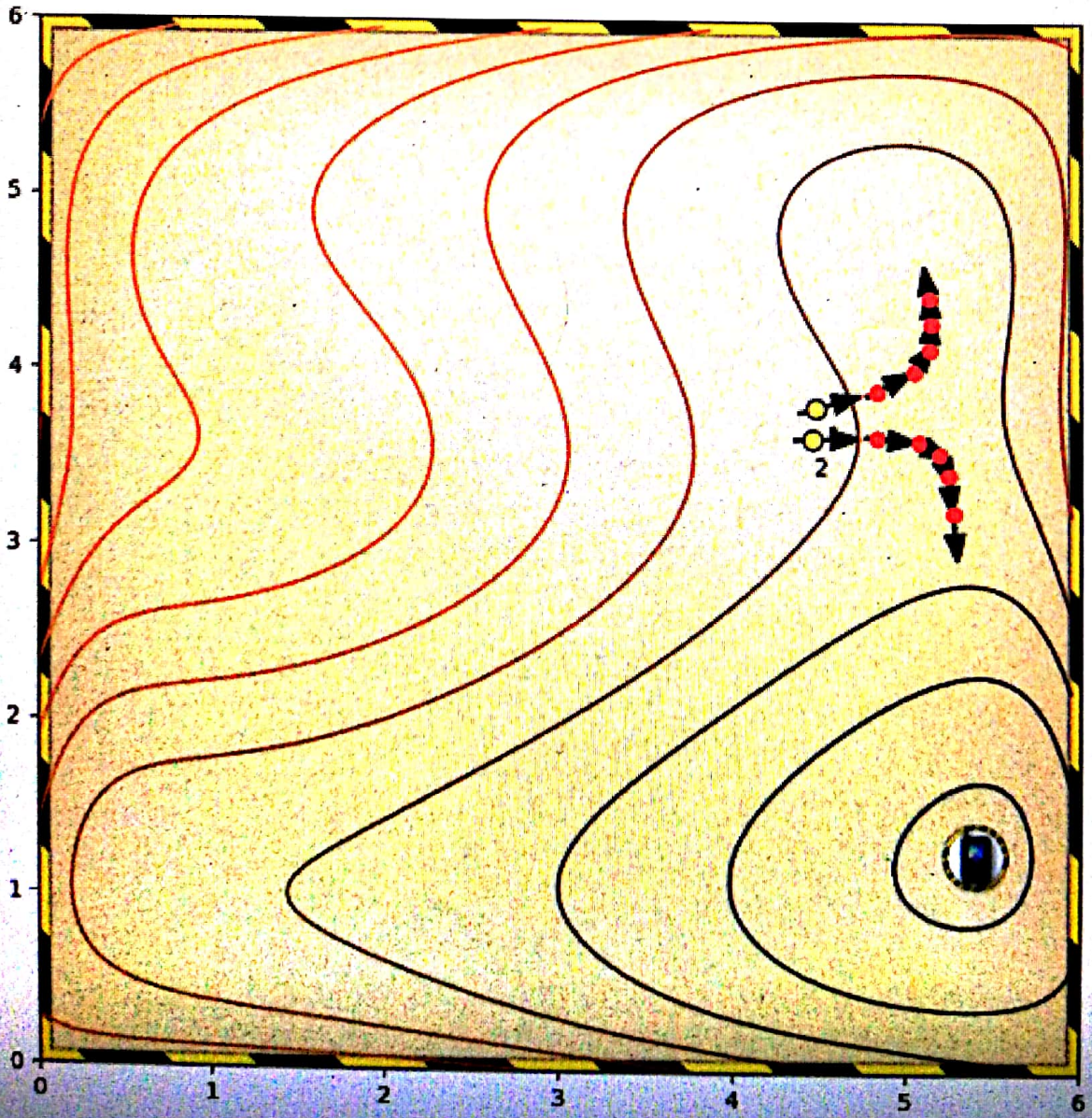
0 1 2 3 4 5 6

- ○ The algorithm is getting stuck near local minima.
- ○ The algorithm is getting stuck near saddle points.
- ○ None of the other options.
- ◉ The global minimum is in a wide and flat basin, so convergence is slow.

✓ **Correct**

This could be improved by increasing the aggression.

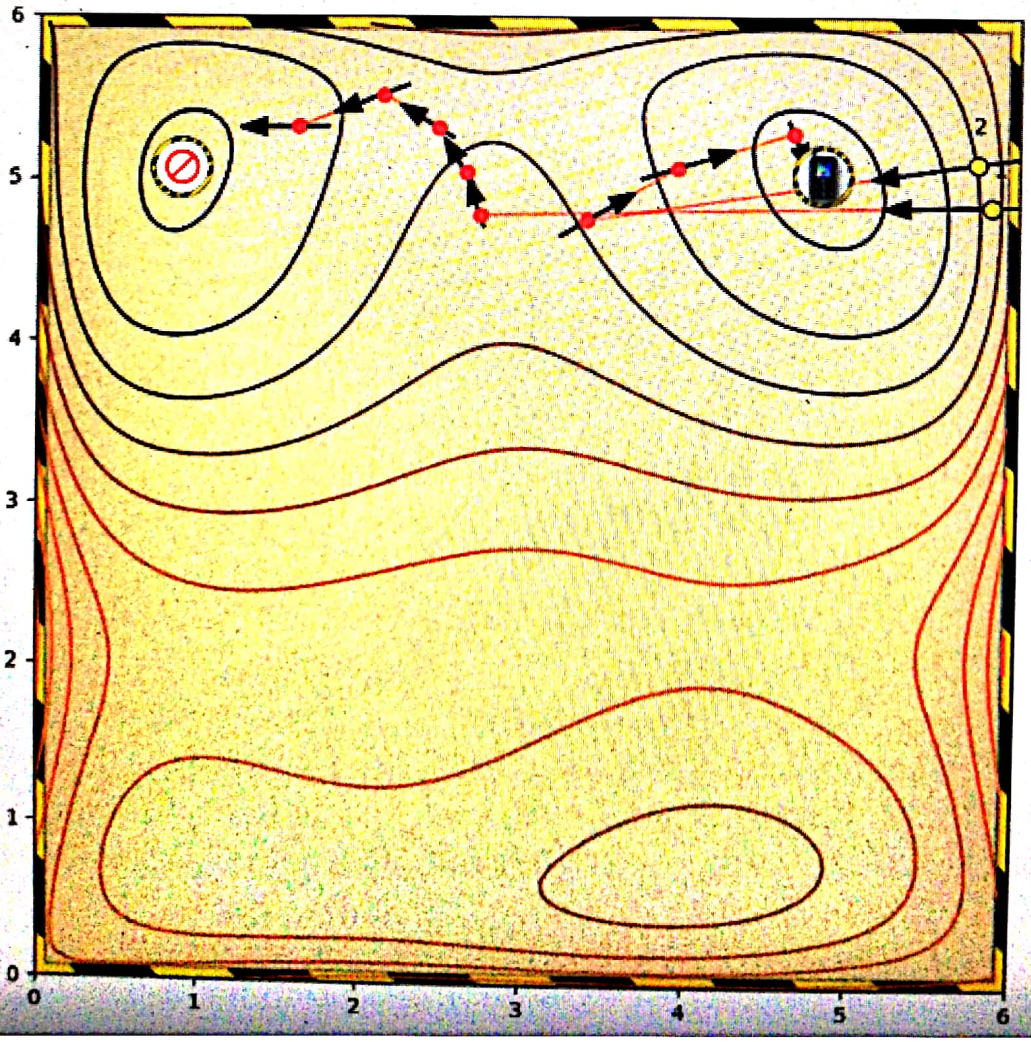
5. What is happening here?



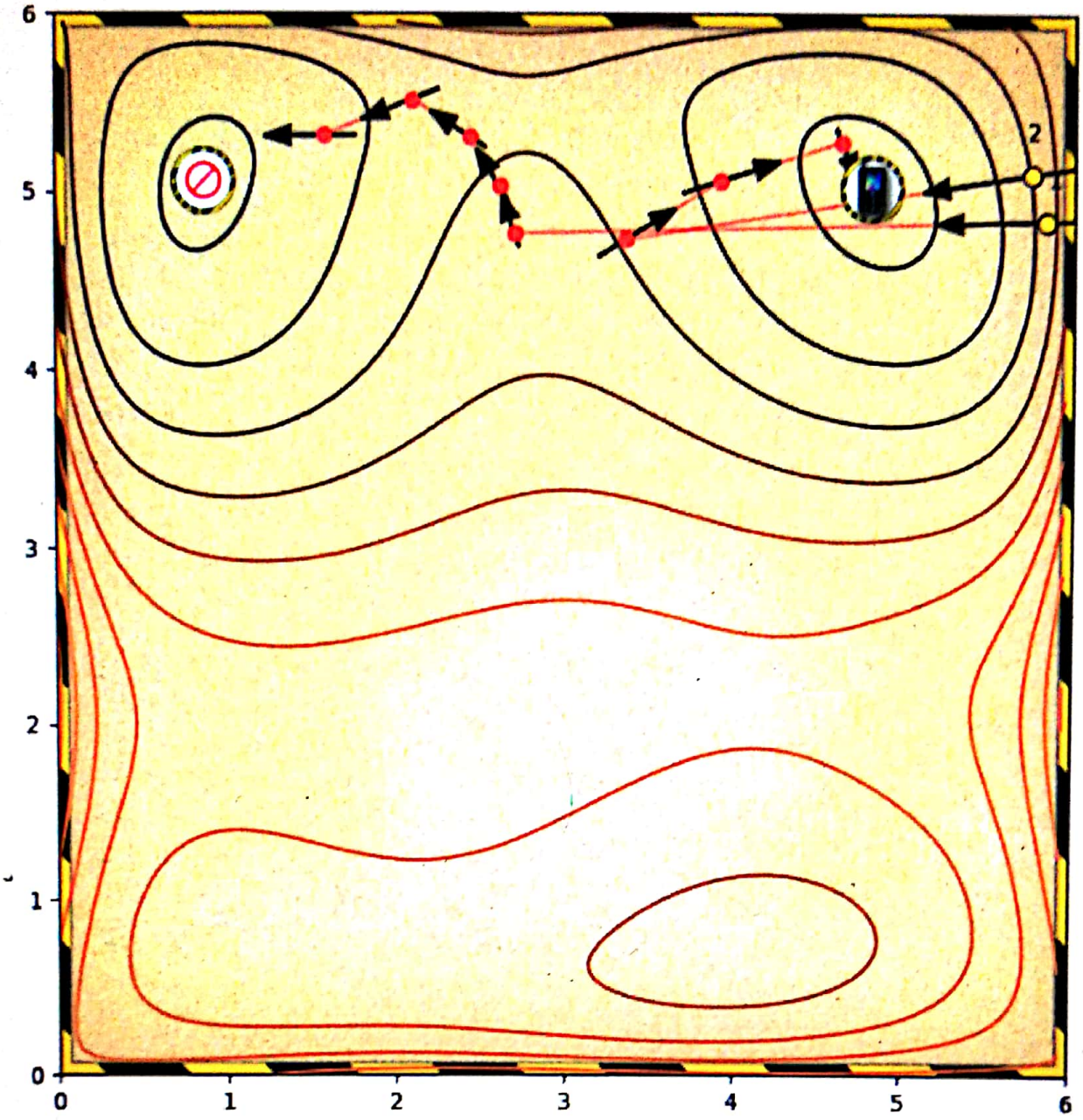
- ○ There is noise in the system.
- ○ The algorithm is passing either side of a local maximum.
- ○ None of the other options.
- ◉ The algorithm is passing either side of a saddle point.
- ○ The algorithm is passing either side of a local minimum.

✓ **Correct**

6. What is happening here?



6. What is happening here?



- ○ There is noise in the system
- ○ None of the other options.
- ○ The marked points are saddle points.
- ◉ The Jacobian at the starting point is very large.

✓ **Correct**

This is causing the algorithm to overshoot. In one case into a different basin.