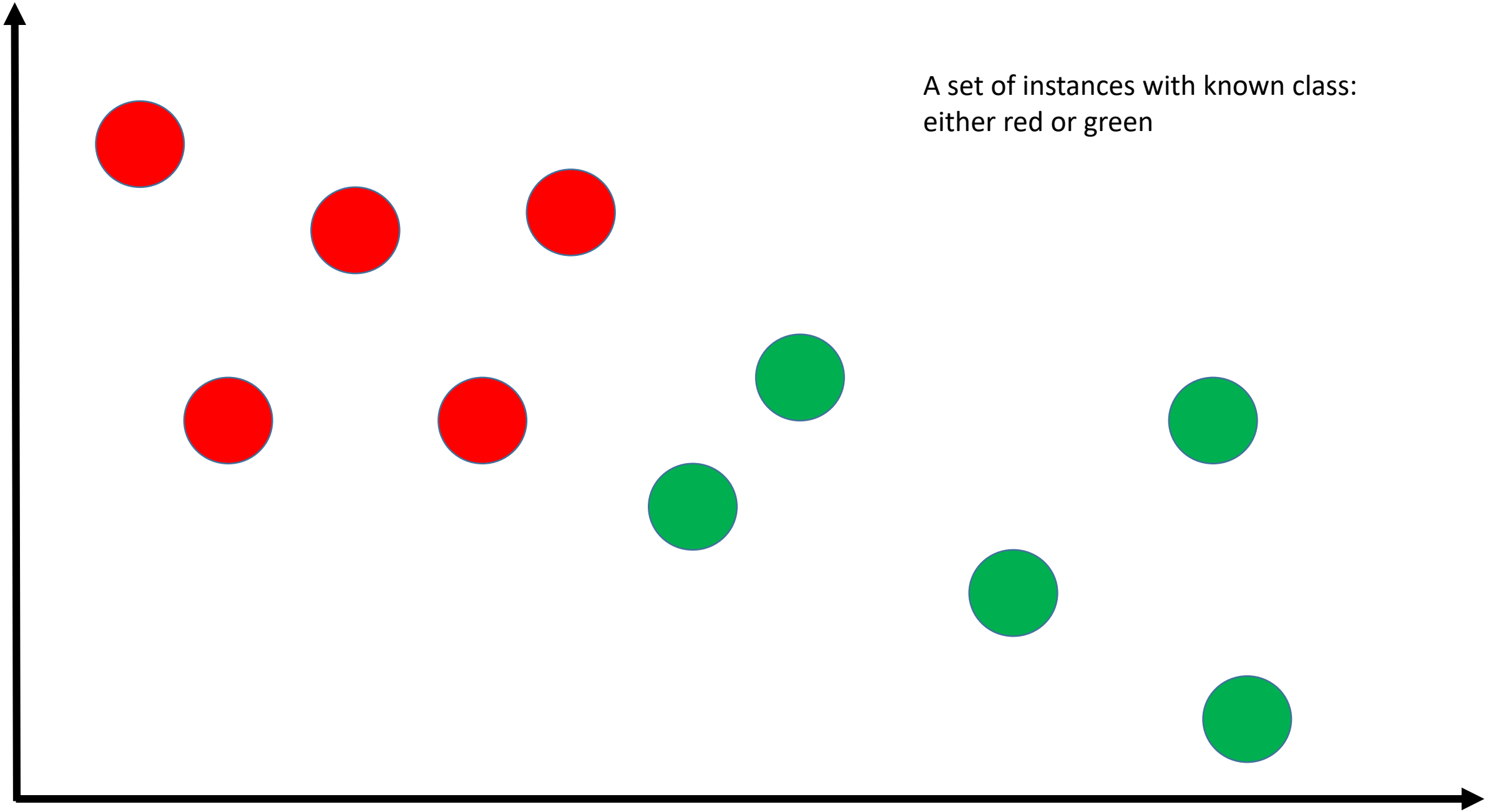
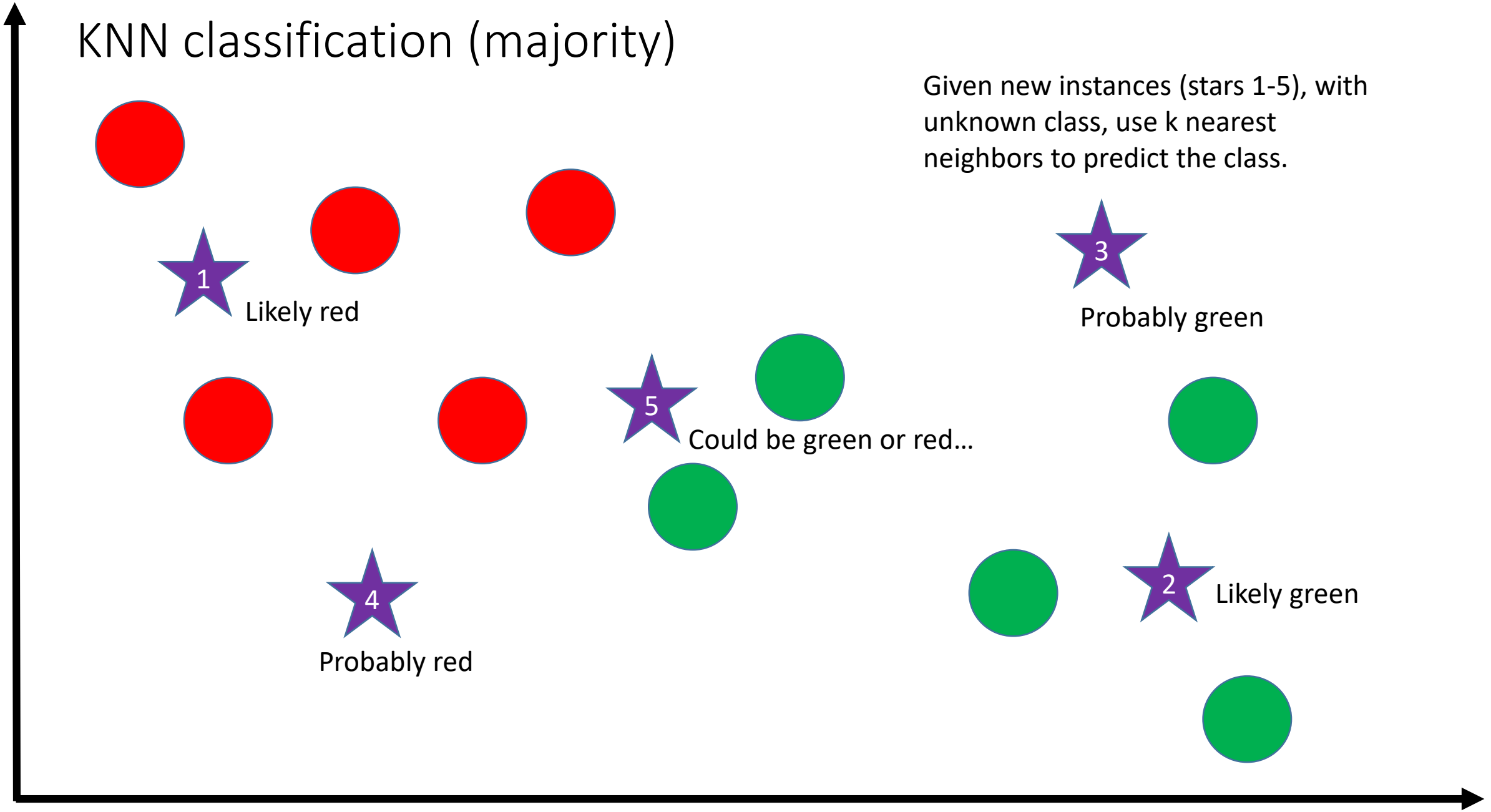
KNN Demo

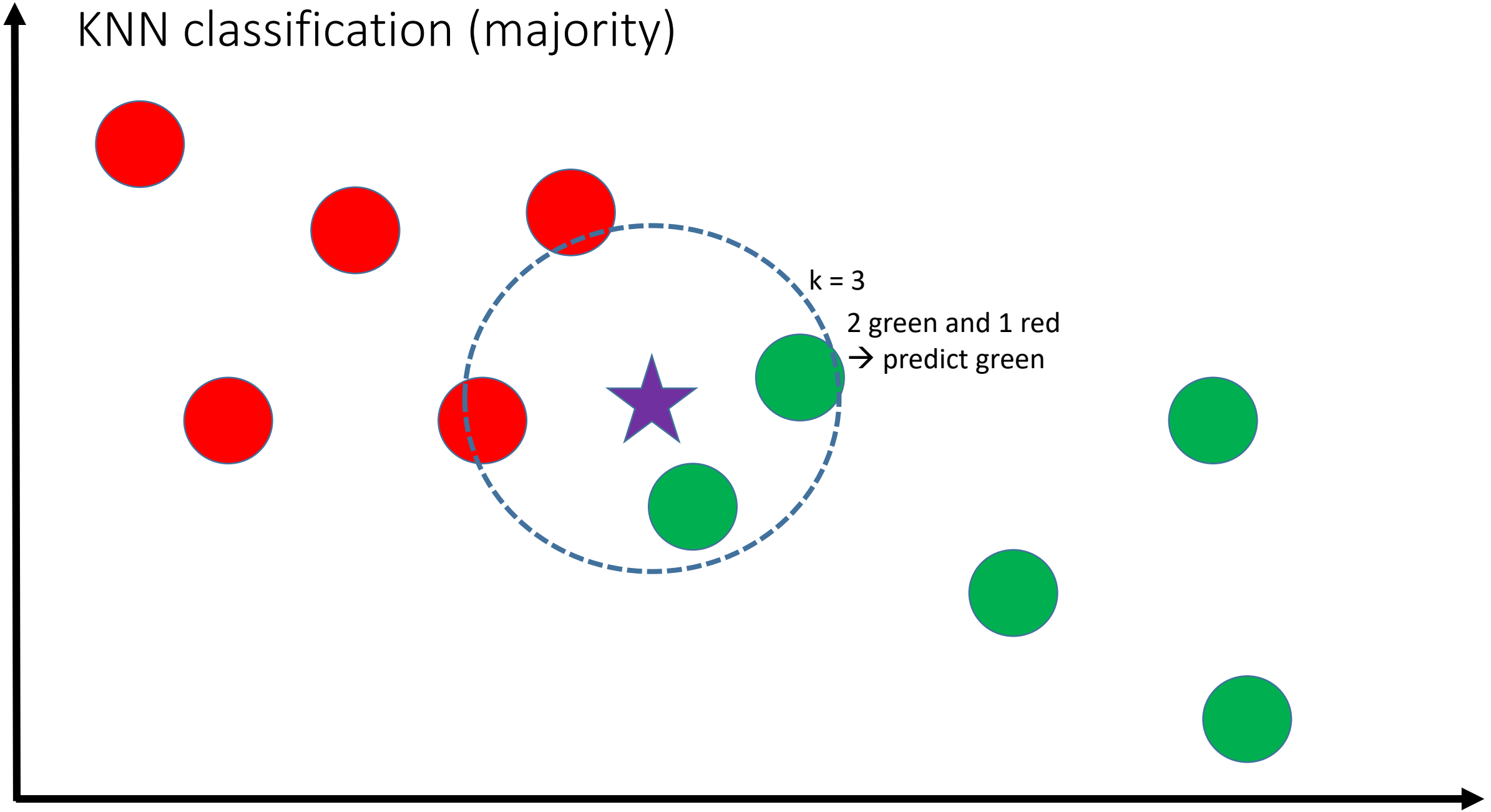
- KNN: majority class
- KNN: distance-weighted nearest neighbor
- Confusion Matrix


A set of instances with known class:
either red or green

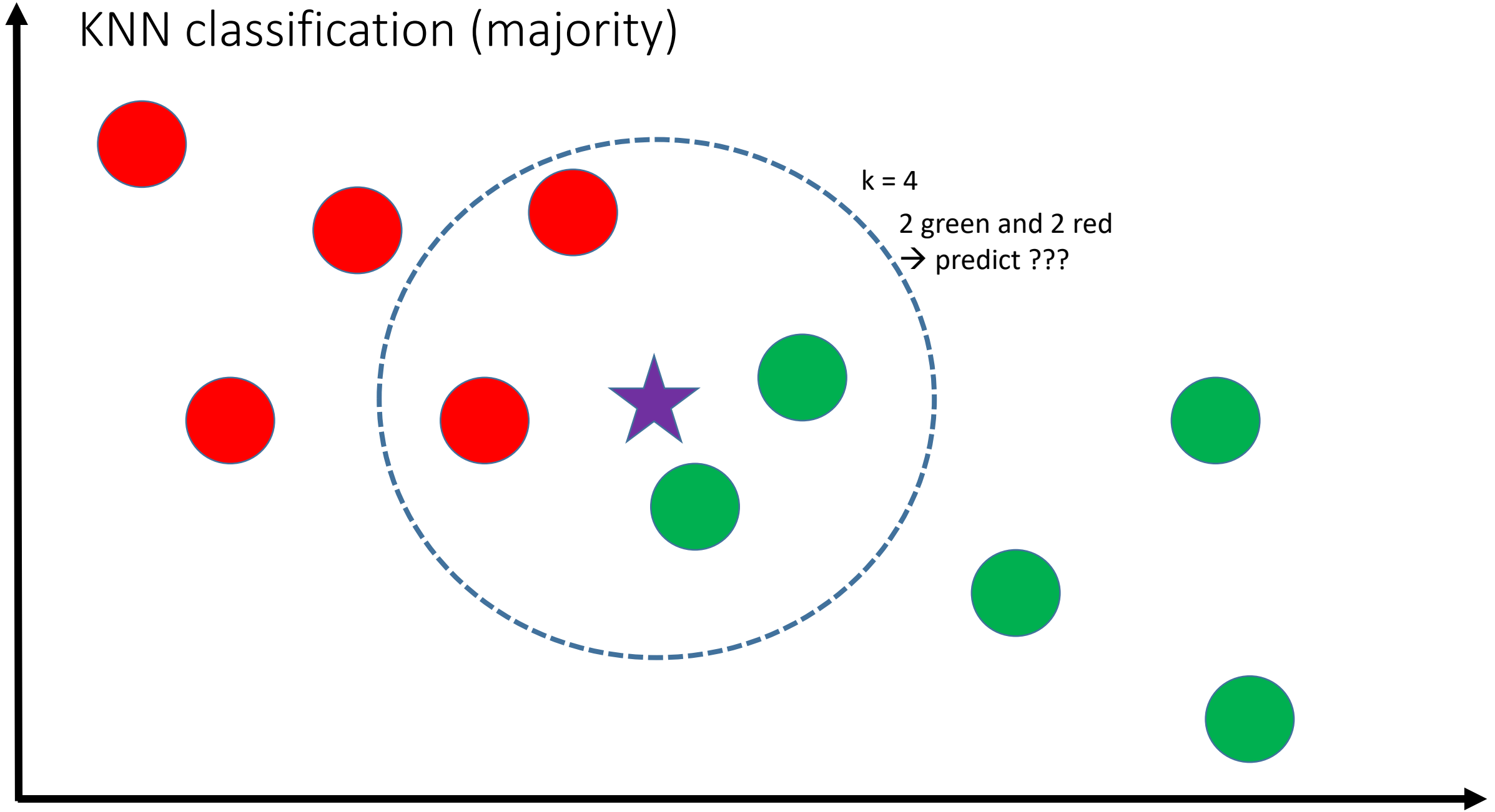
KNN classification (majority)



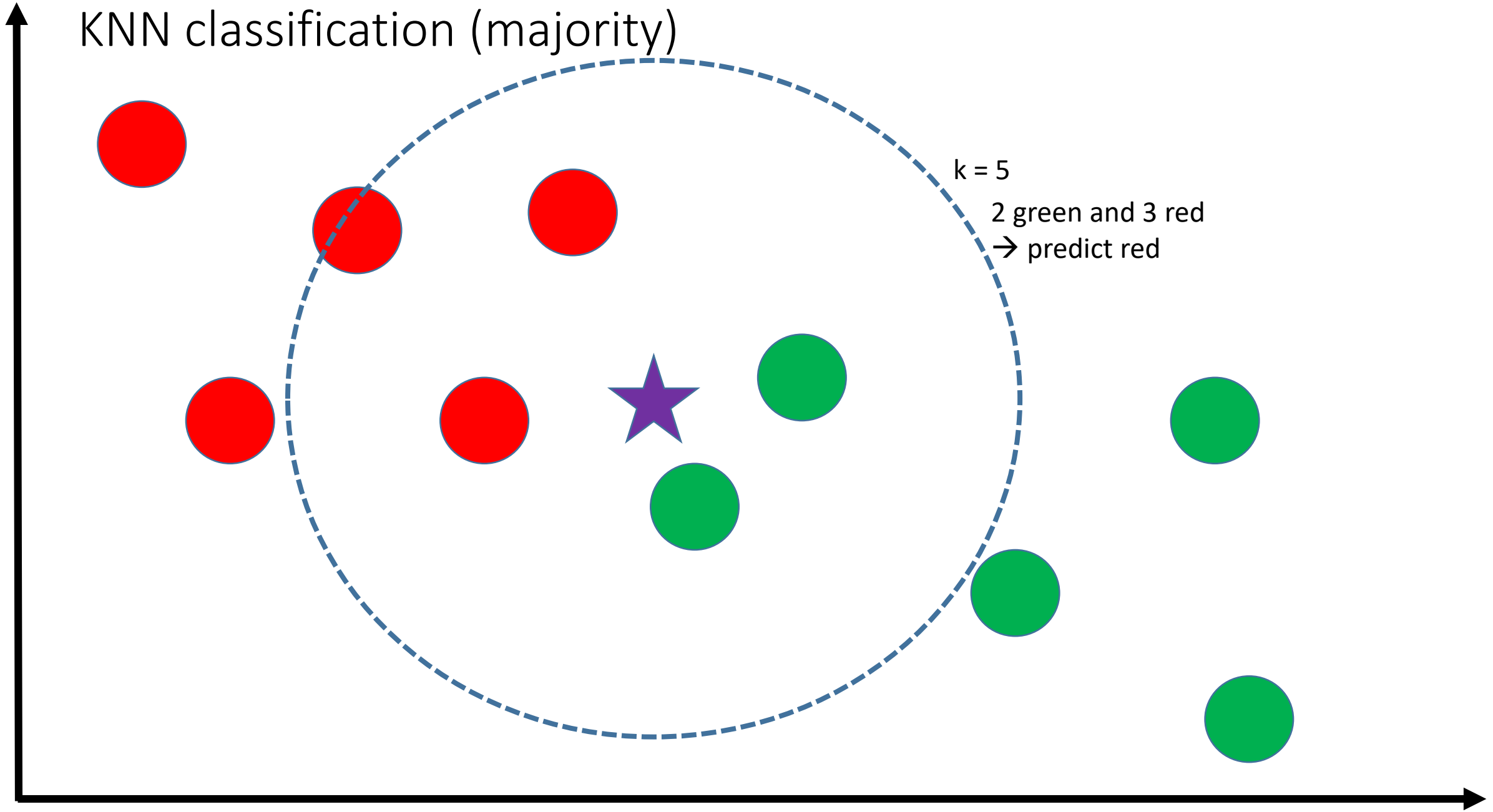
KNN classification (majority)



KNN classification (majority)

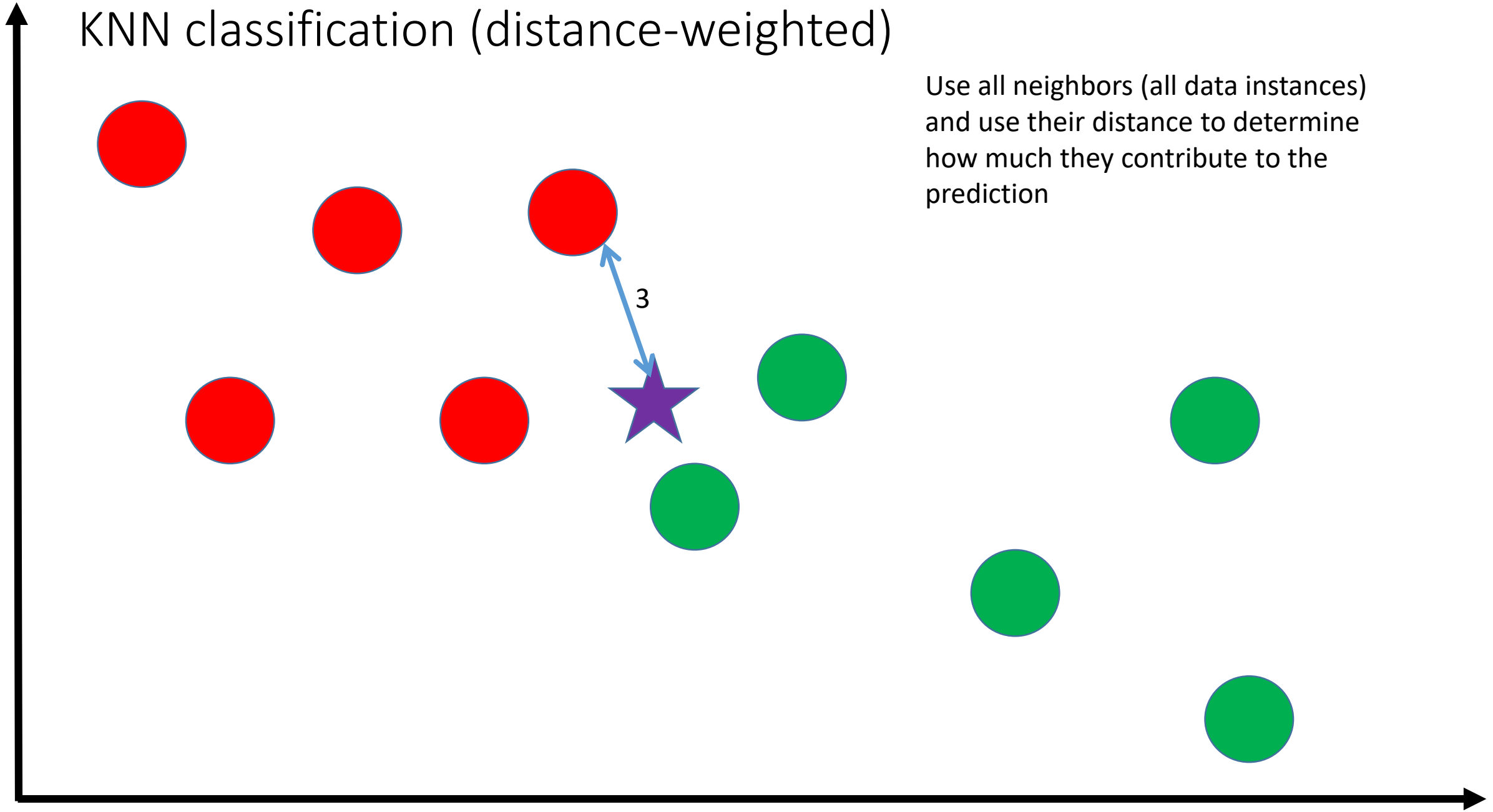


KNN classification (majority)



KNN classification (distance-weighted)

Use all neighbors (all data instances) and use their distance to determine how much they contribute to the prediction



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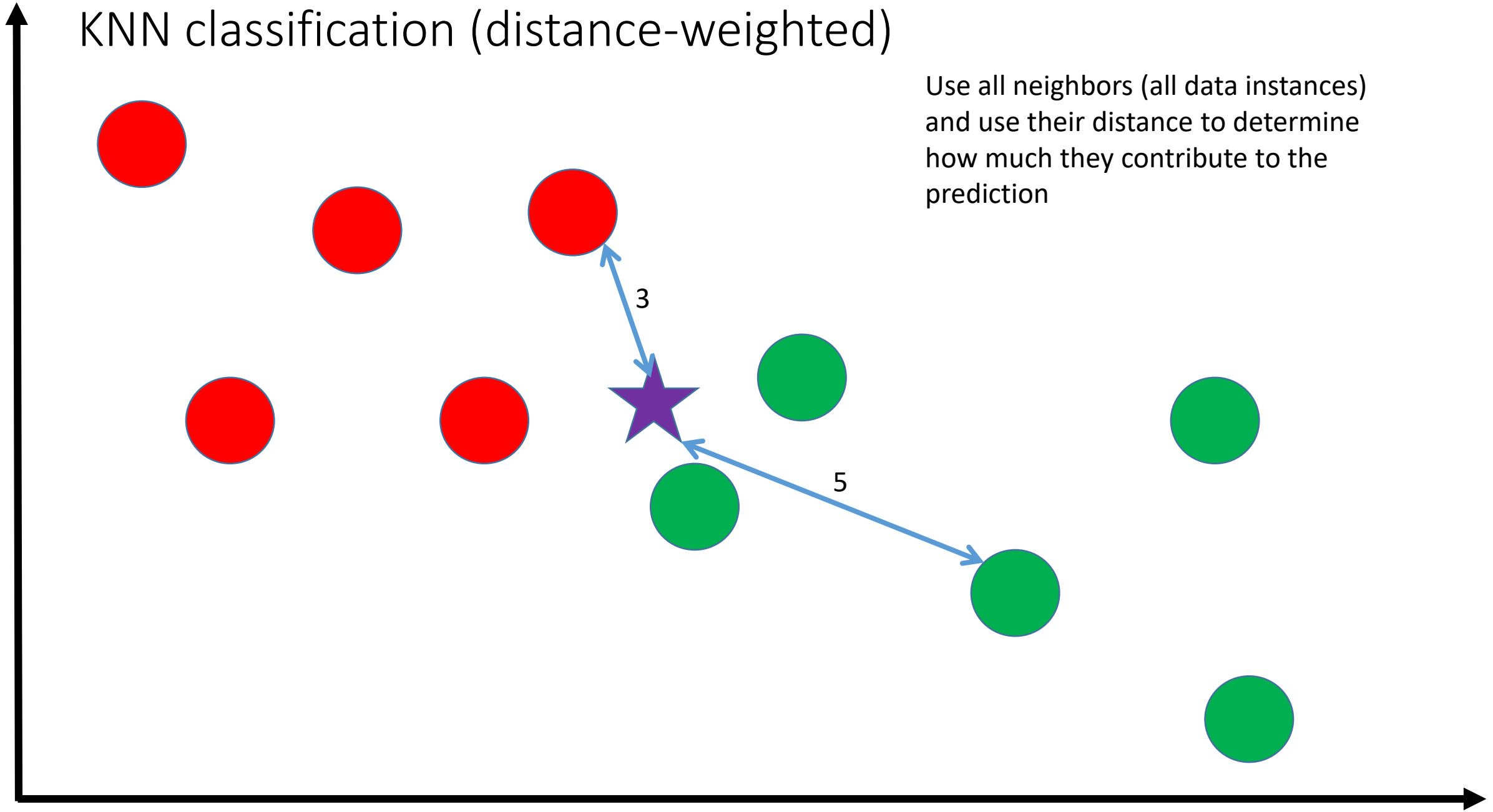
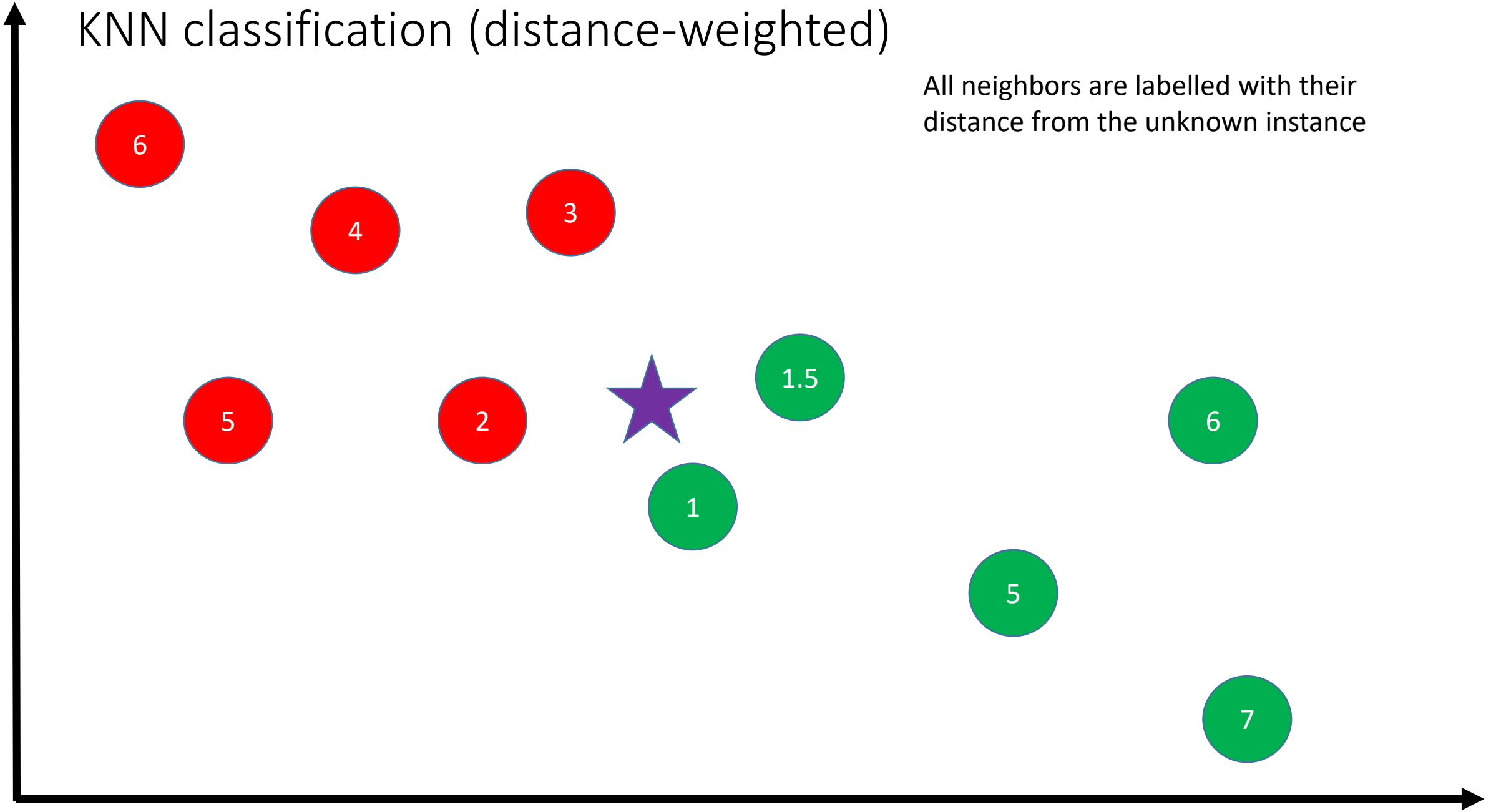
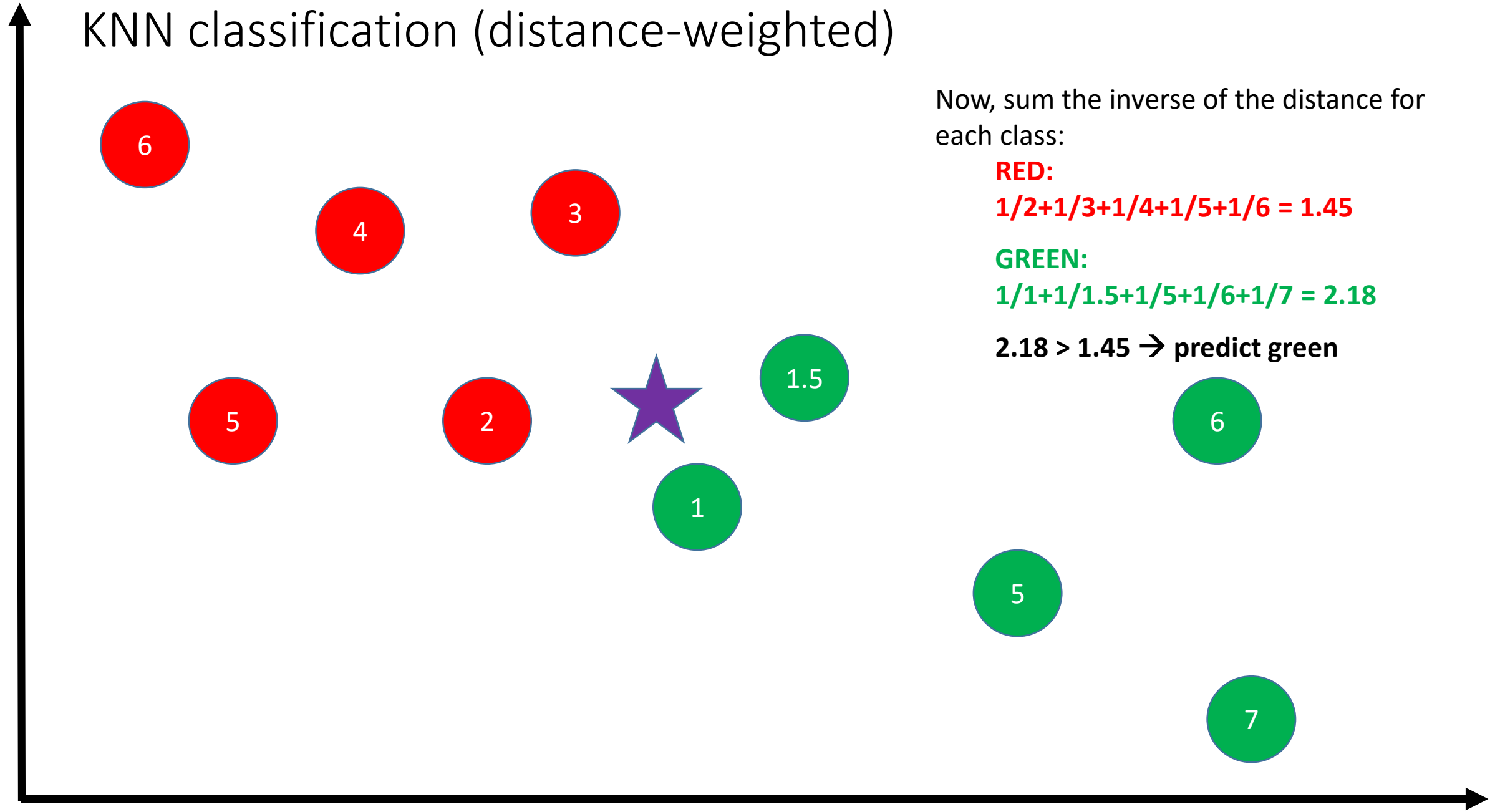


KNN classification (distance-weighted)

All neighbors are labelled with their distance from the unknown instance



KNN classification (distance-weighted)



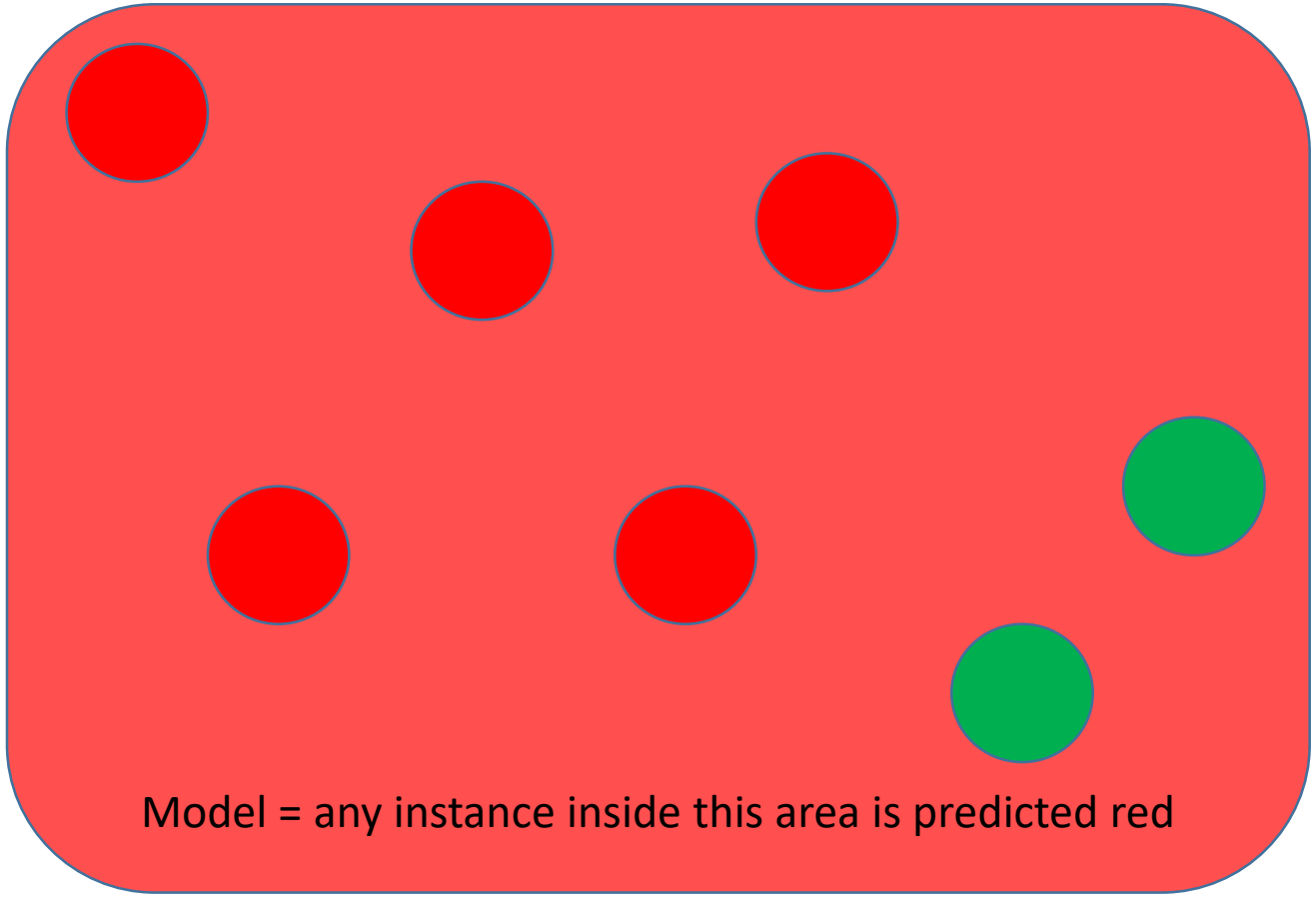
Now, sum the inverse of the distance for each class:

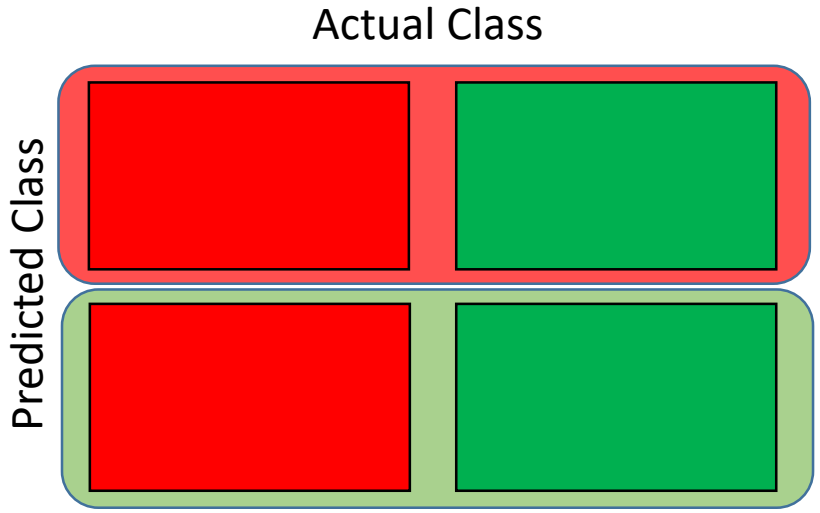
RED:
1/2+1/3+1/4+1/5+1/6 = 1.45

GREEN:
1/1+1/1.5+1/5+1/6+1/7 = 2.18

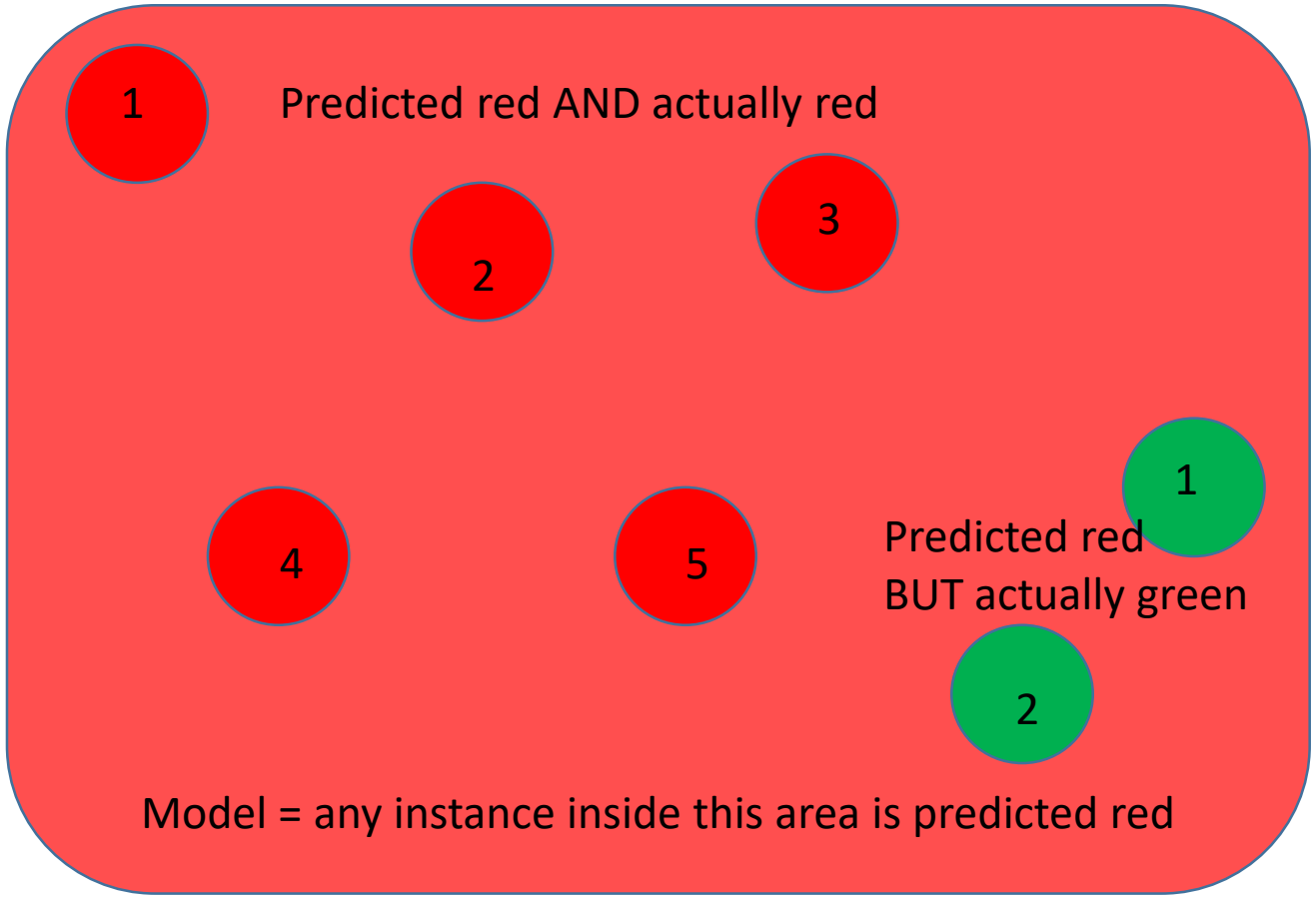
2.18 > 1.45 → predict green

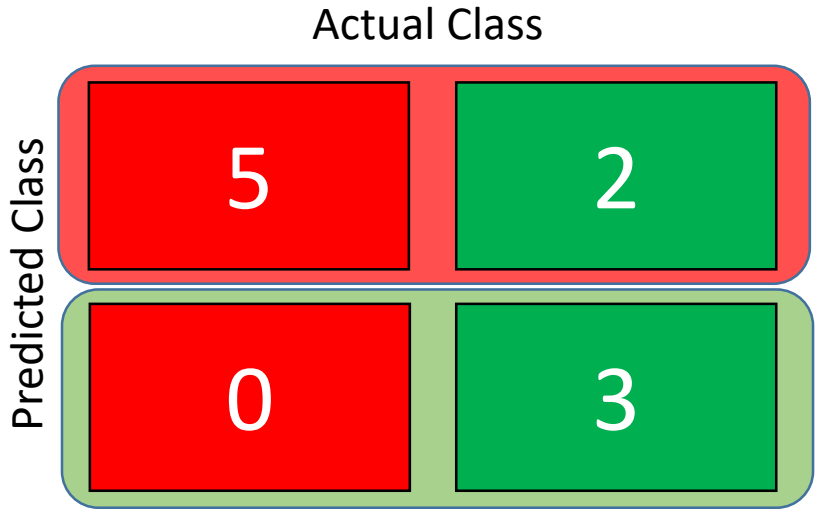
Confusion Matrix

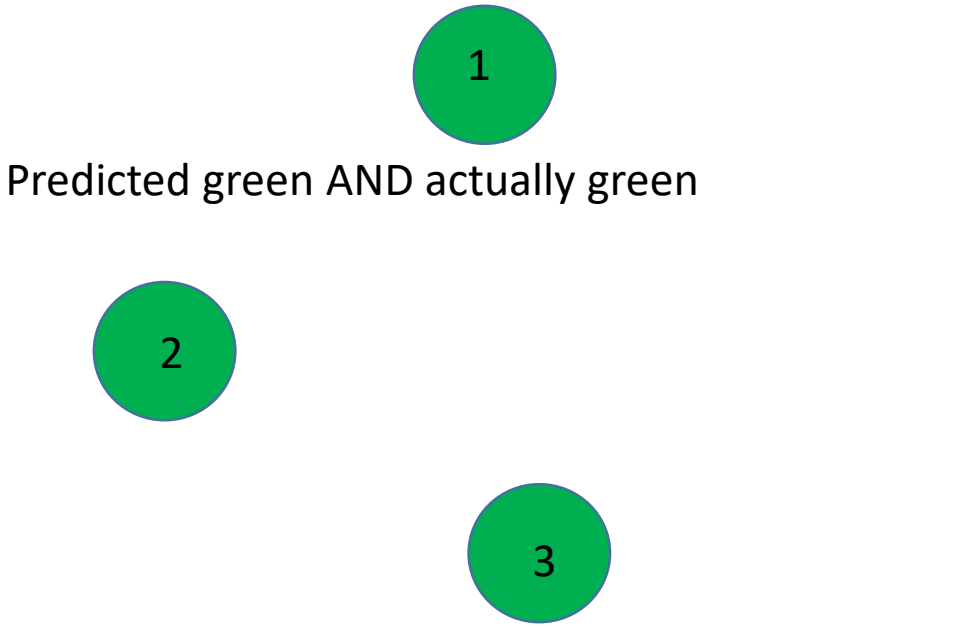




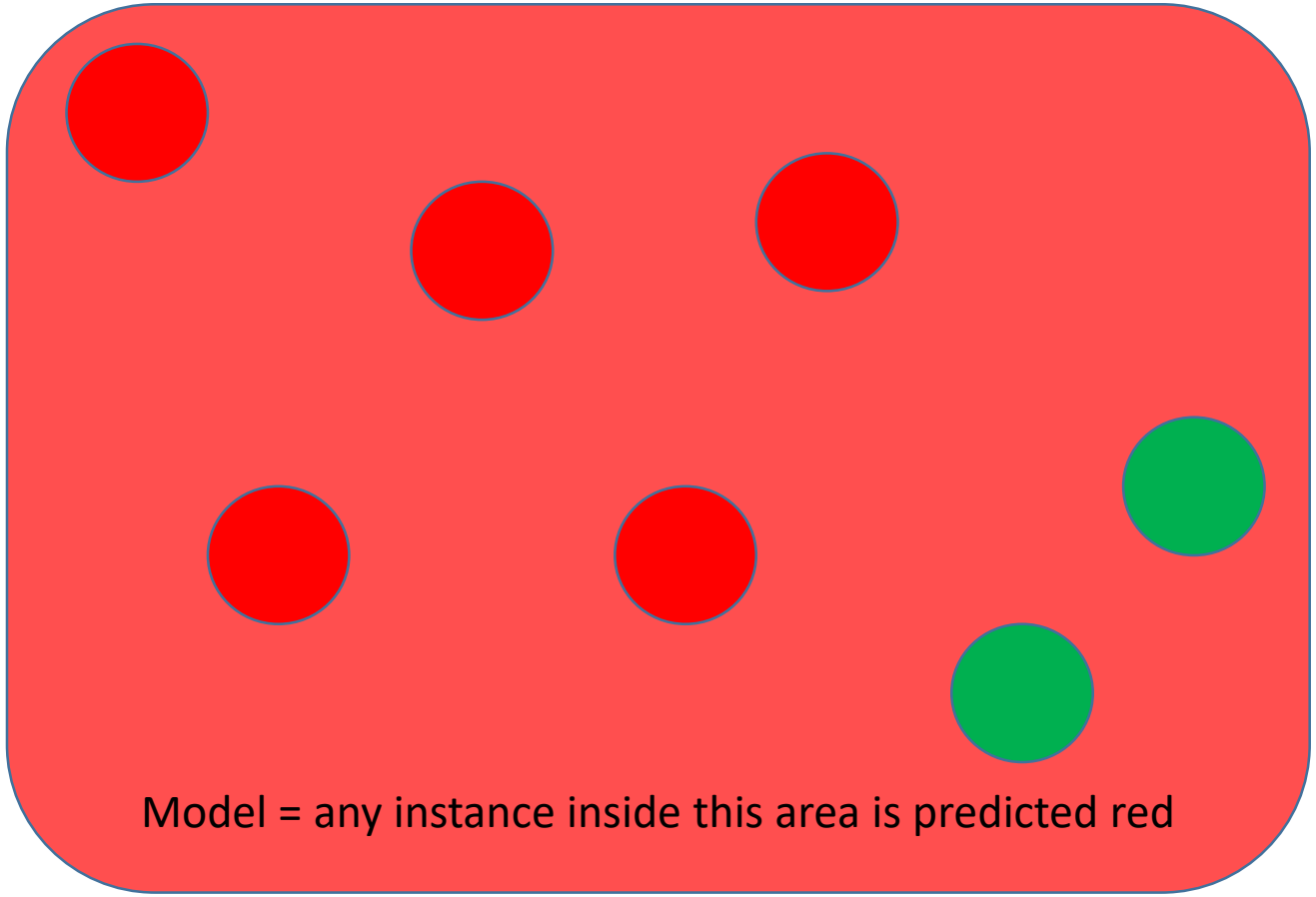
Confusion Matrix







Confusion Matrix

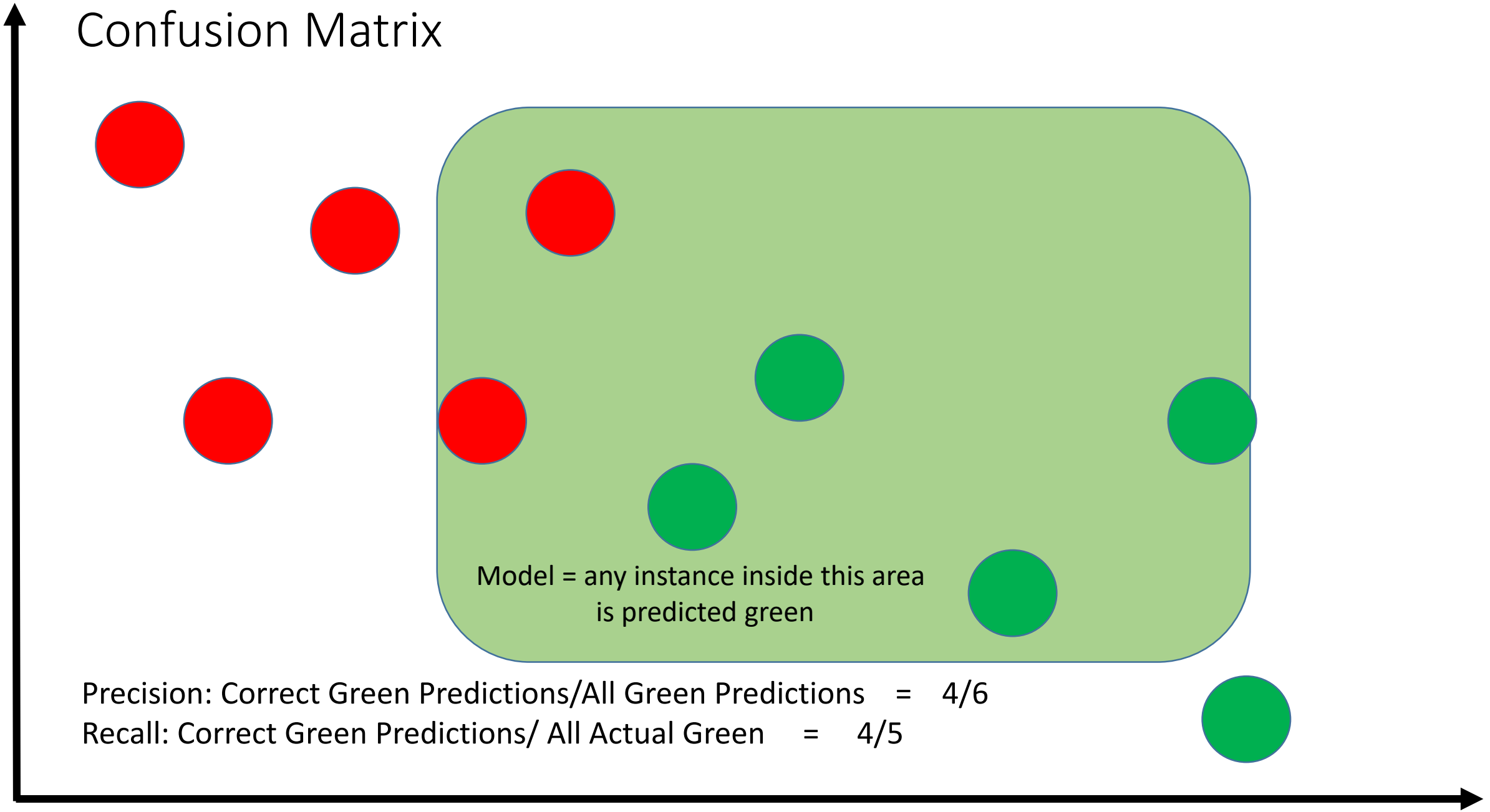


Predicted Class \ Actual Class		
	5	2
	0	3

Precision: Correct Red Predictions/All Red Predictions = 5/7

Recall: Correct Red Predictions/ All Actual Red = 5/5

Confusion Matrix



Precision: Correct Green Predictions/All Green Predictions = 4/6

Recall: Correct Green Predictions/ All Actual Green = 4/5