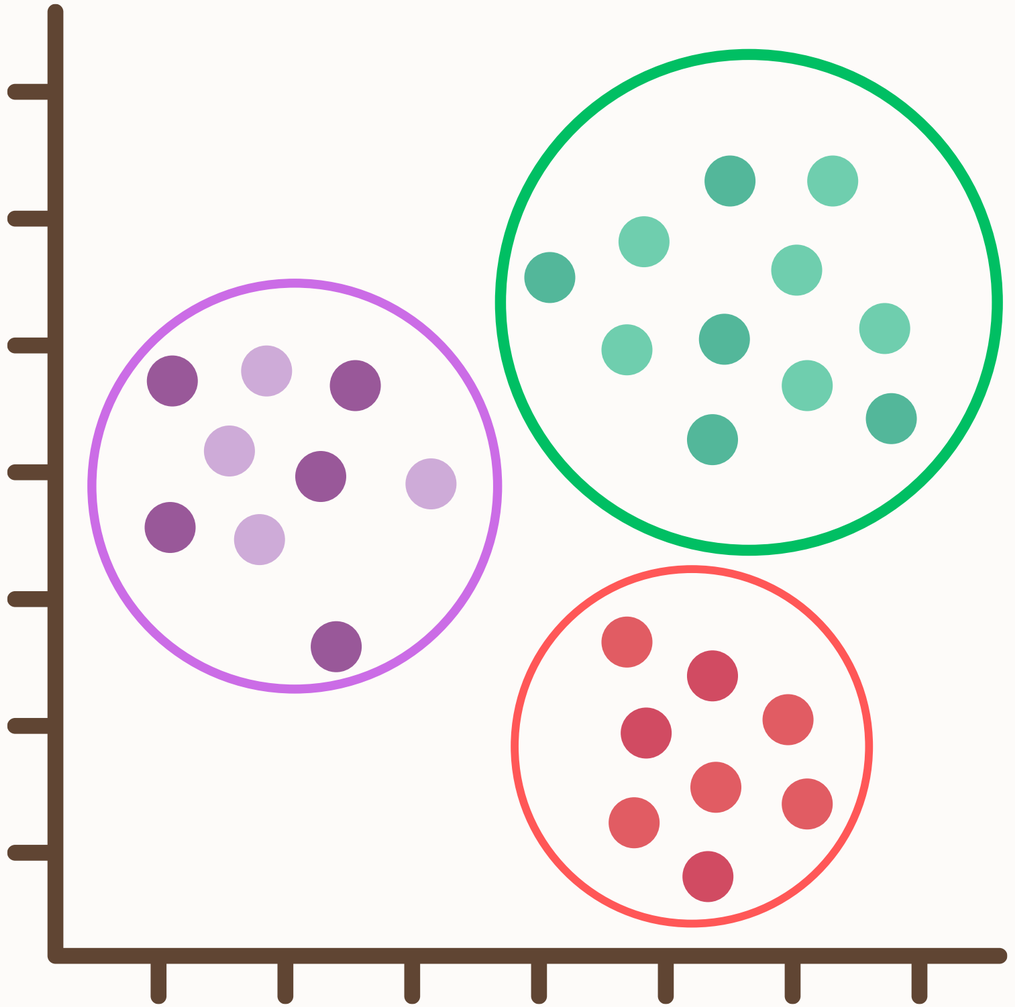
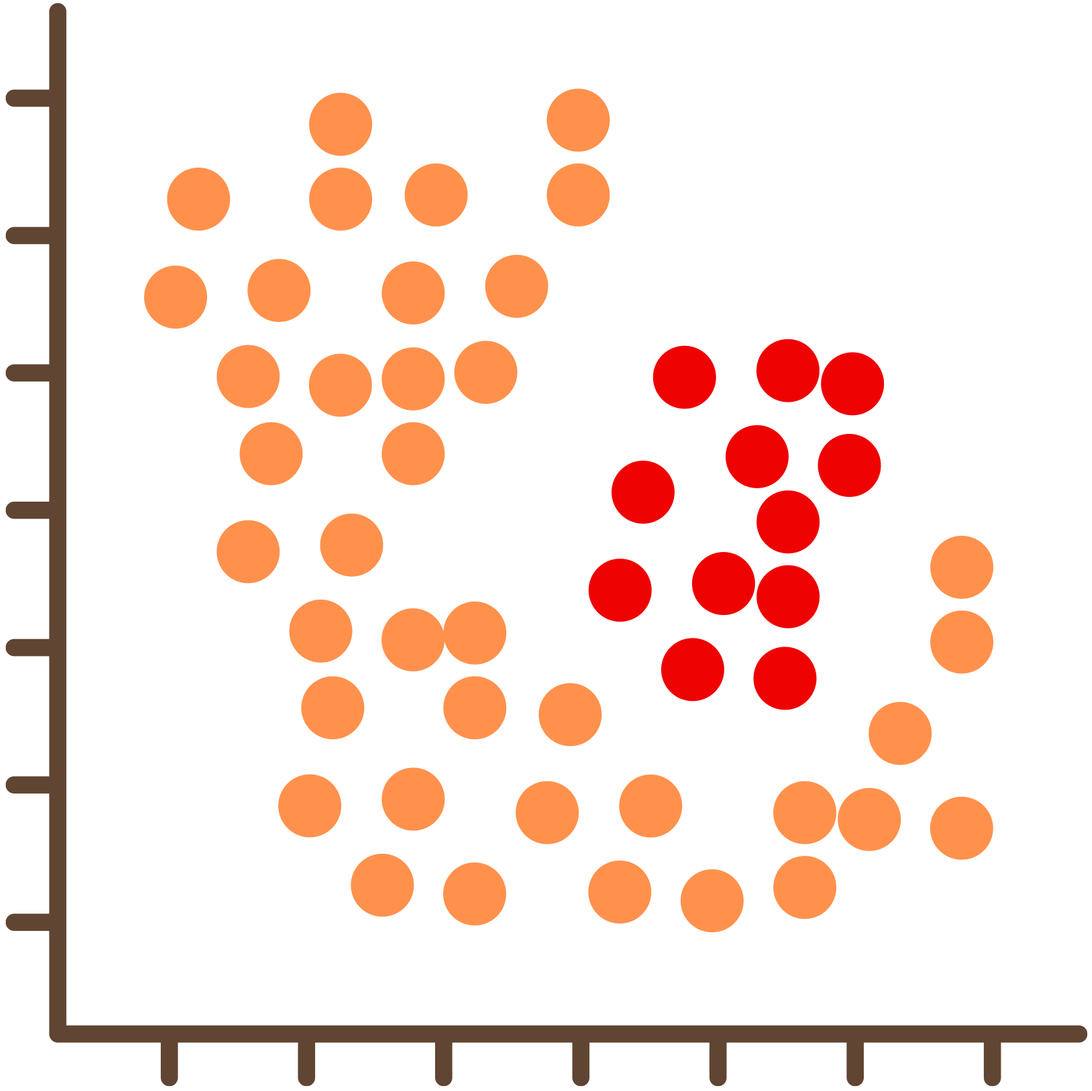
K-means can help us here

codefinity



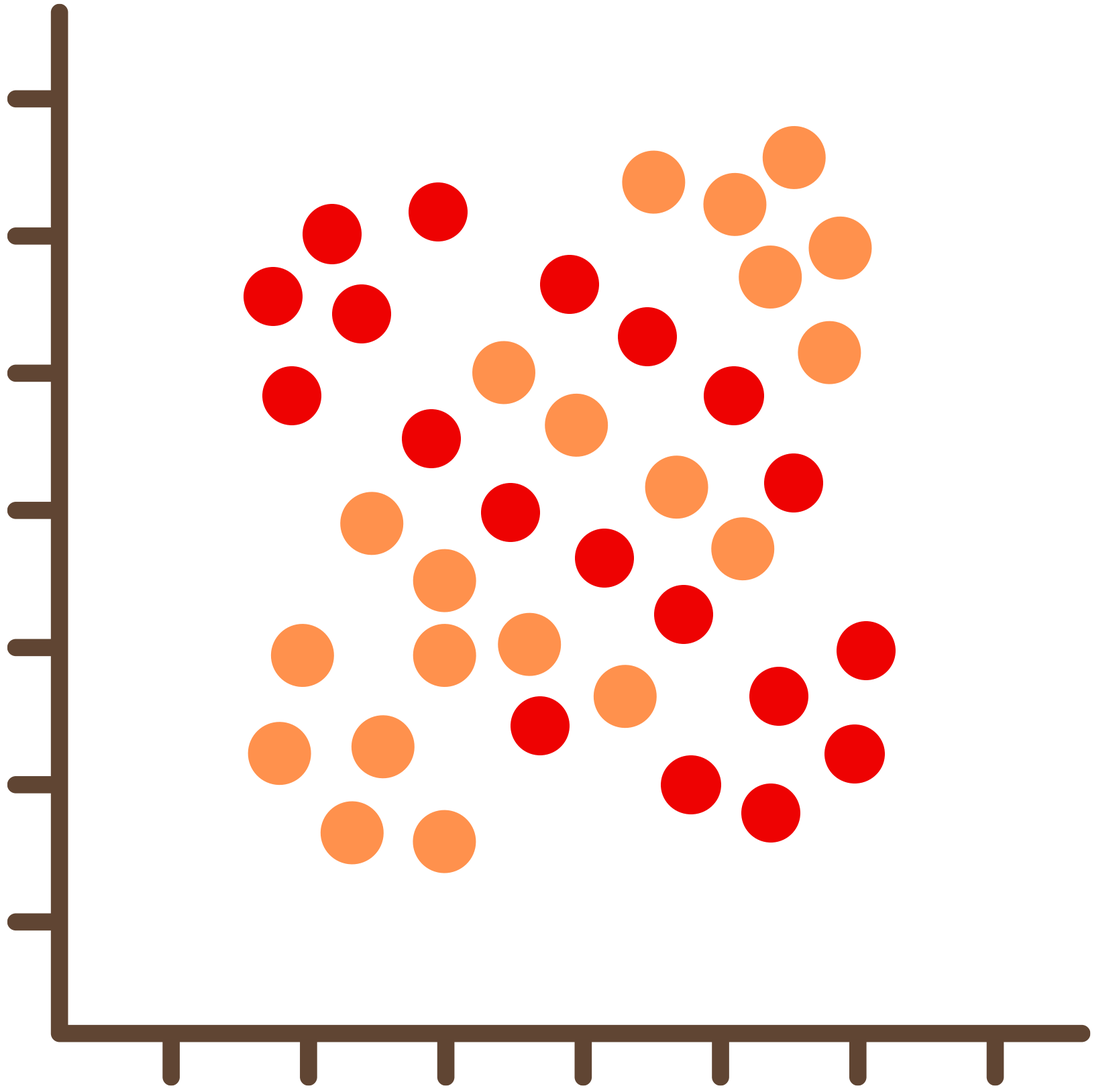
DBSCAN can help us here



codefinity

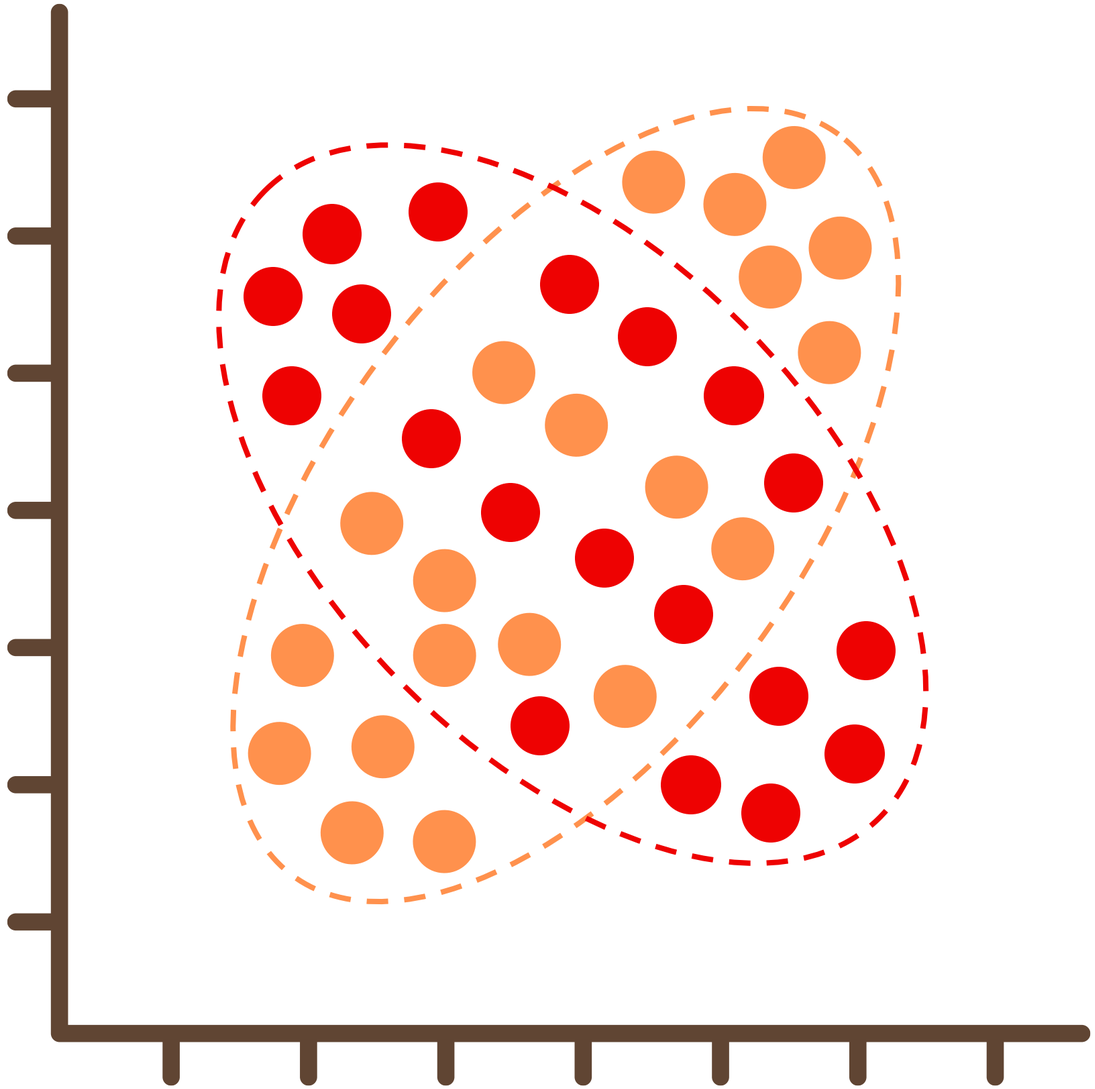
How about this type of Data?

codefinity



Gaussian Mixture Model

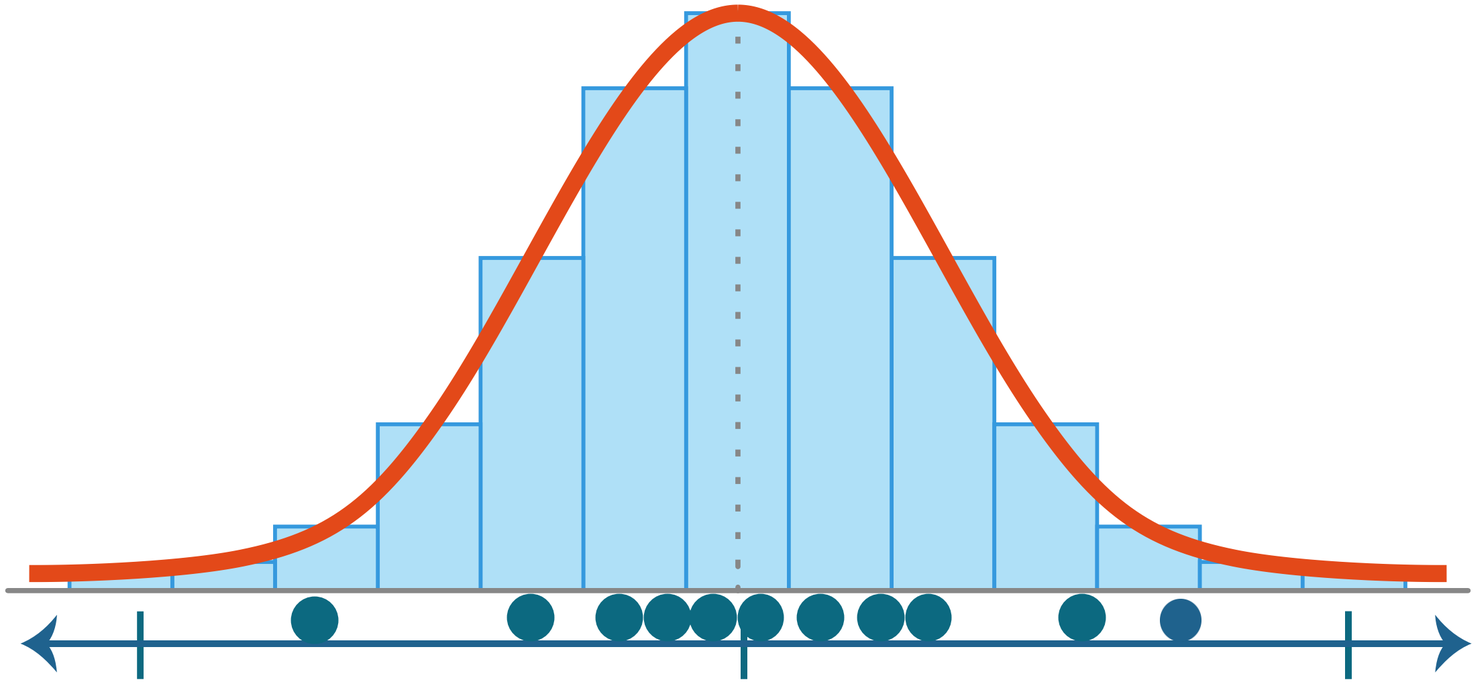
codefinity

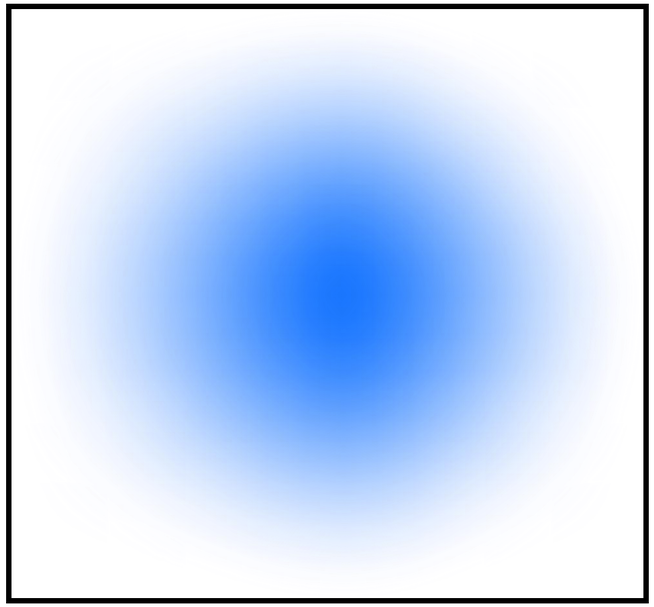


What is Gaussian?

codefinity

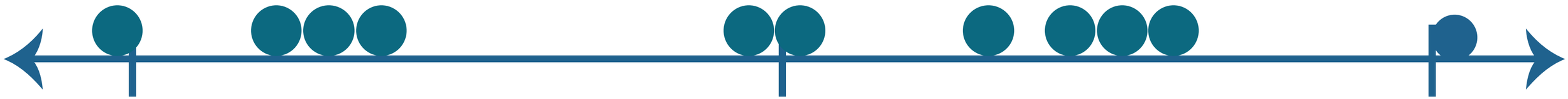
Gaussian Distribution vs Normal Distribution





How Gaussian Mixture Model Works

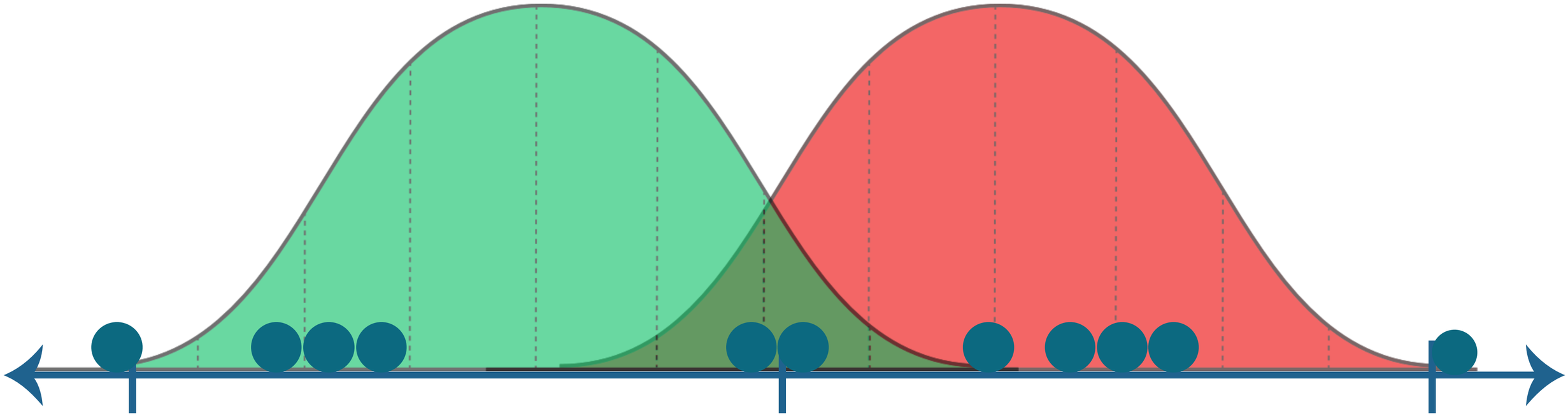
codefinity



How Gaussian Mixture Model Works

codefinity

Step 1: Pick a random number of Gaussians



How Gaussian Mixture Model Works

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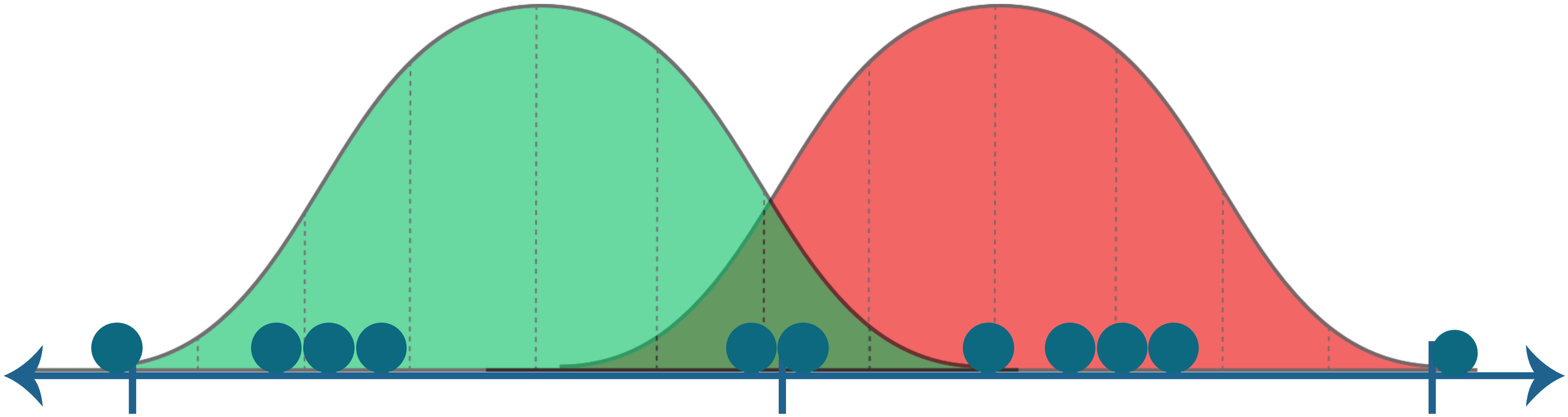
Step 2: Calculate the probability of each point’s belongingness



How Gaussian Mixture Model Works

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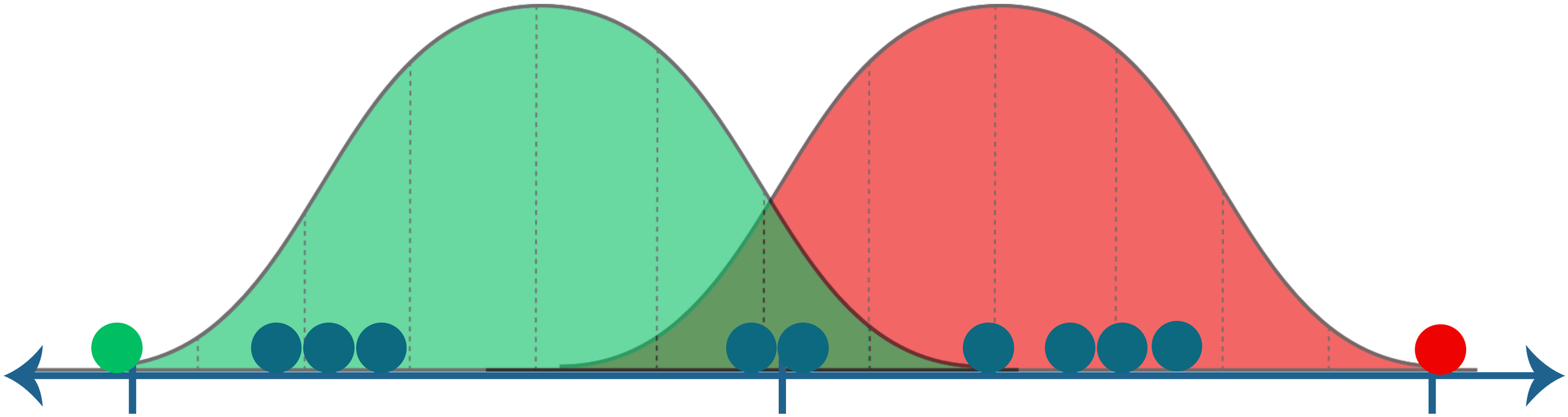

How Gaussian Mixture Model Works

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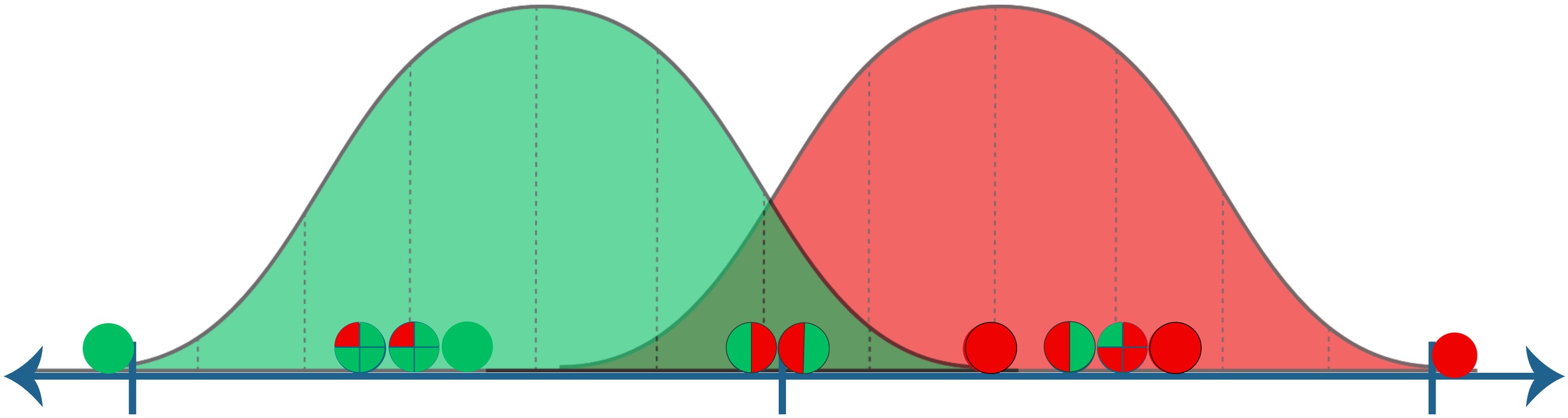
Step 2: Calculate the probability of each point’s belongingness

This process is called
“Responsibility”



How Gaussian Mixture Model Works

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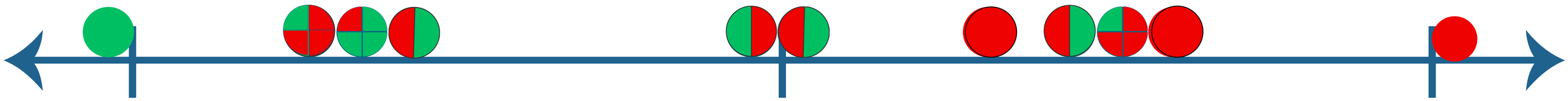
Step 3: Shifting the Gaussians according to the points



How Gaussian Mixture Model Works

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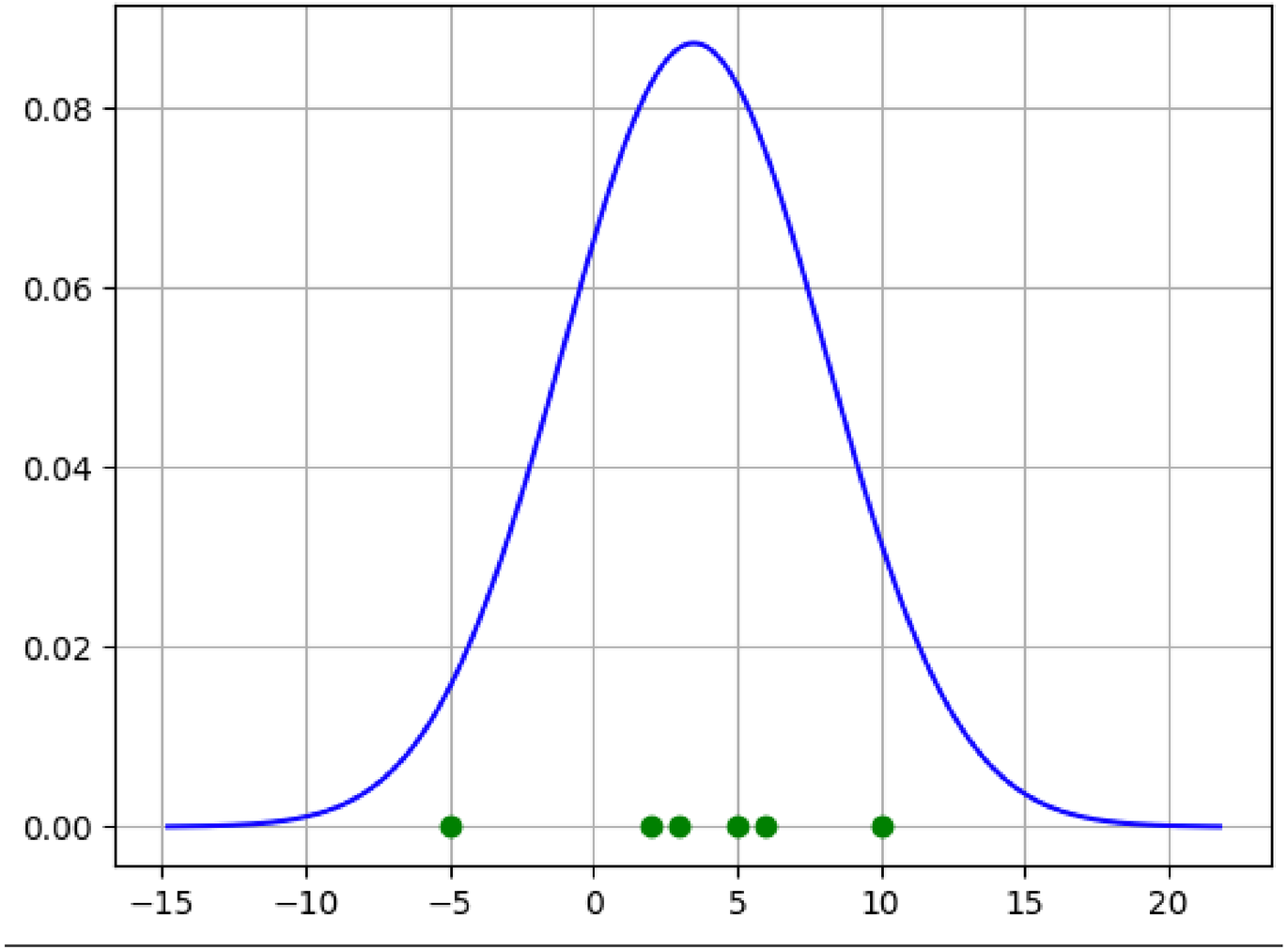
Step 3: Shifting the Gaussians according to the points

```python
import numpy as np
import matplotlib.pyplot as plt
from scipy.stats import norm

# Given data
data = [2, 5, 3, 6, 10, -5]
# Calculate mean and standard deviation
mean = np.mean(data)
std = np.std(data)
# Generate x values
x = np.linspace(mean - 4*std, mean + 4*std, 1000)
# Calculate the normal distribution values
y = norm.pdf(x, mean, std)

# Plot the normal distribution
plt.plot(x, y, label=f"Normal Distribution (mean={mean:.2f}, std={std:.2f})", color='blue')
# Plot the data points as green balls on the x-axis
plt.scatter(data, np.zeros_like(data), color='green', label='Data Points', zorder=5)
plt.grid(True)

# Display the plot
plt.show()
```

How Gaussian Mixture Model Works

codefinity

Step 3: Shifting the Gaussians according to the points

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How Gaussian Mixture Model Works

codefinity

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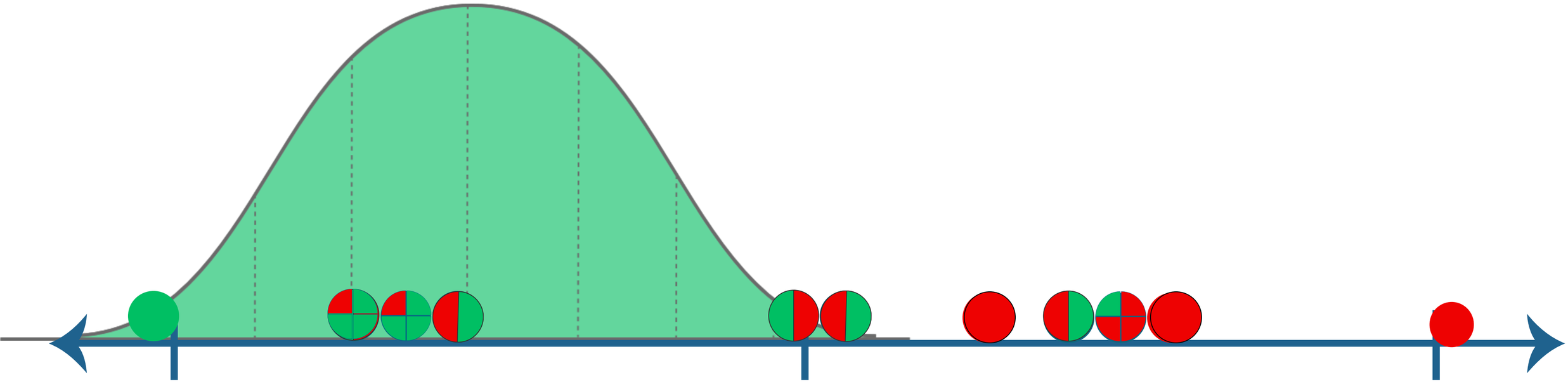

How Gaussian Mixture Model Works

codefinity

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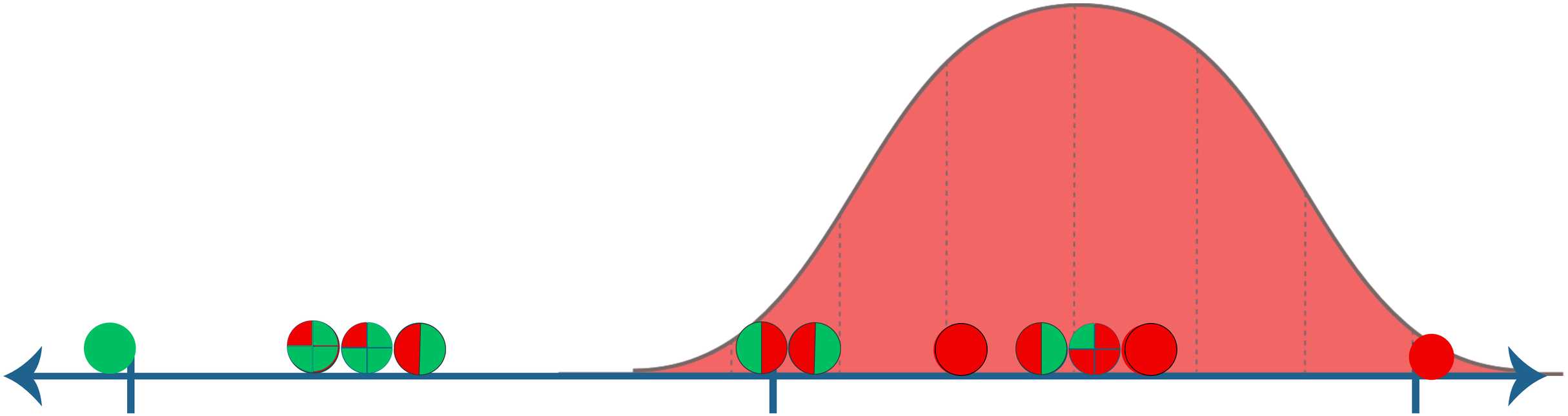

How Gaussian Mixture Model Works

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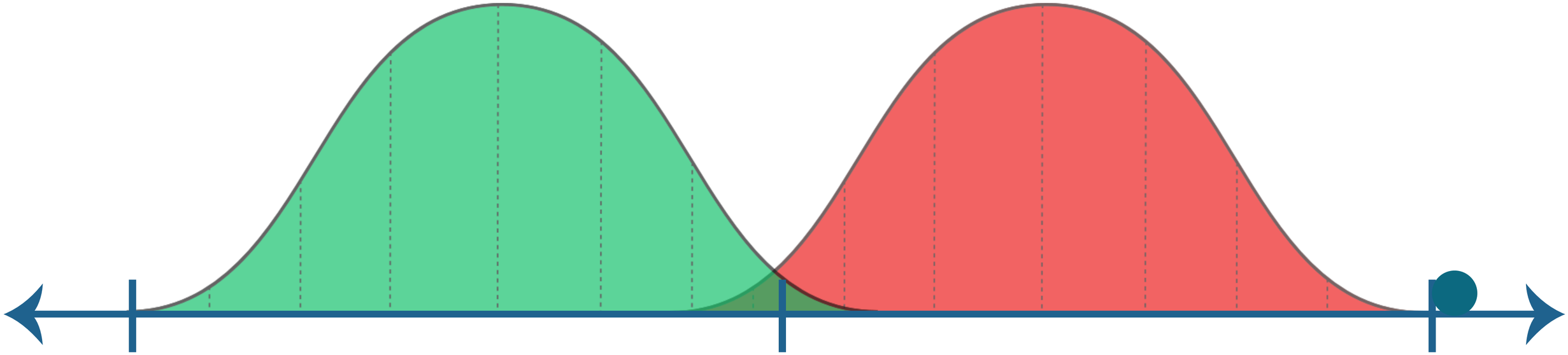
Step 4: Keep Repeating Step 2 & 3



How Gaussian Mixture Model Works

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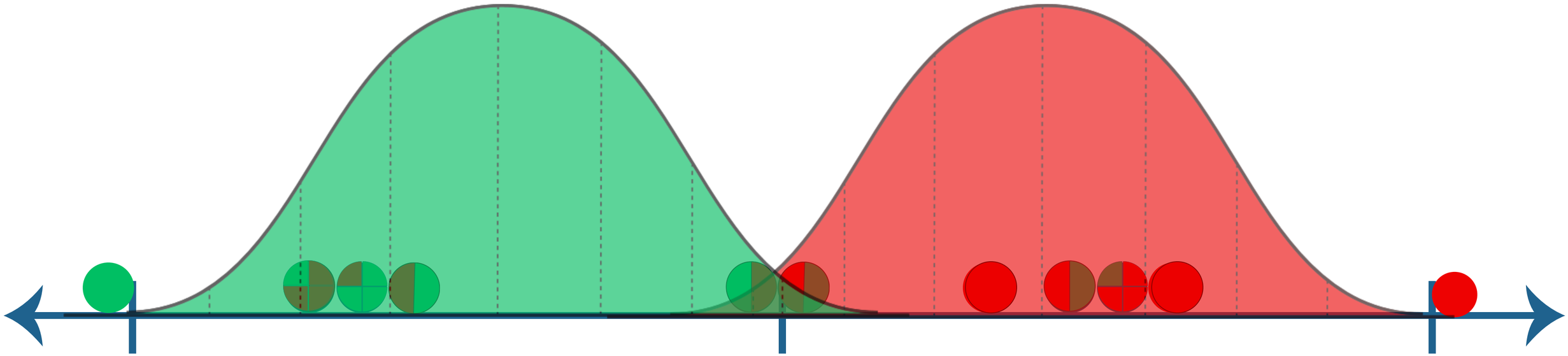
Step 4: Keep Repeating Step 2 & 3



How Gaussian Mixture Model Works

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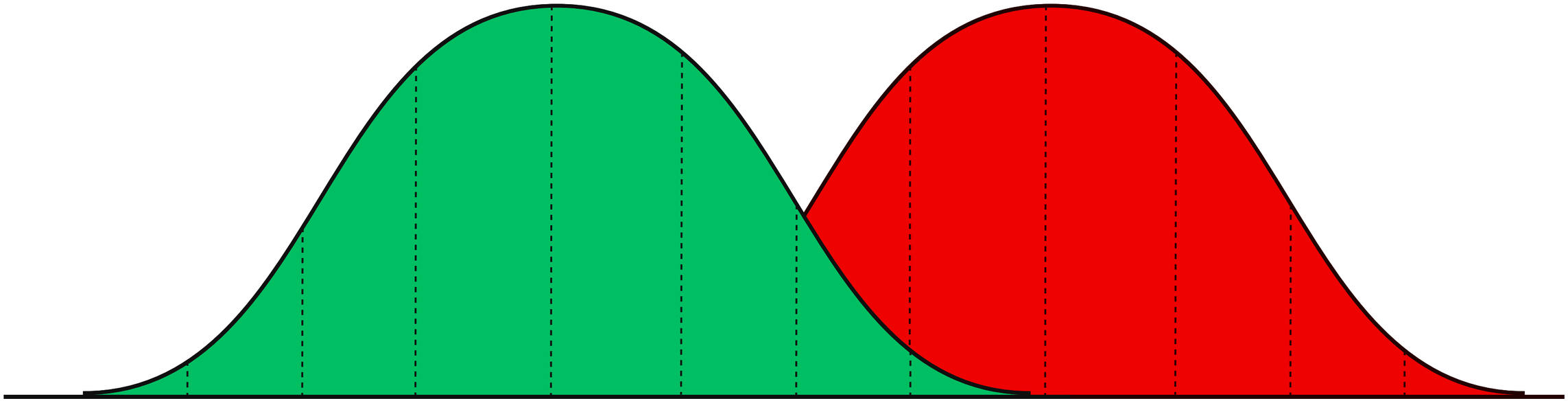

How Gaussian Mixture Model Works

codefinity

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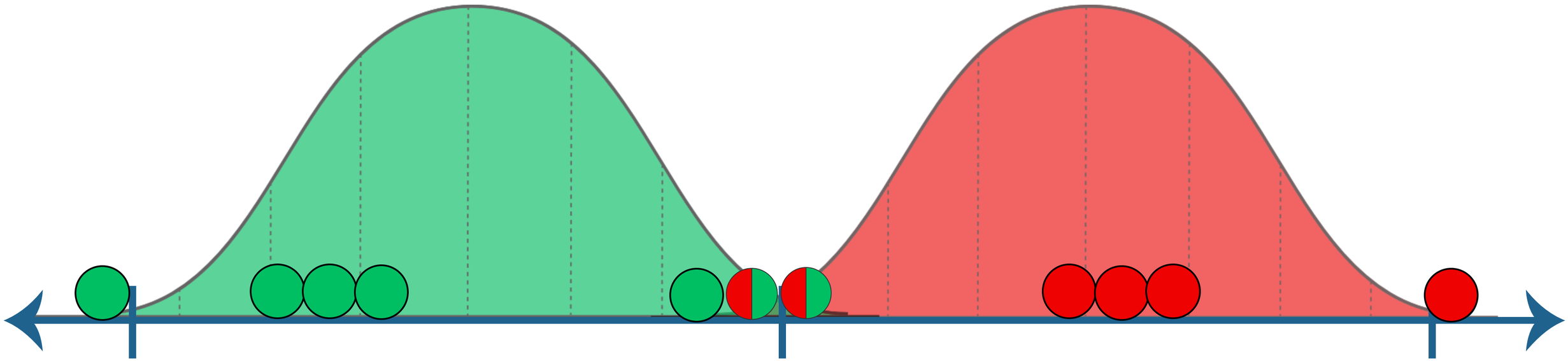

How Gaussian Mixture Model Works

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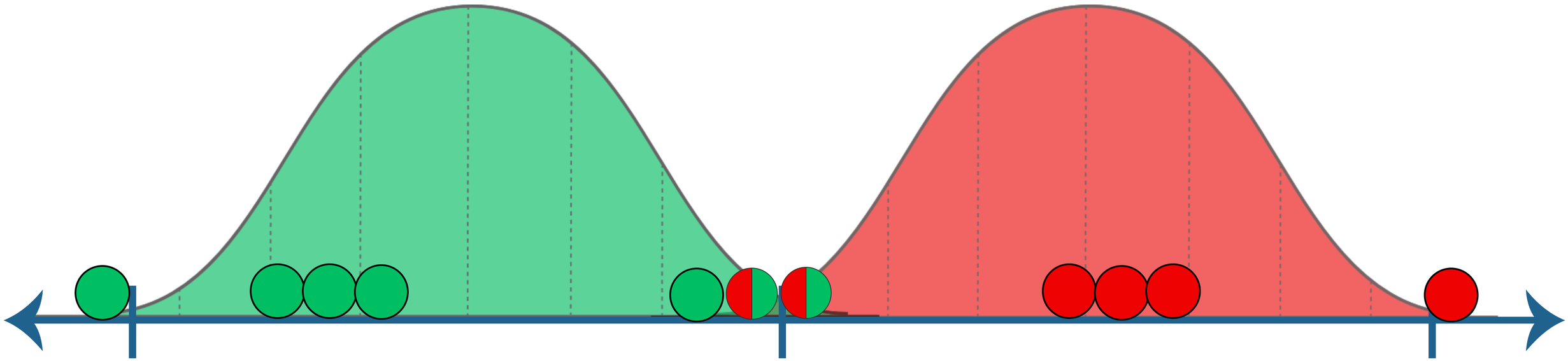
When do we stop?

When will we reach the convergence ?



Gaussian Mixture Model

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Similarity with K-means

Difference with K-means