Classification Results

Question 2e.

1. **Feature Vector = [x1]**

```
PS C:\Users\Aadharsh K Xavier\Documents\VS Code\Assignments> python -u
t\Q2_b.py"
Percentage of points misclassified:  53.333333333333336
```

2. **Feature Vector = [x1   x2]**

```
PS C:\Users\Aadharsh K Xavier\Documents\VS Code\Assignments> python -u "c:\
t\Q2_c.py"
Percentage of points misclassified:  63.333333333333336
```

3. **Feature Vector = [x1   x2   x3]**

```
PS C:\Users\Aadharsh K Xavier\Documents\VS Code\Assignments> python -u "c:\
s\S8\TDA\Assignment\Q2_d.py"
Percentage of points misclassified:  43.333333333333336
```

Misclassification was maximum when only features x1 and x2 were considered and was minimum when all three features x1, x2 and x3 were considered.

Question 2f.

```
PS C:\Users\Aadharsh K Xavier\Documents\VS Code\Assignments> python -u "c
s\S8\TDA\Assignment\Q2_f.py"

Classifying using feature vector  ['x1']
    Point  [1 2 1]  belongs to class w1
    Point  [5 3 2]  belongs to class w2
    Point  [0 0 0]  belongs to class w1
    Point  [1 0 0]  belongs to class w1

Classifying using feature vector  ['x1', 'x2']
    Point  [1 2 1]  belongs to class w1
    Point  [5 3 2]  belongs to class w2
    Point  [0 0 0]  belongs to class w1
    Point  [1 0 0]  belongs to class w1

Classifying using feature vector  ['x1', 'x2', 'x3']
    Point  [1 2 1]  belongs to class w2
    Point  [5 3 2]  belongs to class w1
    Point  [0 0 0]  belongs to class w1
    Point  [1 0 0]  belongs to class w1
```

Design Details

Mu = mean(feature vector)

Sigma = 0
For i = 0 to len(sample):
        Sigma = sigma + (x - mu) * (x - mu)
Sigma = sigma / (n - 1)

Given a point x to classify
For each class w_i:
        g_i (x) = calculate_discriminant(x, mu, sigma, prior_probability)
        Assign the point to the class with the highest g_i (x) value