# Confusion Matrix Metrics Explained

## 1. Confusion Matrix Definitions

Let’s define the components of a binary confusion matrix:  
  
Actual vs Predicted:  
| | Predicted Normal (0) | Predicted Anomaly (1) |  
|-----------------------|--------------------------|----------------------------|  
| Actual Normal (0) | TN (True Negative) | FP (False Positive) |  
| Actual Anomaly (1) | FN (False Negative) | TP (True Positive) |  
  
Your data:  
TP = 158  
FP = 845  
FN = 844  
TN = 18209  
Total = TP + TN + FP + FN = 20056

## 2. Accuracy

Formula:

Accuracy = (TP + TN) / (TP + TN + FP + FN)

Calculation:

Accuracy = (158 + 18209) / 20056 = 18367 / 20056 ≈ 0.9158 = 91.58%

## 3. F1 Score (for Anomaly Class = 1)

Formulas:

Precision = TP / (TP + FP)

Recall = TP / (TP + FN)

F1 Score = 2 × (Precision × Recall) / (Precision + Recall)

Calculation:

Precision = 158 / (158 + 845) = 158 / 1003 ≈ 0.1575

Recall = 158 / (158 + 844) = 158 / 1002 ≈ 0.1577

F1 Score ≈ 2 × (0.1575 × 0.1577) / (0.1575 + 0.1577) ≈ 0.1576

## 4. Wrong Predictions

Wrong Predictions = FP + FN = 845 + 844 = 1689

Wrong Prediction Percentage = (1689 / 20056) × 100 ≈ 8.42%

## 5. Correct Predictions

Correct Predictions = TP + TN = 158 + 18209 = 18367

Correct Prediction Percentage = (18367 / 20056) × 100 ≈ 91.58%