# Classification reportni boshqa kichik dataset orqali xar bir qismini xisoblash va koding bilan tekshiring. Xisoblashlar ruchka va varoqda berildi.

Quyida varoqda ishalngan holati, men o'zim kichik bir dataset oldim 10 qiymatdan iborat bo'lgan.



### Kichik dataset

| y_actual | y_pred | | Sample |
|---|---|---|---|
| 1 | 1 | TP | 0 |
| 0 | 0 | FN | 1 |
| 1 | 0 | TN | 2 |
| 0 | 1 | FP | 3 |
| 1 | 1 | TP | 4 |
| 0 | 1 | FP | 5 |
| 0 | 1 | FP | 6 |
| 1 | 0 | TN | 7 |
| 1 | 0 | TN | 8 |
| 0 | 0 | FN | 9 |

0 – False → bu y_actual uchun
1 – True

0 – Negative → bu y_pred uchun.
1 – Positive

Confusion Matrix:

| | Pred 0 | Pred 1 |
|---|---|---|
| actual 0 | 2 | 3 |
| actual 1 | 3 | 2 |



$FN = 2$
$TN = 3$
$FP = 3$
$TP = 2$

$$Accuracy: \quad \frac{TP + TN}{TP + FP + TN + FN} = \frac{2+3}{2+3+3+2} =$$

$$\frac{5}{10} = \frac{1}{2} = 0,5 \approx 50\%$$

$$Precision: \quad \frac{TP}{TP+FP} = \frac{2}{2+3} = \frac{2}{5} = 0,4$$

$$Recall: \quad \frac{TP}{TP+FN} = \frac{2}{2+2} = \frac{2}{4} = \frac{1}{2} = 0,5$$

$$F1-score = 2 \cdot \frac{precision \cdot recall}{precision + recall} =$$

$$= 2 \cdot \frac{0,4 \times 0,5}{0,4 + 0,5} \approx 0,44$$

## Confusion Matrix

```python
from sklearn.metrics import confusion_matrix, classification_report

y_actual = [1, 0, 1, 0, 1, 0, 0, 1, 1, 0]
y_pred = [1, 0, 0, 1, 1, 1, 1, 0, 0, 0]

cm = confusion_matrix(y_actual, y_pred)
```
[1] ✓ 1.9s                                                    Python

```python
cm
```
[2] ✓ 0.0s                                                    Python
```
array([[2, 3],
       [3, 2]])
```

```python
# Classification Report

class_report = classification_report(y_actual, y_pred)
```
[3] ✓ 0.0s                                                    Python

```python
print(class_report)
```
[4] ✓ 0.0s                                                    Python

```
              precision    recall  f1-score   support

           0       0.40      0.40      0.40         5
           1       0.40      0.40      0.40         5

    accuracy                           0.40        10
   macro avg       0.40      0.40      0.40        10
weighted avg       0.40      0.40      0.40        10
```