**MANUAL CALCULATION OF CLASSIFICATION REPORT USING FORMULAS (RANDOM FOREST)**

**GIVEN DATA:**

**precision recall f1-score support**

**0 0.93 0.92 0.92 85**

**1 0.86 0.88 0.87 49**

**accuracy 0.90 134**

**macro avg 0.89 0.90 0.90 134**

**weighted avg 0.90 0.90 0.90 134**

**[[78 7]**

**[ 6 43]]**

**FORMULAS AND CALCULATIONS:**

**1.Accuracy:**

= T(P) + T(N) / T(P) + T(N) + F(P) + F(N)

= 78 + 43 / 78 + 7 + 43 + 6

= 121 / 134

= 0.90

**Recall:**

2. (Purchased)

= T(P) / T(P) + F(P)

= 78 / 78 + 7

= 78 / 85

= 0.92

3. (Not purchased)

= T(N) / T(N) + F(N)

= 43 / 43 + 6

= 43 / 49

= 0.88

**Precision:**

4. (purchased)

= T(P) / T(P) + F(N)

= 78 / 78 + 6

= 78 / 84

= 0.93

5. (not purchased)

= T(N) / T(N) + F(P)

= 43 / 43 + 7

= 43 / 50

=0.86

Total count in the test set = 134

Total count of purchased in the test set = 85

Total count of not purchased in the test set = 49

**F1-Measure:**

6. (purchased)

= 2\*Recall\*Precision / Recall + Precision

= 2\*0.92\*0.93 / 0.92 + 0.93

= 0.92

7. (not purchased)

= 2\*Recall\*Precision / Recall + Precision

= 2\*0.88\*0.86 / 0.88 + 0.86

= 0.87

**Macro Average:**

8. (precision)

= Precision(P) + Precision(N) / 2

= 0.93 + 0.86 / 2

= 0.89

9. (Recall)

= Recall(P) + Recall(N) / 2

= 0.92 + 0.88 / 2

= 0.90

10. (F1)

= F1(P) + F1(N) / 2

= 0.92 + 0.87 / 2

= 0.90

**Weighted Average:**

11. (precision)

= Precision(P)\*(purchased/ total count) + Precision(N)\*(not purchased / total count)

= 0.90

12. (Recall)

= Recall(P)\*(purchased/ total count) + Recall(N)\*(not purchased / total count)

= 0.90

13. (F1)

= F1(P)\*(purchased/ total count) + F1(N)\*(not purchased / total count)

= 0.90

**Therefore, both classification report and manual classification report are same.**