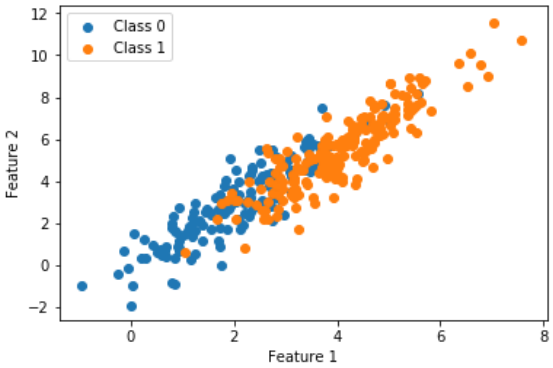
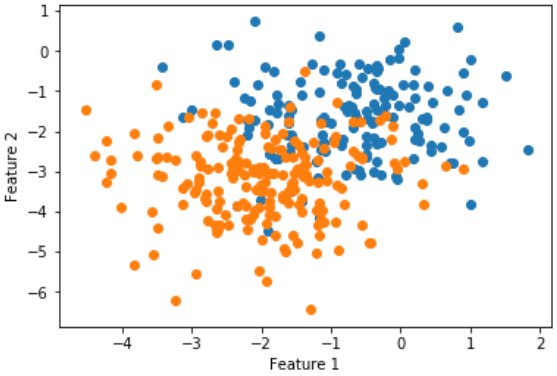
Data Visualizations

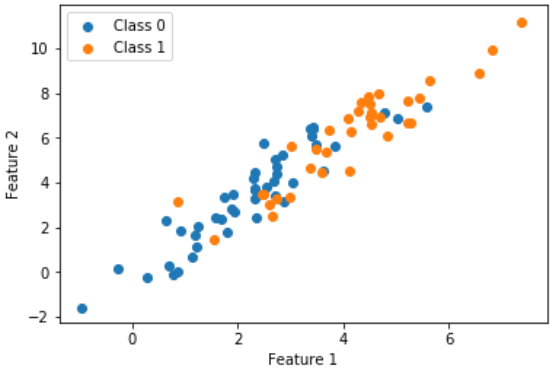
Correlated (Training)



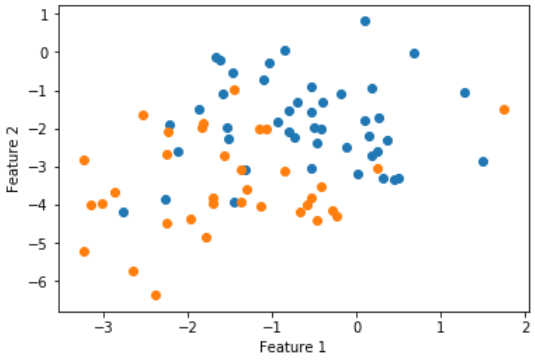
Class Wise Decorrelated (Training)



Test Dataset



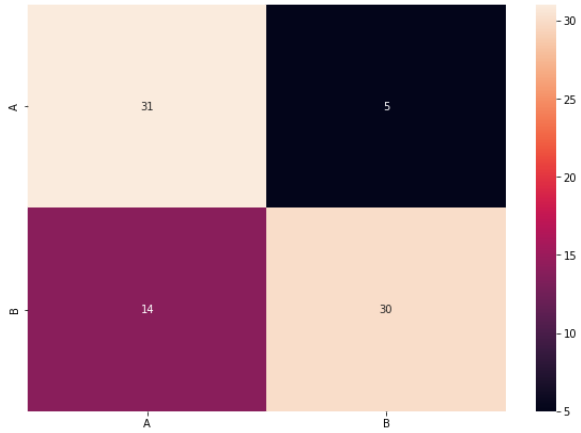
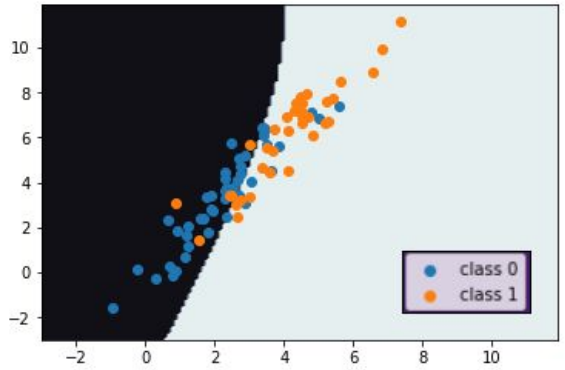
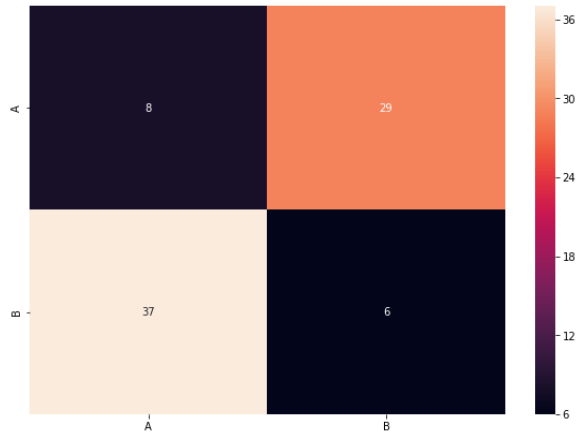
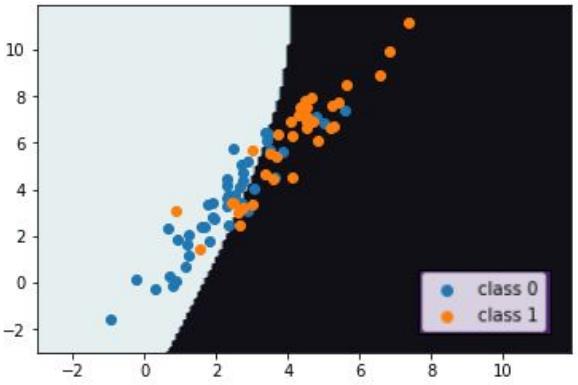
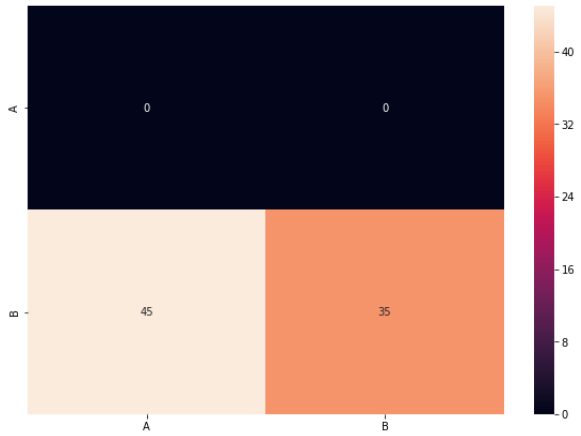
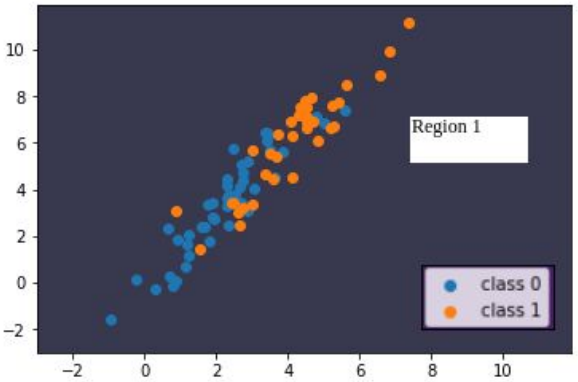
Test Dataset



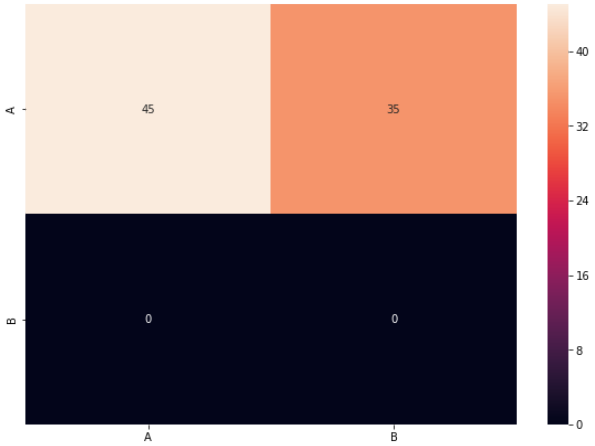
ACCURACY TABLE(%)

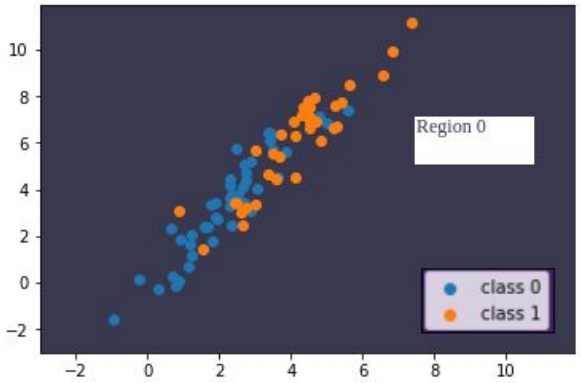
Risk Matrices	CORRELATED			DECORRELATED	
	TRAINING	TEST	TEST MISSING	TRAINING	TEST
Risk 1	81	77	70	84	82.5
Risk 2	17	18	36	14	17
Risk 3	57	44	44	57	44
Risk 4	43	56	57	43	57
Risk 5	83	82	72	86	83
Risk 6	82	77	73	83	78

Ques 3: Correlated Features
TEST DATASET

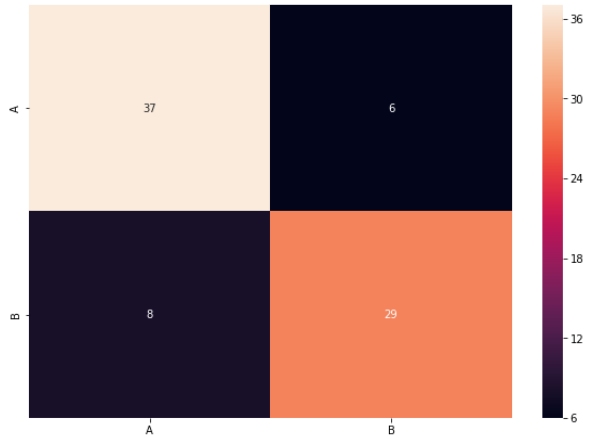
Risk Matrices	Confusion Matrix	Decision Boundary
0 1 1 0		
1 0 0 1		
1000 1000 0 0		

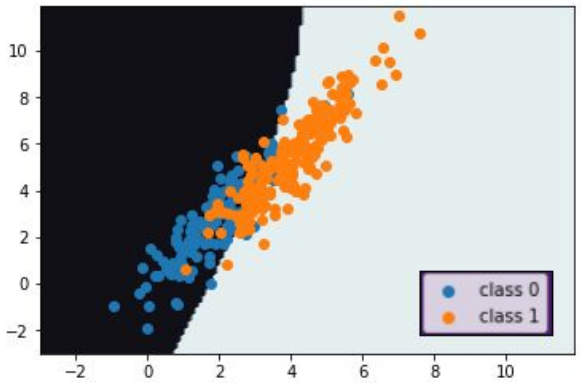
0	0
1000	1000



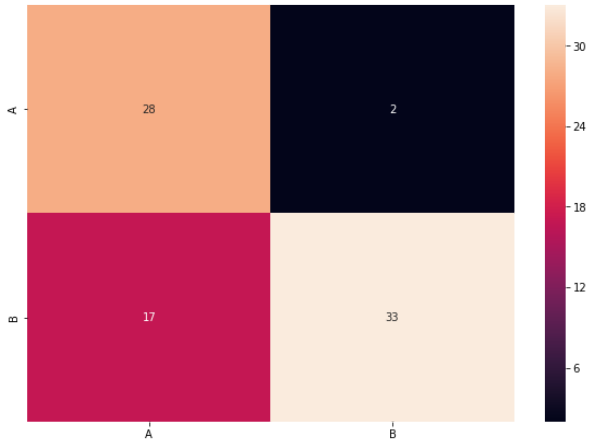


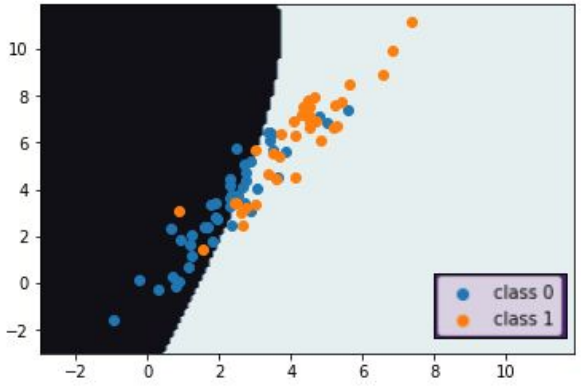
0	100
150	0



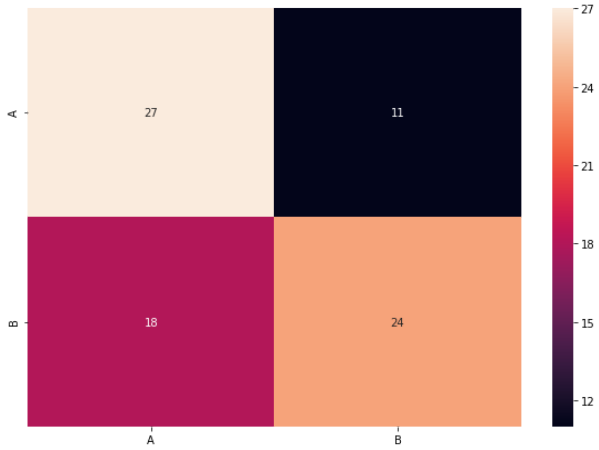
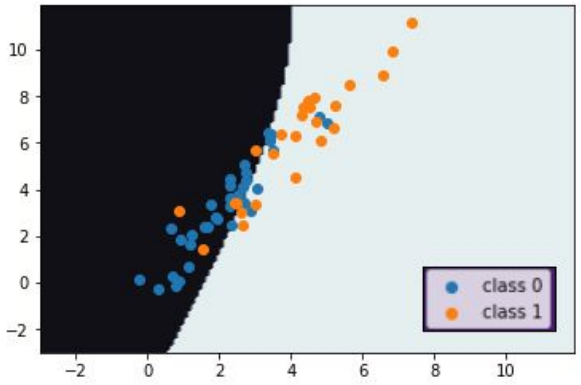
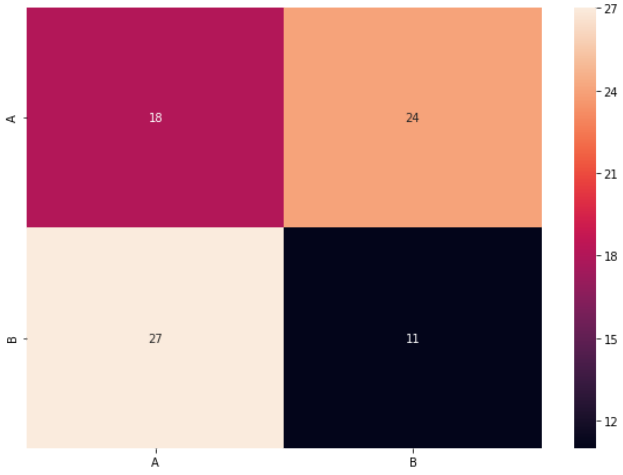
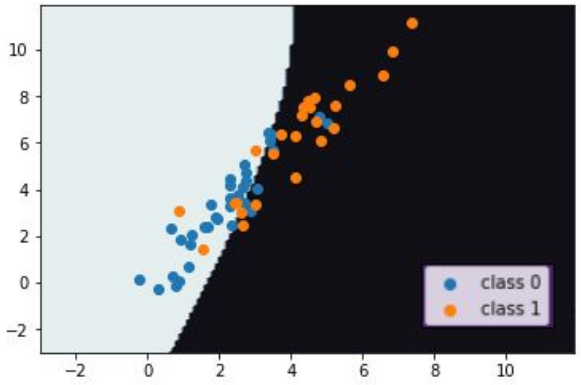
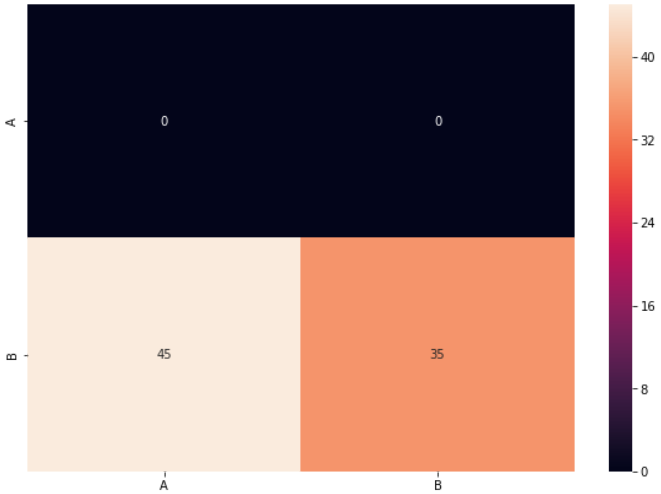
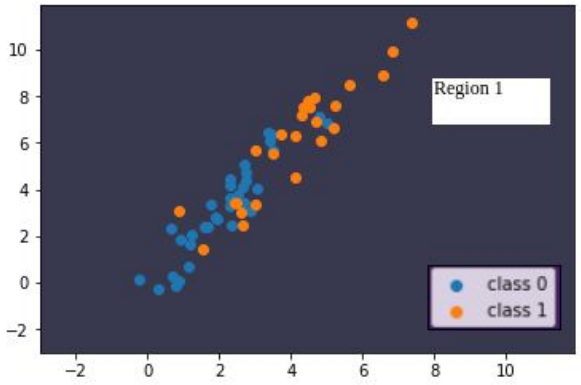


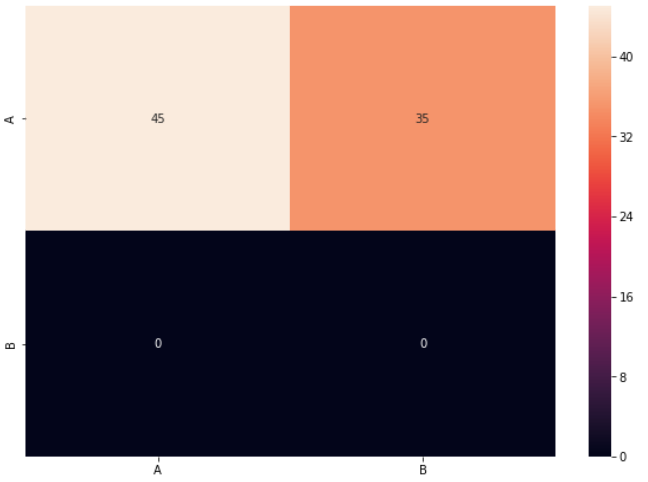
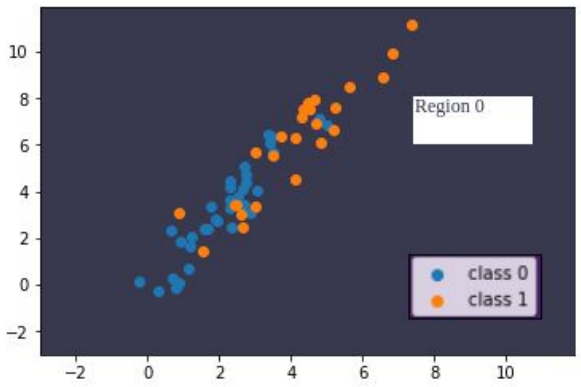
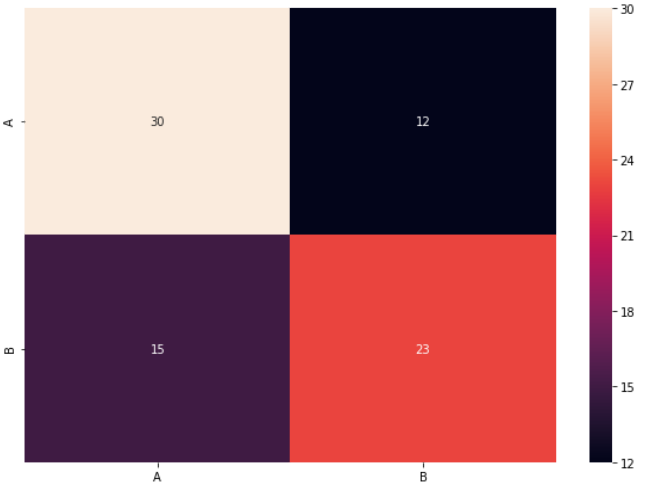
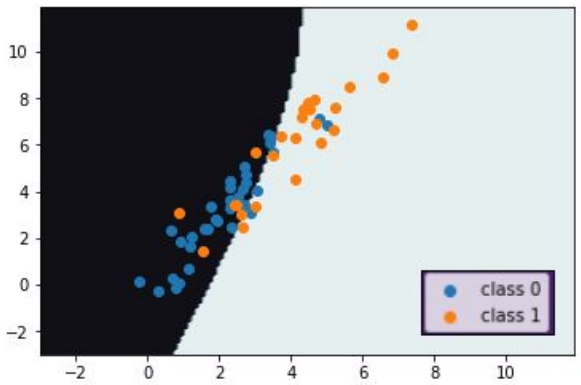
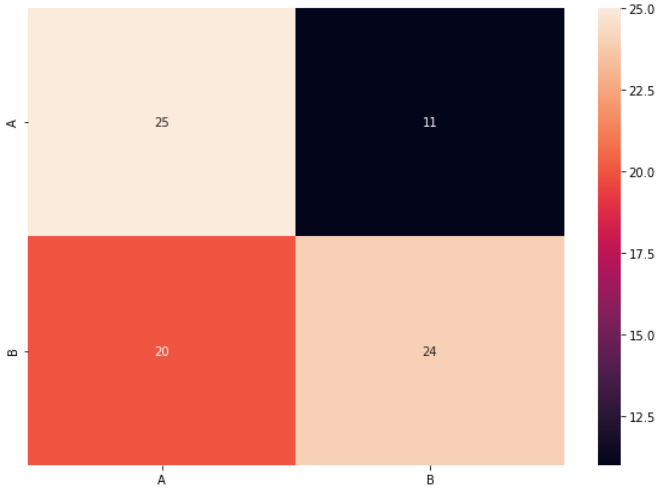
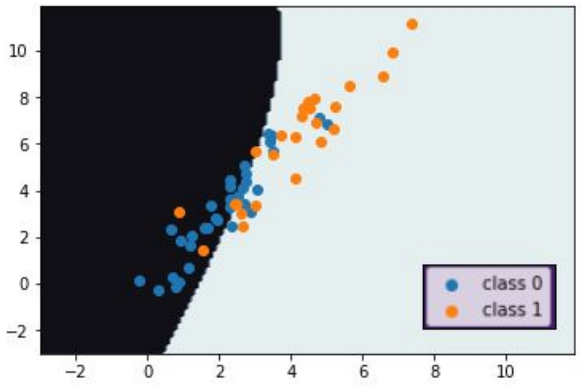
0	150
100	0



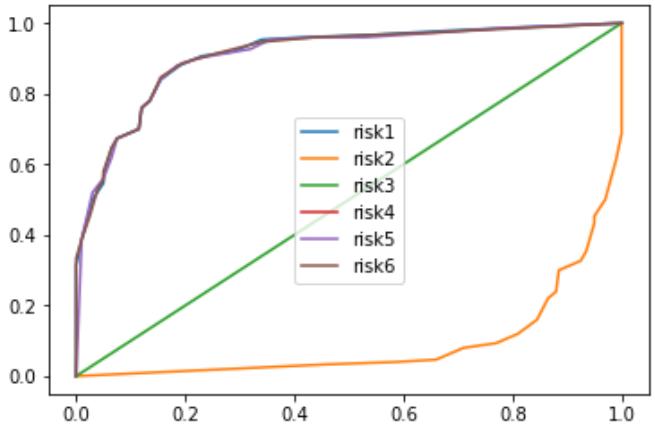


TEST MISSING DATASET

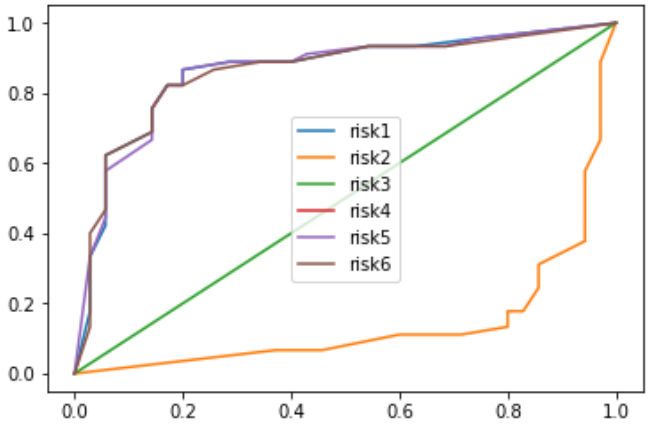
Risk Matrices	Confusion Matrix	Decision Boundary
0 1 1 0		
1 0 0 1		
1000 1000 0 0		

0	0		
1000	1000		
0	100		
150	0		
0	150		
100	0		

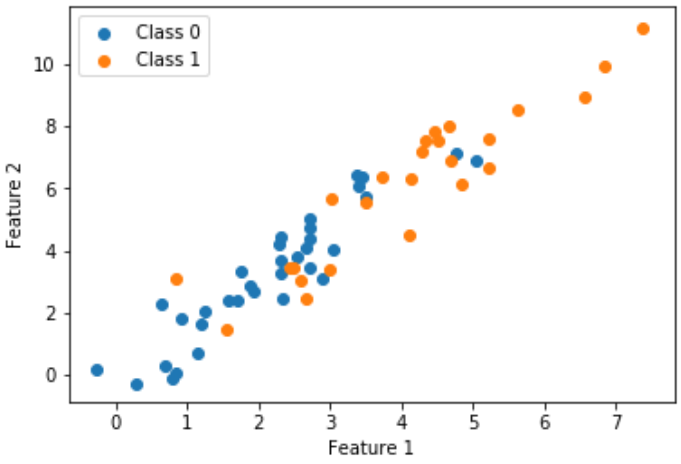
TRAINING DATASET ROC



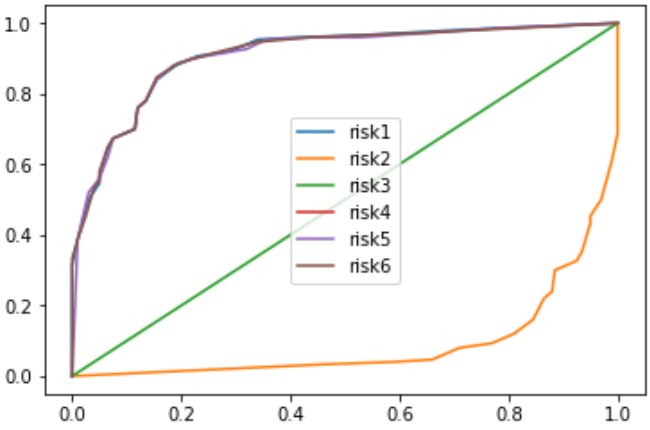
TEST DATASET ROC



VISUALIZATION OF MISSING DATASET

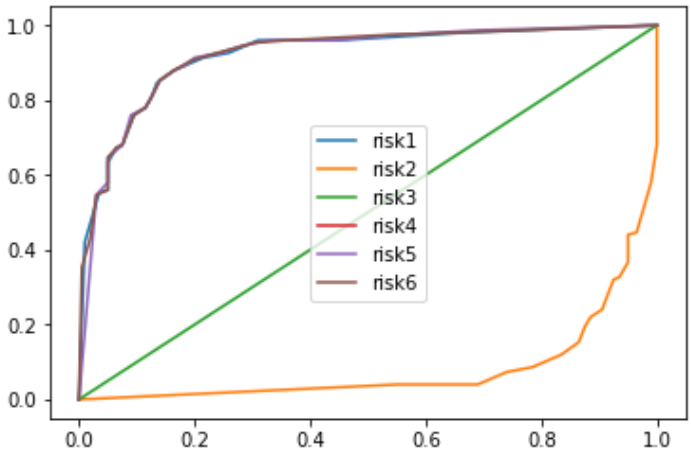


MISSING TEST DATASET TOC

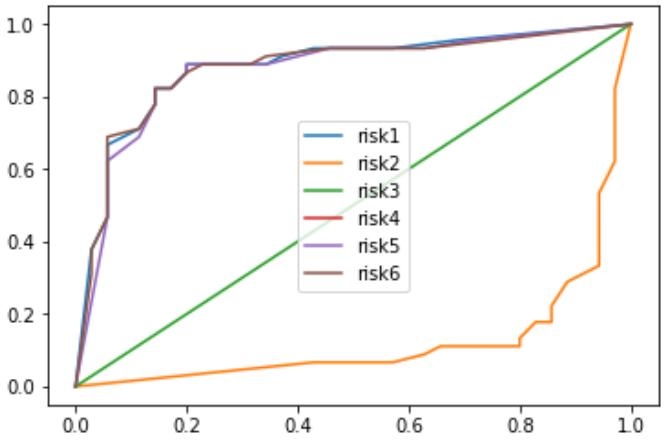


Ques 4: Decorrelated Features

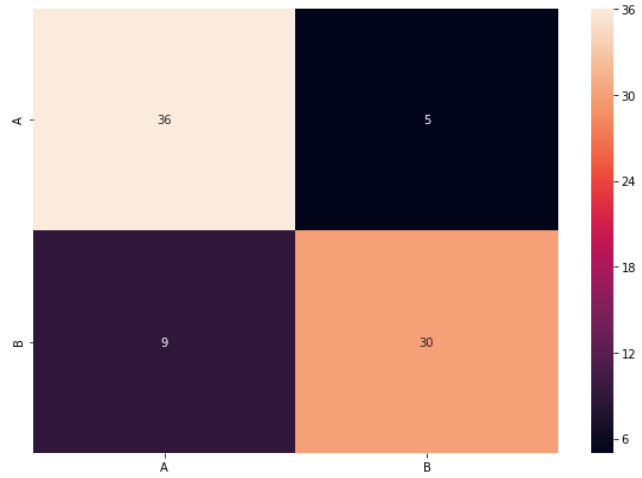
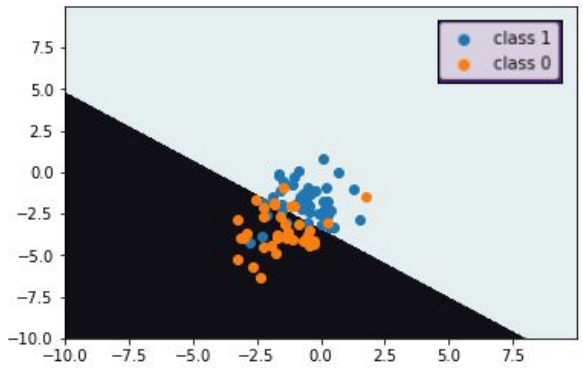
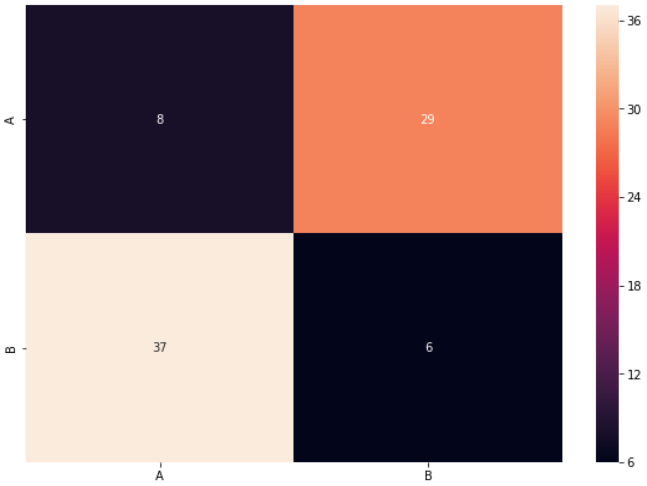
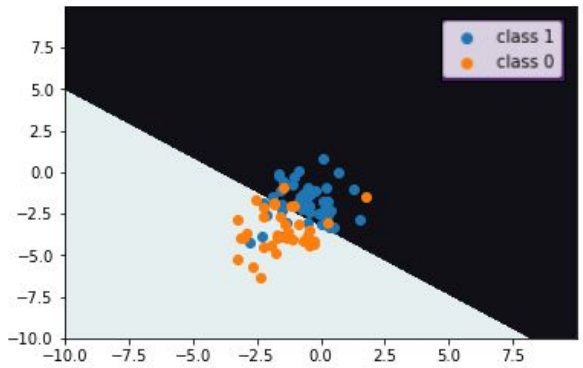
TRAINING DATASET ROC



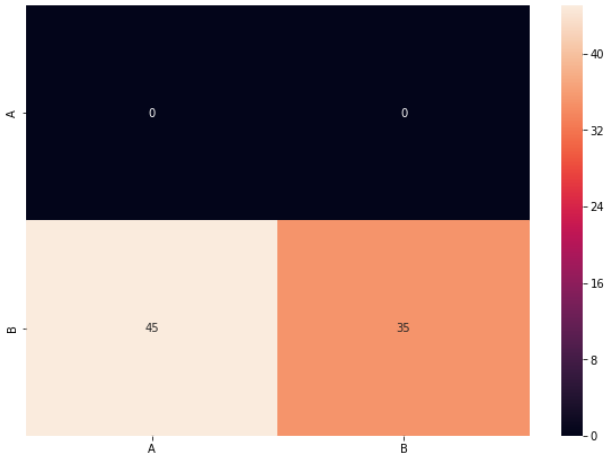
TEST DATASET ROC

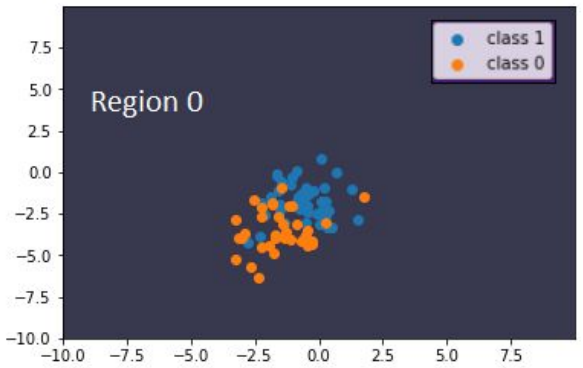


TEST DATASET

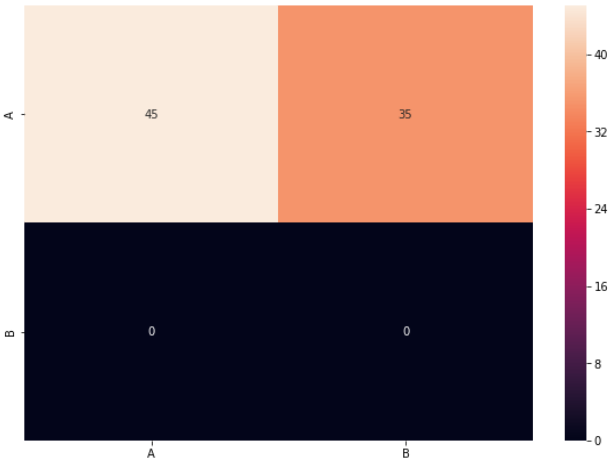
Risk Matrices	Confusion Matrix	Decision Boundary
0 1 1 0		
1 0 0 1		

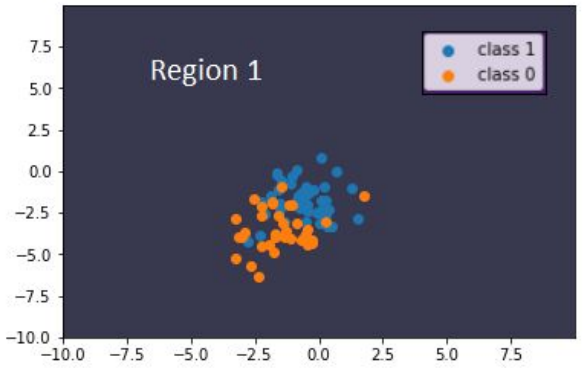
1000	1000	
0	0	



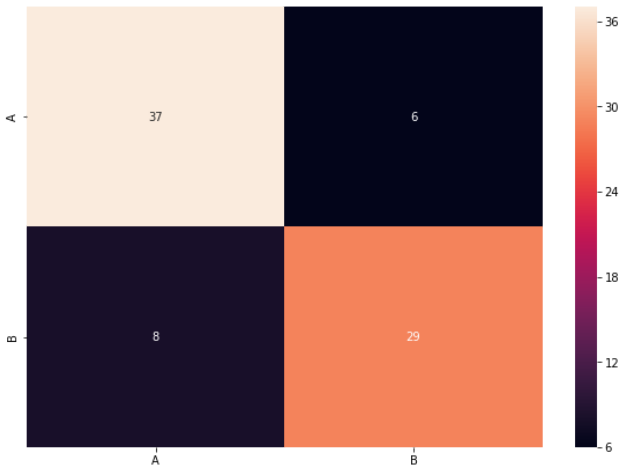


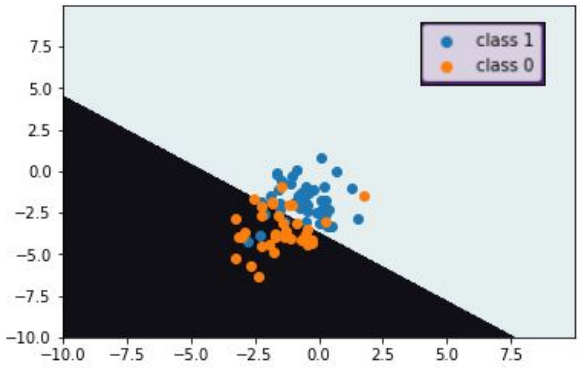
0	0	
1000	1000	



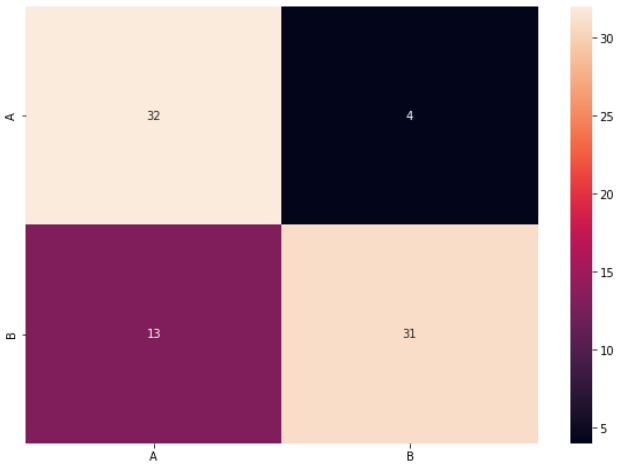


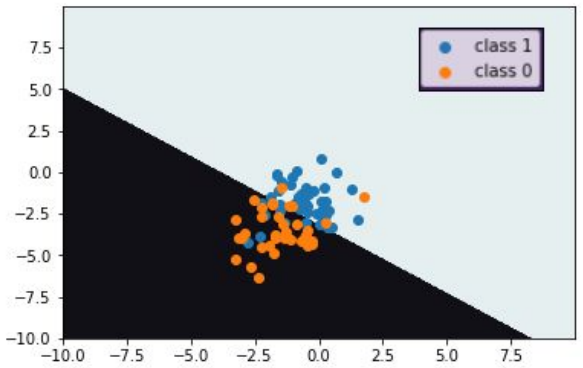
0	100	
150	0	





0	150
100	0





Computer Exercise:

Ques 1:

No. of Features	Total Error	Bhattacharyya Bound
1	0.35	0.47
2	0.40	0.46
3	0.15	0.41

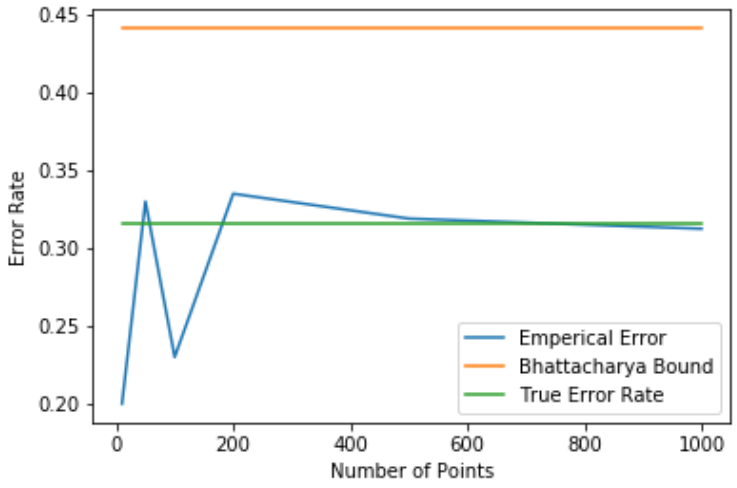
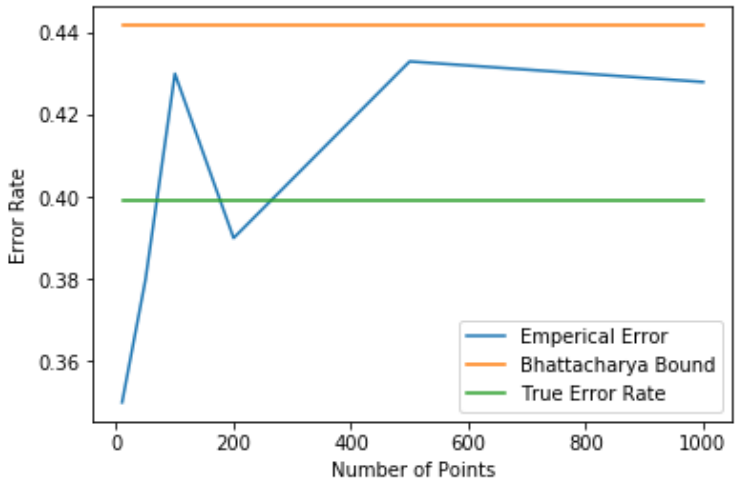
Ques 2:

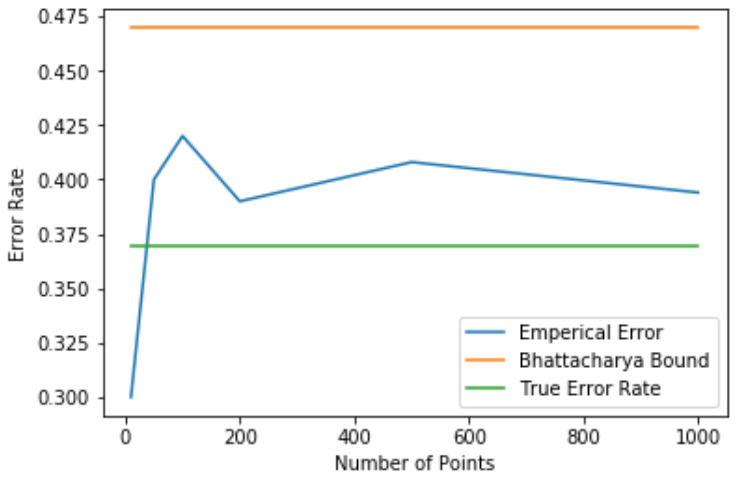
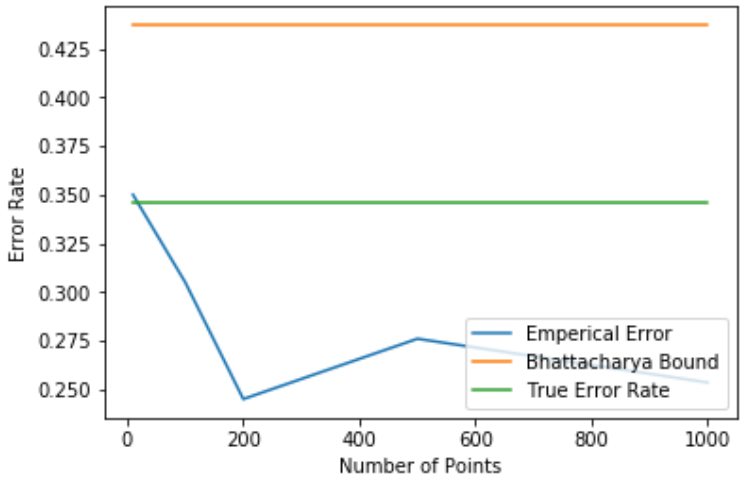
True Error from Region 2:

(0.5 + 0.5*erf(db-m2)/(math.sqrt(2)*sig2))*P(x2)

True Error from Region 1:

(0.5 - 0.5*erf(db-m1)/(math.sqrt(2)*sig1))*P(x1)

PRIOR VALUES	Error	BHATTA BOUND	ORIGINAL DECISION BOUNDARY	NEW DECISION BOUNDARY	PLOT
Mean 1 -.5 Mean 2 .5 Variance 1 1 Variance 2 1 Prior 1 0.5 Prior 2 0.5	0.32	0.44	0.0	-0.14 0.08 0.03 -0.04 0.06 0.03	
Mean 1 -.5 Mean 2 .5 Variance 1 2 Variance 2 2 Prior 1 0.67 Prior 2 0.33	0.40	0.44	1.39	1.39 1.39 1.39 1.39 1.39 1.39	

Mean 1 -.5 Mean 2 .5 Variance 1 2 Variance 2 2 Prior 1 0.5 Prior 2 0.5	**0.37**	**0.47**	**0.0**	**-0.01 0.26 -0.54 -0.01 -0.04 -0.05**	
Mean 1 -.5 Mean 2 .5 Variance 1 3 Variance 2 1 Prior 1 0.5 Prior 2 0.5	**0.35**	**0.43**	**-0.24**	**-1.6 -0.19 -0.85 -0.98 -0.98 -0.92**	

Analysis and Inference:

1. **Class Wise Decorrelation increases the accuracy.**
2. **Changing risk can affect the accuracy crucially.**
3. **Empirical Error is independent of number of features.**
4. **Bhattacharyya bound tends to decrease with increase in number of features.**