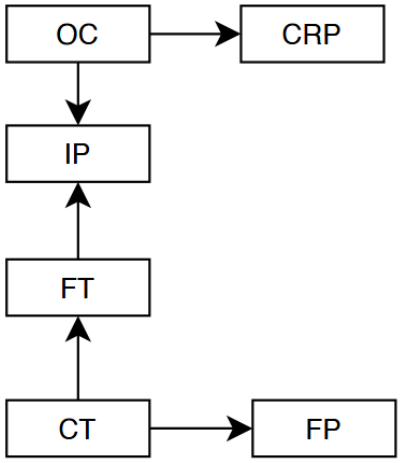
1.

A.



P(OC = TRUE) = 0.8

P(CT = TRUE) = 0.05

P(CRP | OC = TRUE) = 0.1

P(CRP | OC = FALSE) = 0.001

P(FT | CT = TRUE) = 0.01

P(FT | CT = FALSE) = 0.004

P(FP | FT, CT = TRUE) = 0.9

P(FP | FT = TRUE, CT = FALSE) = 0.1

P(FP | FT = FALSE, CT = FALSE) = 0.01

P(IP | FT = TRUE, OC = TRUE) = 0.15

P(IP | FT = FALSE, OC = TRUE) = 0.1

P(IP | FT = TRUE, OC = FALSE) = 0.051

P(IP | FT = FALSE, OC = FALSE) = 0.001

B.

-Prior probability of fraud:

P(FT) = P(FT | CT = TRUE) * P(CT) + P(FT | CT = FALSE) * P(CT = FALSE)

= 0.01 * 0.05 + 0.004 * 0.95 = 0.0043

-Probability of fraud:

P(FT = T | FP = T, IP = F, CRP = T)

= P(FP = T, IP = F, CRP = T | FT = T) * P(FT = T) / P(FP = T, IP = F, CRP = T)

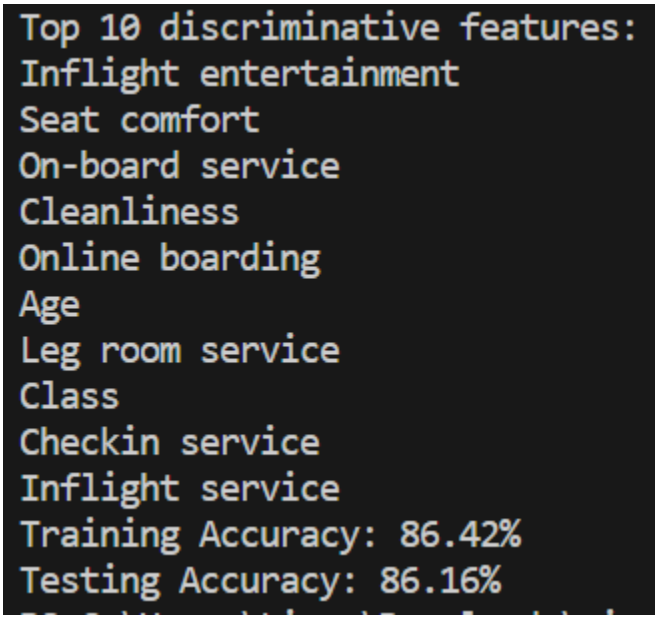
C.

P(FT = T | FP = T, IP = F, CRP = T, CT = T)

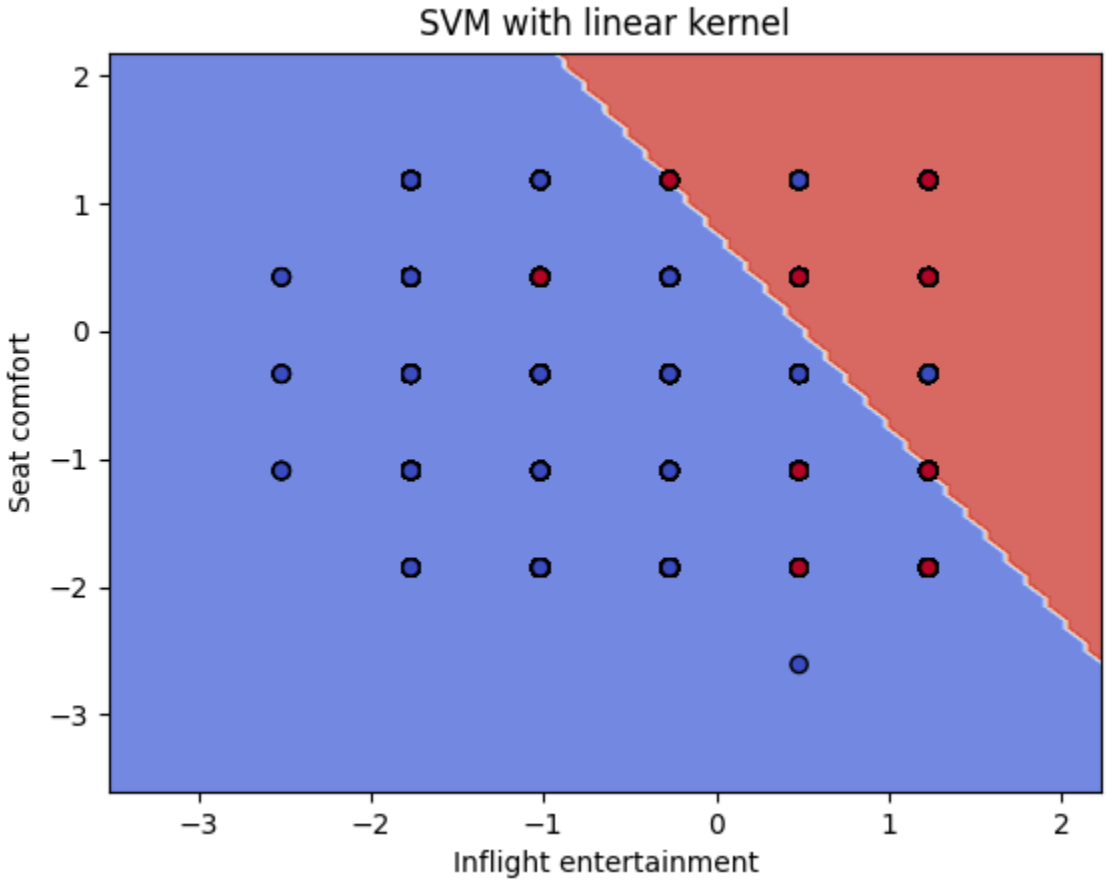
= P(FP =T, IP = F, CRP = T | FT = T, CT = T) * P(FT = T | CT = T) / P(FP = T, IP = F, CRP = 1, CT = T)

2.

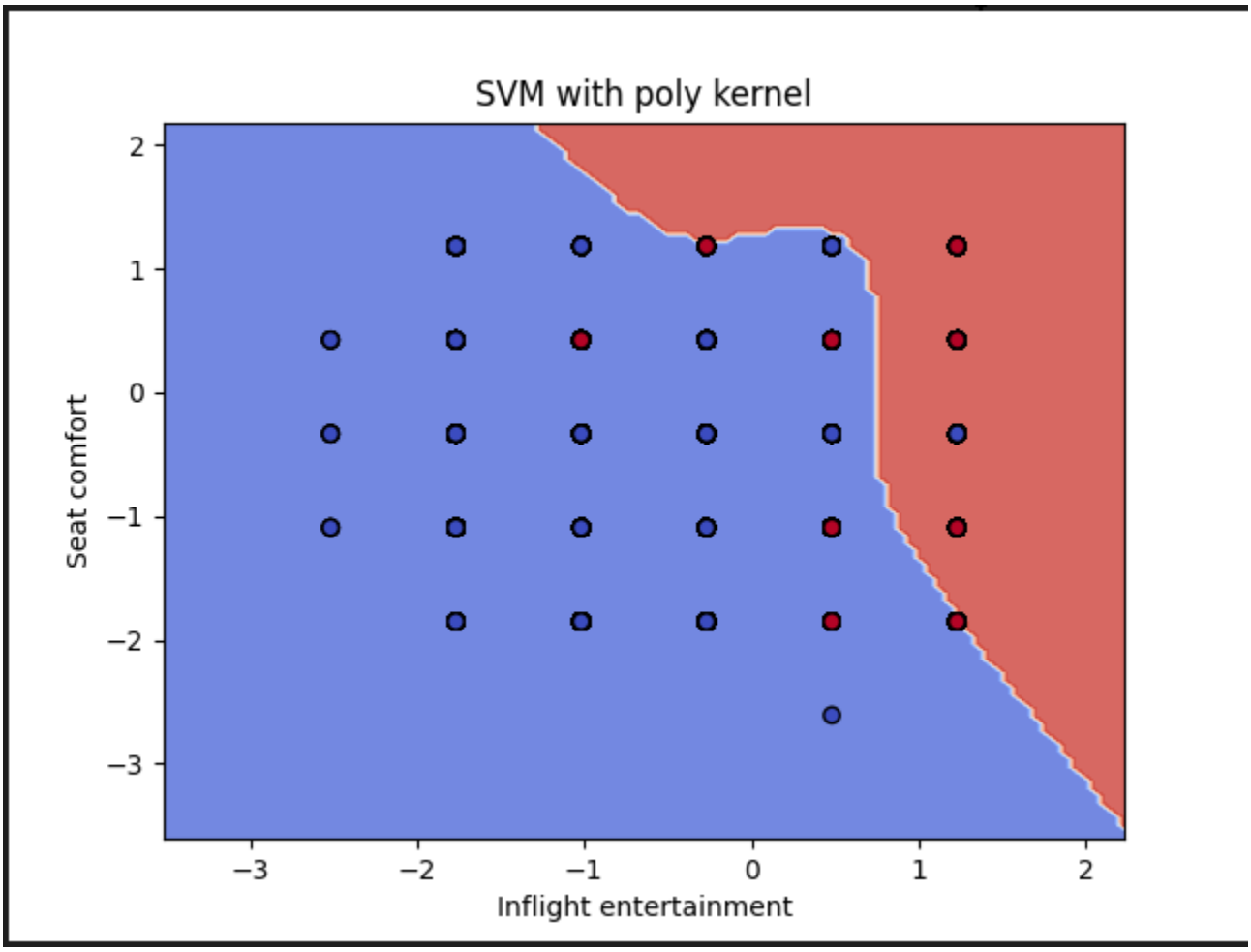
a.



b.




```
SVM (linear kernel):
Training Accuracy: 70.66%
Testing Accuracy: 70.49%
```




```
SVM (poly kernel):
Training Accuracy: 63.75%
Testing Accuracy: 63.68%
```

3.

The model achieved moderate accuracy. The results are varied based on different parameters.

	Neurons	Epochs	Optimizer	Accuracy
0	100	50	ADAM	73.16
1	100	50	SGD	72.78
2	100	100	ADAM	72.91
3	100	100	SGD	73.82
4	200	50	ADAM	73.43
5	200	50	SGD	74.34
6	200	100	ADAM	72.54
7	200	100	SGD	75.70

4.

```
KMeans Accuracy: 0.7596
Agglomerative Clustering Accuracy: 0.8368
```