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Task1:

Daily temperatures are conditionally independent as given.

P(M|temp<80) = P(temp<80|M)*P(M)/P(temp<80)
= 0.8*0.05/(0.8*0.05+0.1*0.95)
= 0.296

Both days's temp are conditionally independent so,

P(email2 has temp<80| email1 has temp<80) = P(M|temp<80)+P(S|temp<80)
$= 0.2963 \times 0.8 + 0.7037 \times 0.1$
$= 0.31$

$P(\text{ 3 daily highs under 80 }) = 0.31*0.31*0.31 = 0.02979$

Task2:

Since P(A) + P(B) <1, it is a valid probability function. I can be though because we don't know the probability values for C and D

Task3:

It can be a probability density function. However it can't be a probability function since the additional of the probablities we know is > 1

Task4:

Class 1, attribute 1, mean = 0.52, std = 0.10
Class 1, attribute 2, mean = 0.54, std = 0.10
Class 1, attribute 3, mean = 0.52, std = 0.07
Class 1, attribute 4, mean = 0.41, std = 0.17
Class 1, attribute 5, mean = 0.50, std = 0.01
Class 1, attribute 6, mean = 0.00, std = 0.01
Class 1, attribute 7, mean = 0.50, std = 0.05
Class 1, attribute 8, mean = 0.24, std = 0.05
Class 2, attribute 1, mean = 0.45, std = 0.11
Class 2, attribute 2, mean = 0.45, std = 0.10
Class 2, attribute 3, mean = 0.53, std = 0.06
Class 2, attribute 4, mean = 0.23, std = 0.11
Class 2, attribute 5, mean = 0.50, std = 0.04
Class 2, attribute 6, mean = 0.00, std = 0.01
Class 2, attribute 7, mean = 0.49, std = 0.06

Class 2, attribute 8, mean = 0.33, std = 0.14
Class 3, attribute 1, mean = 0.43, std = 0.10
Class 3, attribute 2, mean = 0.48, std = 0.11
Class 3, attribute 3, mean = 0.36, std = 0.06
Class 3, attribute 4, mean = 0.22, std = 0.08
Class 3, attribute 5, mean = 0.51, std = 0.05
Class 3, attribute 6, mean = 0.00, std = 0.01
Class 3, attribute 7, mean = 0.51, std = 0.04
Class 3, attribute 8, mean = 0.27, std = 0.09
Class 4, attribute 1, mean = 0.79, std = 0.07
Class 4, attribute 2, mean = 0.76, std = 0.07
Class 4, attribute 3, mean = 0.38, std = 0.06
Class 4, attribute 4, mean = 0.32, std = 0.11
Class 4, attribute 5, mean = 0.50, std = 0.01
Class 4, attribute 6, mean = 0.00, std = 0.01
Class 4, attribute 7, mean = 0.51, std = 0.07
Class 4, attribute 8, mean = 0.27, std = 0.09
Class 5, attribute 1, mean = 0.74, std = 0.16
Class 5, attribute 2, mean = 0.62, std = 0.13
Class 5, attribute 3, mean = 0.42, std = 0.08
Class 5, attribute 4, mean = 0.30, std = 0.12
Class 5, attribute 5, mean = 0.50, std = 0.01
Class 5, attribute 6, mean = 0.00, std = 0.01
Class 5, attribute 7, mean = 0.51, std = 0.06
Class 5, attribute 8, mean = 0.24, std = 0.04
Class 6, attribute 1, mean = 0.54, std = 0.14
Class 6, attribute 2, mean = 0.50, std = 0.12
Class 6, attribute 3, mean = 0.51, std = 0.05
Class 6, attribute 4, mean = 0.24, std = 0.10
Class 6, attribute 5, mean = 0.50, std = 0.01
Class 6, attribute 6, mean = 0.49, std = 0.39
Class 6, attribute 7, mean = 0.51, std = 0.03
Class 6, attribute 8, mean = 0.24, std = 0.05
Class 7, attribute 1, mean = 0.48, std = 0.11
Class 7, attribute 2, mean = 0.47, std = 0.09
Class 7, attribute 3, mean = 0.54, std = 0.06
Class 7, attribute 4, mean = 0.22, std = 0.12
Class 7, attribute 5, mean = 0.50, std = 0.04
Class 7, attribute 6, mean = 0.00, std = 0.03
Class 7, attribute 7, mean = 0.50, std = 0.06
Class 7, attribute 8, mean = 0.26, std = 0.09
Class 8, attribute 1, mean = 0.74, std = 0.11
Class 8, attribute 2, mean = 0.73, std = 0.11
Class 8, attribute 3, mean = 0.49, std = 0.05
Class 8, attribute 4, mean = 0.29, std = 0.07
Class 8, attribute 5, mean = 0.50, std = 0.01
Class 8, attribute 6, mean = 0.00, std = 0.01

Class 8, attribute 7, mean = 0.46, std = 0.08
Class 8, attribute 8, mean = 0.23, std = 0.02
Class 9, attribute 1, mean = 0.55, std = 0.14
Class 9, attribute 2, mean = 0.56, std = 0.16
Class 9, attribute 3, mean = 0.51, std = 0.07
Class 9, attribute 4, mean = 0.20, std = 0.07
Class 9, attribute 5, mean = 0.50, std = 0.01
Class 9, attribute 6, mean = 0.00, std = 0.01
Class 9, attribute 7, mean = 0.53, std = 0.05
Class 9, attribute 8, mean = 0.24, std = 0.05
Class 10, attribute 1, mean = 0.78, std = 0.06
Class 10, attribute 2, mean = 0.73, std = 0.12
Class 10, attribute 3, mean = 0.48, std = 0.11
Class 10, attribute 4, mean = 0.33, std = 0.07
Class 10, attribute 5, mean = 1.00, std = 0.01
Class 10, attribute 6, mean = 0.00, std = 0.01
Class 10, attribute 7, mean = 0.55, std = 0.02
Class 10, attribute 8, mean = 0.23, std = 0.01

Accuracy : 0.4483