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Task 2.

No, because during the first round of reasignmen, where the red average is on the red dot, and the blue average is roughly in the center, the dots that are closer to the red average than the blue average in the center will be reassigned to the red cluster, meaning this could not be the final result of the k-means algorithm.

Task 3.
a. No, the EM algorithm will not always give the same results when applied to the same dataset with the same K. When initializing the EM algorithm, we chose random values, meaning the mixture of gaussians can give a different result based on that randomness
b. Yes, the agglomerative clustering algorithm with the Dmin distance will always give the same results when applied to the same dataset. Since the minimum distance is being used every time and it never needs to break a tie, we will get the same min every time due to the dataset being the same and therefore produce the same result.

Task 4.
a.
    i.   (2,4)(7)(11)(16)(22)(29)(37)
    ii.   (2,4,7)(11)(16)(22)(29)(37)
    iii.   (2,4,7,11)(16)(22)(29)(37)
    iv.   (2,4,7,11,16)(22)(29)(37)
    v.   (2,4,7,11,16,22)(29)(37)
    vi.   (2,4,7,11,16,22,29)(37)
    vii.   (2,4,7,11,16,22,29,37)
b.
    i.   (2,37)(4)(7)(11)(16)(22)(29)
    ii.   (2,29,37)(4)(7)(11)(16)(22)
    iii.   (2,22,29,37)(4)(7)(11)(16)
    iv.   (2,16,22,29,37)(4)(7)(11)
    v.   (2,11,16,22,29,37)(4)(7)
    vi.   (2,7,11,16,22,29,37)(4)
    vii.   (2,4,7,11,16,22,29,37)