1. **Spotify** (17 points)

You ask Spotify (a music streaming service) to shuffle songs from a playlist with 10 songs by 5 different artists (A, B, C, D and E). There are 2 songs by each artist.

a. (4 points) What is the total number of orderings of the 10 songs (each song is distinct)?

permutation of 10 songs is

$10!$

b. (4 points) Spotify realizes that if it plays two songs from the same artist in a row, users don't trust that the shuffle was truly random. What is the probability that a random ordering of the songs has two songs from artist A in a row?

We can combine 2 songs from artist A and the total number of ordering is

$9!2!$

$P\{2 \text{ songs from artist A in a row}\}$

$= \frac{9!2!}{10!} = \frac{2}{10} = \frac{1}{5}$