Suppose Players 1 and 2 play mixed strategies $s_1 = (p, 1-p)$ and $s_2 = (q, 1-q)$, respectively, for $p, q > 0$.

Note that Player 2's expected payoff with these strategies is:

$$\mathbb{E}\Big[s_2 \mid s_1\Big] = \mathbb{E}\Big[\text{Heads} \mid s_1\Big] \cdot q + \mathbb{E}\Big[\text{Tails} \mid s_1\Big] \cdot (1-q).$$

Suppose, now, that Player 1's strategy makes Heads more attractive for Player 2:

$$\mathbb{E}\Big[\text{Heads} \mid s_1\Big] > \mathbb{E}\Big[\text{Tails} \mid s_1\Big].$$

In this case, Player 2 would want to deviate to $s_2' = (1, 0)$:

$$\begin{aligned}\mathbb{E}\Big[s_2' \mid s_1\Big] &= \mathbb{E}\Big[\text{Heads} \mid s_1\Big] \cdot 1 + \mathbb{E}\Big[\text{Tails} \mid s_1\Big] \cdot 0 \\ &> \mathbb{E}\Big[\text{Heads} \mid s_1\Big] \cdot q + \mathbb{E}\Big[\text{Tails} \mid s_1\Big] \cdot (1-q).\end{aligned}$$

So $\boldsymbol{s} = (s_1, s_2)$ cannot be a Nash equilibrium. Same if $\mathbb{E}\Big[\text{Tails} \mid s_1\Big] > \mathbb{E}\Big[\text{Heads} \mid s_1\Big]$.

The only way to avoid this is for Player 1 to play a strategy $s_1^* = (p, 1-p)$ that makes Player 2 indifferent between their actions:

$$\begin{aligned}\mathbb{E}\Big[\text{Heads} \mid s_1\Big] = \mathbb{E}\Big[\text{Tails} \mid s_2\Big] &\text{ iff } (-1) \cdot p + 1 \cdot (1-p) = 1 \cdot p + (-1) \cdot (1-p) \\ &\text{ iff } p = 1/2.\end{aligned}$$

So Player 1 wants to play $s_1^* = (1/2, 1/2)$. Similarly, Player 2 wants to play $s_2^* = (1/2, 1/2)$. This is the mixed Nash equilibrium.