1. In the following \((B, C)\) means there is a tie between \(B\) and \(C\).

(a) Majority: Kohinoor \(\succ\) Cowherds \(\succ\) (Stile, Crown)
(b) Copeland: Cowherds \(\succ\) Crown \(\succ\) Stile \(\succ\) Kohinoor
(c) Borda: Cowherds \(\succ\) Crown \(\succ\) Stile \(\succ\) Kohinoor

2. (a) There is no Condorcet winner, because every alternative loses against one other alternative.
(b) There is no clear winner for any of the rules. All result in a tie.
(c) Chinese wins against Pizza in the first round. Indian wins against Chinese in the second round, so Indian is chosen.
(d) The winner is completely determined by the order of tournaments. This makes it likely that Alice has strategically chosen the order so that her choice wins.

3. (a) The Spearman’s Footrule distance is 8; the Kendall-tau distance is 5.
(b) \(E \succ D \succ C \succ B \succ A\) has the maximum distance of 10. This is the total number of pairs, \(n(n-1)/2\), so it is not possible to exceed this number.

4. (a) The Condorcet winner is Highfield Campus.
(b) Highfield Campus \(\succ\) Portswood \(\succ\) Bedford Place \(\succ\) Common
(c) Highfield Campus \(\succ\) Portswood \(\succ\) Common \(\succ\) Bedford Place

5. (a) Footrule optimal: \(A \succ B \succ C\); Kemeny rule: \(B \succ A \succ C\).
(b) Footrule optimal is not Condorcet consistent (counterexample above, as \(B\) is the Condorcet winner). Kemeny rule is Condorcet consistent (proof by contradiction: assume Condorcet winner is not at the top in the optimal ranking; it can then be swapped with its higher-ranked neighbour to decrease the Kendall-tau distance, as by definition more than half the voters rank the Condorcet winner above its neighbour. This means the ranking was not optimal.).