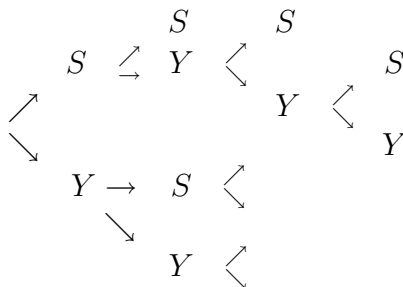


SOLUTIONS to QUIZ 6

- (1) A new type of series between the Boston Red Sox and the New York Yankees has been proposed (the theory being that this may finally lift the Curse of the Bambino). If the Sox win two games, they win the series; if the Yanks win three games, they win.

(a) Draw the tree diagram.



and so on

- (b) List all the possible such series between Sox and Yanks (for each series, record the sequence of S/Y wins).

SS SYS SYYS SYYY YSS
 YSYS YSY YYSS YYSY YYY

- (2) How many distinct arrangements of the letters in the address `www.google.com` are there? (Ignore the dots.)

There are 12 letters in all, with some repetitions: 3 w's, 3 o's, and 2 g's. Thus, the number of distinct arrangement is

$$\frac{12!}{3! \cdot 3! \cdot 2!} = 6,652,800$$

- (3) A hospital has 6 patients who need a CAT scan to be done next Monday. There are 10 technicians who can administer the CAT scan test. In how many ways can the tests be scheduled, if no technician can perform more than one CAT scan that day?

$$P(10, 6) = 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 = 151,200$$

- (4) The rarest language in the world is Cornish, with only 10 known fluent speakers (mostly in Cornwall, UK). Cornish is a very complex language, with 24 consonants and 5 vowels. How many 4-letter words starting with a consonant can be formed in Cornish (whether they make sense or not, that's besides the point), if letters may not be repeated.

$$24 \cdot 28 \cdot 27 \cdot 26 = 471,744$$

- (5) A soccer team has 24 players: 8 forwards, 4 midfielders, 9 defenders, and 3 goalies. How many different 11-member teams can be formed, where a team consists of 2 forwards, 4 midfielders, 4 defenders, and 1 goalie?

$$C(8, 2) \cdot C(4, 4) \cdot C(9, 4) \cdot C(3, 1) = 28 \cdot 1 \cdot 126 \cdot 3 = 10,584$$

- (6) A committee of 4 students is to be selected from a class of 16 students, of which 9 are women and 7 are men. How many committees containing at least 3 women are possible?

$$C(9, 3) \cdot C(7, 1) + C(9, 4) = 84 \cdot 7 + 126 = 714$$