Suppose you flip a fair coin four times. Let E be the event that you get at least three Heads, and let F be the event that the first flip is not Tails. What is the event that E occurs, but F does not?

(a) $\{THHH\}$

(b) $\{HHHH, HHHT, HHTH, HTHH, THHH\}$

(c) $\{HHHH, HHHT, HHTH, HTHH\}$

(d) $\{HHHT, HHTH, HTHH, THHH\}$

(e) $\{HHHT, HHTH, HTHH\}$

(f) $\{HHHH, TTTT, TTTH, TTHT, HTTT\}$

(g) $\{TTTT, TTTH, TTHT, HTTT\}$

(h) $\{HHHH, TTTH, TTHT, HTTT\}$

(i) $\{TTTH\}$

(j) $\{TTTT\}$

(k) $\{\}$

(l) None of these

$E = \{HHHT, HHTH, HTHH, THHH\}$

$F = \{HXXX\}$

Suppose you flip a fair coin four times. Let E be the event $\{HTHT, HTTT, TTTH\}$ and let F be the event $\{THTH, HTTT, TTTH\}$. Which of the following is the event that either E or F occurs, but not both?

(a) No two flips in a row give the same result.

(b) At least two Heads occur.

(c) At least two Tails occur.

(d) At least three Heads occur.

(e) At least three Tails occur.

(f) Two Heads and two tails occur.

(g) The sure event.

(h) The null event.

(i) The first and last flips are the same.

(j) The first and last flips are different.

(k) The second and third flips are different.

(l) None of these

$E \oplus F$

$\rightarrow E \Delta F = (E \setminus F) \cup (E \setminus F)$

$= (E \cup F) \setminus (E \cap F)$

$(E \cup F) \setminus (E \cap F)$

$\rightarrow \{HTTT, TTTH, THTH, HTHT\} \setminus \{HTTT, TTTH\}$

$= \{THTH, HTHT\}$

$C = \frac{n!}{r!(n-r)!}$

$\times 2,3 \rightarrow 1P, 2D$

D P

A box contains 7 coins, namely 4 dimes and 3 pennies. You pick 3 coins at random from the box without replacement. All coins are equally likely to be chosen. What is the probability that the three chosen coins are not all dimes and no two of the chosen coins are both pennies?

(a) 18/35

(b) 3/7

(c) 1/14

(d) 1/42

(e) 6/35

(f) 1/6

(g) 1/12

(h) 1/7

(i) 3/7

(j) 3/35

(k) 1/84

(l) None of these

$\binom{7}{3} = \frac{7!}{3!(7-3)!} = \frac{7!}{3!4!} = \frac{7 \cdot 6 \cdot 5}{3!} = 35$

$\binom{4}{2} \cdot \binom{3}{1} = \frac{4!}{2!2!} \cdot \frac{3!}{1!2!} = \frac{3 \cdot 2}{1} \cdot 3 = 18$

$\frac{18}{35}$