1.

P(H)=P(T)=0.5.

P(H2∩H4)=P(H2)×P(H4)

=0.5 × 0.5

= 0.25

2.

Total number of balls = 2 + 3 + 4 = 9

Probability that the first ball is red and the second is green:

P(R1∩G2) = (4/9) x (3/8) = (12/72)

Probability that the first ball is green and the second is red:

P(G1∩R2) = (3/9) x (4/8) = (12/72)

Summing both probabilities: (12/72) + (12/72) = (24/72) = (1/3)

3.

Scenarios where there are at least 2 tails(T):

a) TTT: 0.4 × 0.4 × 0.4 = 0.064

b) TTH: 0.4 × 0.4 × 0.6 = 0.096

c) THT: 0.4 × 0.6 × 0.4 = 0.096

d) HTT: 0.6 × 0.4 × 0.4 = 0.096

Summing all the probabilities:

0.064 + 0.096 + 0.096 + 0.096 = 0.352

4.

The probability of not winning for any single ticket is (995/1000) = 0.995.

For 4 tickets to all not be winners:

0.9954 = 0.9801

Using the complementary rule, the probability that he wins with at least one ticket:

1 – 0.9801 = 0.0199

5.

Let G be the event that a student is a girl and L be the event that a student has long hair.

Plug in:

Thus, given that a student has long hair, there’s roughly 91.3% chance they’re a girl when chosen randomly from this class of students.