

Wed Oct 28, 2020

MATH 3050 Discussion Meeting

Section 9.2 Intro to Probability

Random Process

Sample Space S set of all possible outcomes

Event $E \subseteq S$

Probability of Event $P(E) = \frac{N(E)}{N(S)}$
(for finite sample space S)

Example of drawing colored balls from an urn

Red balls R_1, R_2

Green balls G_1, G_2, G_3

Choose two balls with replacement

		Second ball				
		R_1	R_2	G_1	G_2	G_3
First Ball	R_1			●	●	●
	R_2			●	●	●
	G_1	●	●			
	G_2	●	●			
	G_3	●	●			

Choose two balls without replacement

		Second ball				
		R_1	R_2	G_1	G_2	G_3
First Ball	R_1	●		●	●	●
	R_2		●	●	●	
	G_1	●	●	●		
	G_2	●	●		●	
	G_3	●	●			●

Event E: exactly one of the balls drawn is green

$$N(E) = 12, \quad N(S) = 25$$

$$P(E) = \frac{12}{25}$$

$$N(E) = 12 \quad N(S) = 20$$

$$P(E) = \frac{12}{20} = \frac{3}{5} = 0.6$$

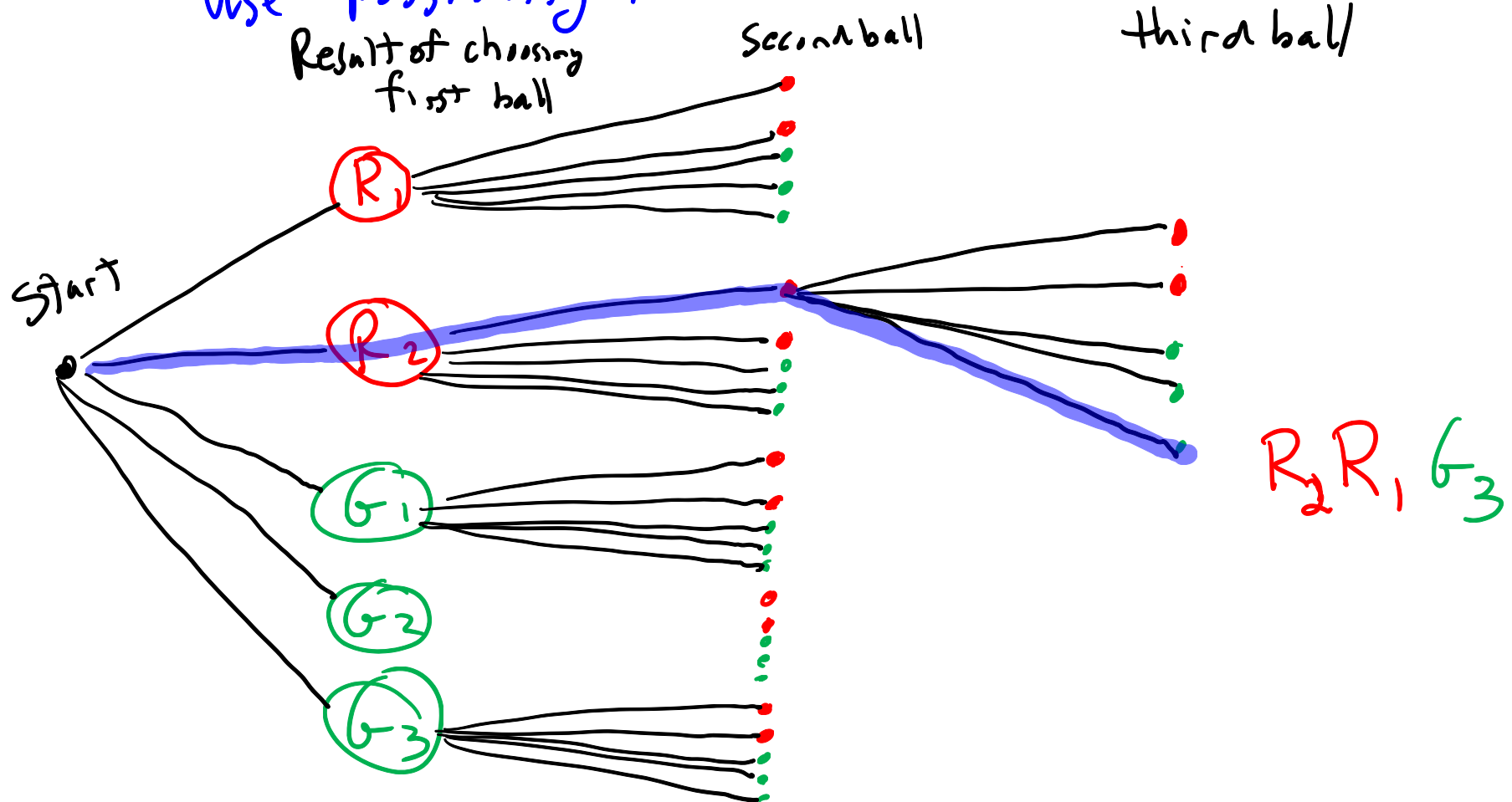
Section 9.2 concepts

Situations where table can't be used to illustrate sample space,

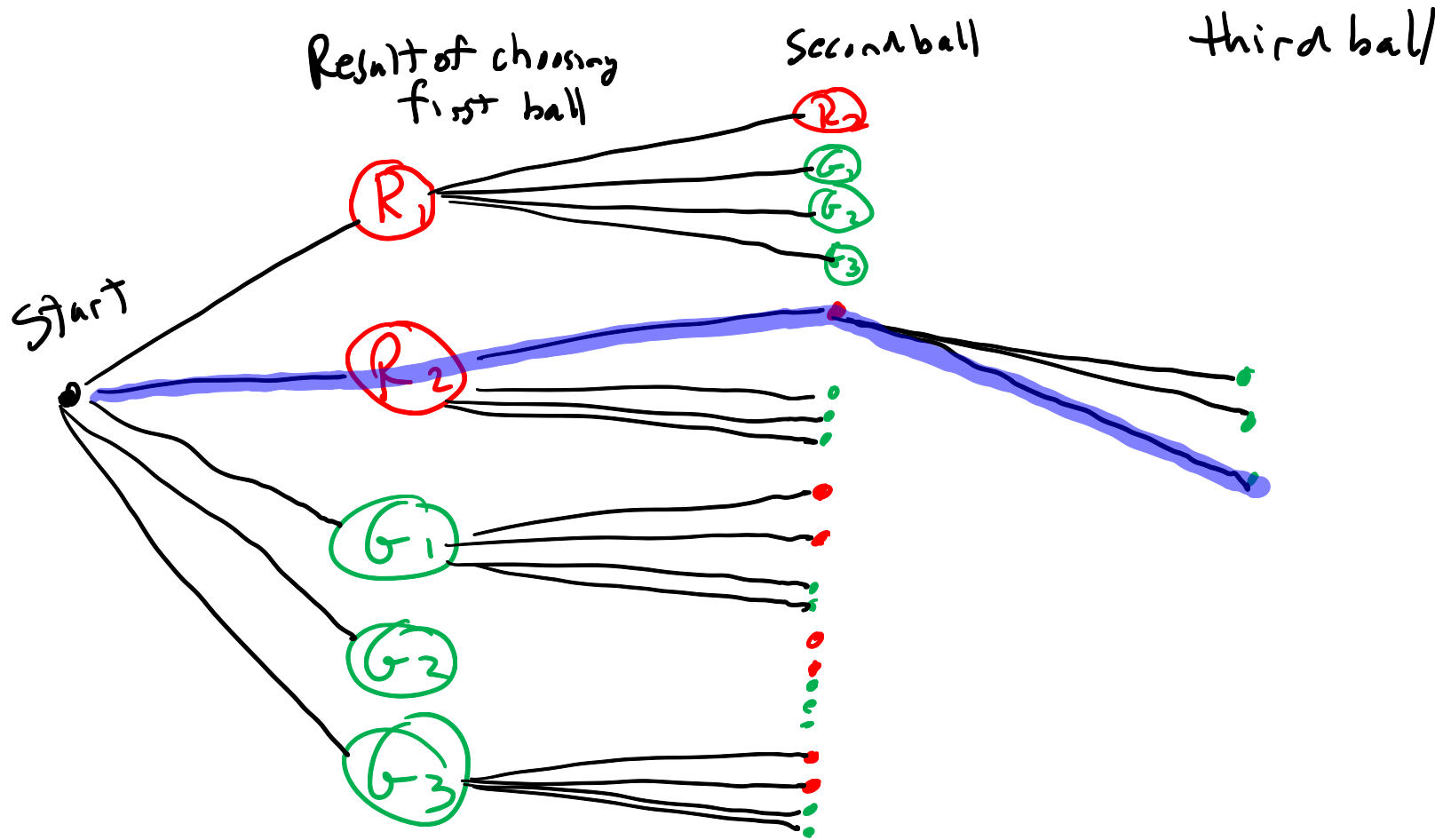
Example Consider the Same Urn as in previous example

Draw 3 balls, with replacement

Use possibility tree to illustrate sample space



Draw 3 balls without replacement



Counting lists

Example If the largest of 56 consecutive integers is 279,
what is the smallest?

index	0	^m 1	2		55	ⁿ 56
integer	223	224	225	...	278	279

$$56 - 56 = 0$$

$$279 - 56 = 223$$

$$\begin{aligned} 56 &= n - (m - 1) \\ &= 56 - (1 - 1) \\ &= 56 - 0 \\ &= 56 \end{aligned}$$

Example

① How many 2 digit integers?

Solution - 0, 1, 2, ..., 9, 10, 11, ..., 99 100

$$\text{Total} = 99 - 9 = 90$$
$$n - (m - 1)$$

② How many 2 digit integers that are multiples of 8?

Solution

index	0	1	2	3		11	12	13
integer	0	8	16	24	...	88	96	104

$$\text{total} = 12 - 1 = 11$$
$$n - (m - 1)$$

