**Lab | Statistics Foundations**

### **Challenge 1**

**A: The values that the player obtains:**

Values a player can receive are:

Set1 = Range(1, & then a number from 1 up to 6)

Set2 = Range(2, & then a number from 1 up to 6)

Set3 = Range(3, & then a number from 1 up to 6)

Set4 = Range(4, & then a number from 1 up to 6)

Set5 = Range(5, & then a number from 1 up to 6)

Set6 = Range(6, & then a number from 1 up to 6)

**B: The sum of the values obtained:**

Total unique possibilities = 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12

**C: The maximum value obtained after rolling both dices:**

Max = 12 (= 2 times 6)

**Case A: Both values are greater than 5**

Measurable space = 1 up to 6

Change that both rolls are bigger than 5 = 1/6 \* 1/6 = 2/36

**Case B: The sum of values is even.**Measurable space = 1 up 6   
Change that sum of values is even = 3/6 \* 3/6 = 9/36 = 1/4

**Case C: The maximum is the value of both rolls.**The maximum value of both rolls = 12  
Measurable space = 1 up to 6

### **Challenge 2**

**A: Number of figures:**Change is 12 out of 52 (if we only count farmer, queen & gentleman)

Sample space = 52

**B: Sum of card values:**

Measurable space = 52 cards because he can pick as many cards as he wants.

He can make different combinations for making the sum 17. He can draw:

ACE + number 2 🡪 change = 4/52 \* 4/51 = 0.06

10-value card + 7 🡪 change = 16/52 \* 4/51 = 0.0241

9-value card + 8 🡪 change = 4/52 \* 4/51 = 0.06

**C: Number of hearts or spades he picks**

Measurable space = 52

Change = 12/52 \* 11/52 = 0.0488

### **Challenge 3**

**A: The score of player A**

This can be any possible number between 1 and 6

**B: The greatest score:**

The greatest score per player can be 6 or if you sum the outcome of player 1 and player 2 you can have 12. It depends on what way you look to question.

**C: The earnings of player A if the game rules state that…..:**

Player A may only roll a number between 2 and 6 to make a change on the coin.

**D: The earnings of player A if the game rules state that….:**

Here can a player A wins maximum of 5 coins. (If player B rolls a 1 and player A rolls a 6).

Or it’s = SetA – (SetA intersection SetB)

**Case A:**

Player A has rolled a dice of 2  
Measurable space = 1 up to 6

**Case B:**

That means that there is a change of 4 out of 36 that the greatest score is 1 or 2

You can only roll 1 or 2 to have this score.

Measurable space = 1 up to 6

**Case C:**

Player A has rolled a number of 6 and player B has rolled 2 or Player A has rolled 5 and Player B has rolled 1.

Player A has rolled a number of 3 or less, because we don’t have more information we can’t give the exact number.

Means that Player A and player B has rolled the same number change is 1/6 = 2/12

### **Bonus Challenge 1:**

**Case A:**

Problem here is that we don’t know if there is a replacement or not. This makes a huge difference in calculating the probability.

First pick = 1 out of 4 (Green ball) + Second pick 1 out of 3 (Blue ball) + Third pick 1 out of 2 (Red Ball)

In case if we think that every balls is a point.

**Case B:**

First case all the players has picked the black ball at first attempt. (both players = 0)

Second case: both players has picked the red ball.

Third case: They both picked the Blue, Green & Redbal

**Case C:**

All the players has picked the black ball at the first attempt.

(1 out of 4 changes to do that).

### **Bonus Challenge 2:**

If the game is without replacement than it changes a lot because you always gonna get 2 or 3 losers…

### **Bonus Challenge 3:**

**Case A:**

There a 5 unique values so first we have 1 change out 5, for the second pick we have a 1 change out of 4 and for the third pick we have a 1 change out of 3 🡪 This is off course in an ideal world were we pick the white balls after each other.

= 1/5\*1/4\*1/3 = probability

**Case B:**

Every time we pick there are 5 values 🡪 have 3 changes to pick White balls:

3/5 \* 3/5 \* 3/5 = probability 27/125

**Case C:**

There a 5 unique values so first we have 1 change out 5, for the second pick we have a 1 change out of 4 🡪 This is off course in an ideal world were we pick the black balls after each other.

= 1/5\*1/4 = probability

**Case D:**

Every time we pick there are 5 values 🡪 have 2 changes to pick Black balls:

2/5 \* 2/5 \* 2/5 = probability 8/125