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In-Class Assignment

Probability Distributions

**Q1: How could you define an *event* in your sampling scheme? Explain your reasoning.**

An event is the total number of possible combinations in this sampling scheme. There are 0-6 combinations in this scenario because there are six plots where birds can be present, and each can have birds either present or absent.

**Q2: What is the sample space of the bird sampling scheme?**

The sample space is the total number of possible events, which can range from 0-6 birds.

**Q3. How many ways are there to arrange two presences**

There are 15 possible permutations of 2 birds in 6 plots. We numbered the plots and worked through each possible permutation manually.

|  |  |  |
| --- | --- | --- |
| 1 | 2 | 3 |
| 4 | 5 | 6 |

Possible combinations:

1 and 2, 1 and 3, 1 and 4, 1 and 5, 1 and 6

2 and 3, 2 and 4, 2 and 5, 2 and 6

3 and 4, 3 and 5, 3 and 6

4 and 5, 4 and 6

5 and 6

**Q4.**

It is not unusual to observe 2 birds in the six plots because the expected condition is 3 birds in the six plots. Stochastic processes introduce variation into natural systems so deviations from the expected value are normal. Since the sample space allows us to have values ranging from 0 to 6 plots occupied by the birds, a value of 2 is well within this range of plausible values.

**Q5.**

There are 6 events in this sample space. These are combinations because we are grabbing them both at once and the order doesn’t matter.

**R = Red, U= unmarked, W= white**

**RW, RU, RR**

**WW, WU**

**UU**

**Q6.** There are 9 events in the sample space. These are permutations because we are grabbing them in a specific order.

**RW, WR, RU, UR, RR**

**WW, WU,UW**

**UU**