**Exercise 2**

**Recall briefly the definition and math notions relevant to "probability space" and make some simple examples, indicating among the triple of the space the meaning of each element in your particular example.**

The "probability space" is a fundamental concept in probability theory and statistics. It is a mathematical set that represents all possible outcomes or results of a random experiment. The relevant mathematical concepts include:

Random Event: A random event is a possible outcome of an experiment. Random events can be simple (such as the outcome of a coin toss being heads or tails) or compound (such as getting a specific combination of results when rolling two dice).

Sample Space: The sample space (or event space) is the set of all possible outcomes of the experiment. It is often denoted by the letter "S." For example, in the sample space of a coin toss, we would have S = {heads, tails}.

Probability: Probability is a measure of the uncertainty associated with each random event. It is a number between 0 and 1, where 0 indicates that the event will never occur, and 1 indicates that the event will always occur. The sum of the probabilities of all possible events in the sample space equals 1.

Here are some simple examples:

Example 1: Coin Toss

Sample Space (S): {heads, tails}

Random Event: Getting "heads" or "tails"

Probability of heads: P(heads) = 0.5

Probability of tails: P(tails) = 0.5

Example 2: Rolling a Die

Sample Space (S): {1, 2, 3, 4, 5, 6}

Random Event: Getting one of the six numbers on the die

Probability of rolling a 3: P(3) = 1/6

Probability of rolling an even number: P(even number) = 3/6 = ½

**If you wanted to model probabilistically the homework Exercise 1, explain what the 3 sets of your probability space and their elements are, in this case.**

Let's suppose there are 5 attacks (N = 5), and the probability of penetration in each attack is 0.2 (p = 0.2). Therefore, the sample space is Ω = {"penetrated", "protected"}, and the event space could include events such as {"first attack penetrated", "second attack protected", "third attack penetrated", "fourth attack penetrated", "fifth attack protected"}. The probability measure assigns a probability of 0.2 to the "penetrated" events and 0.8 to the "protected" events