Abdullah Gul University

Math-301 (Probability & Statistics)

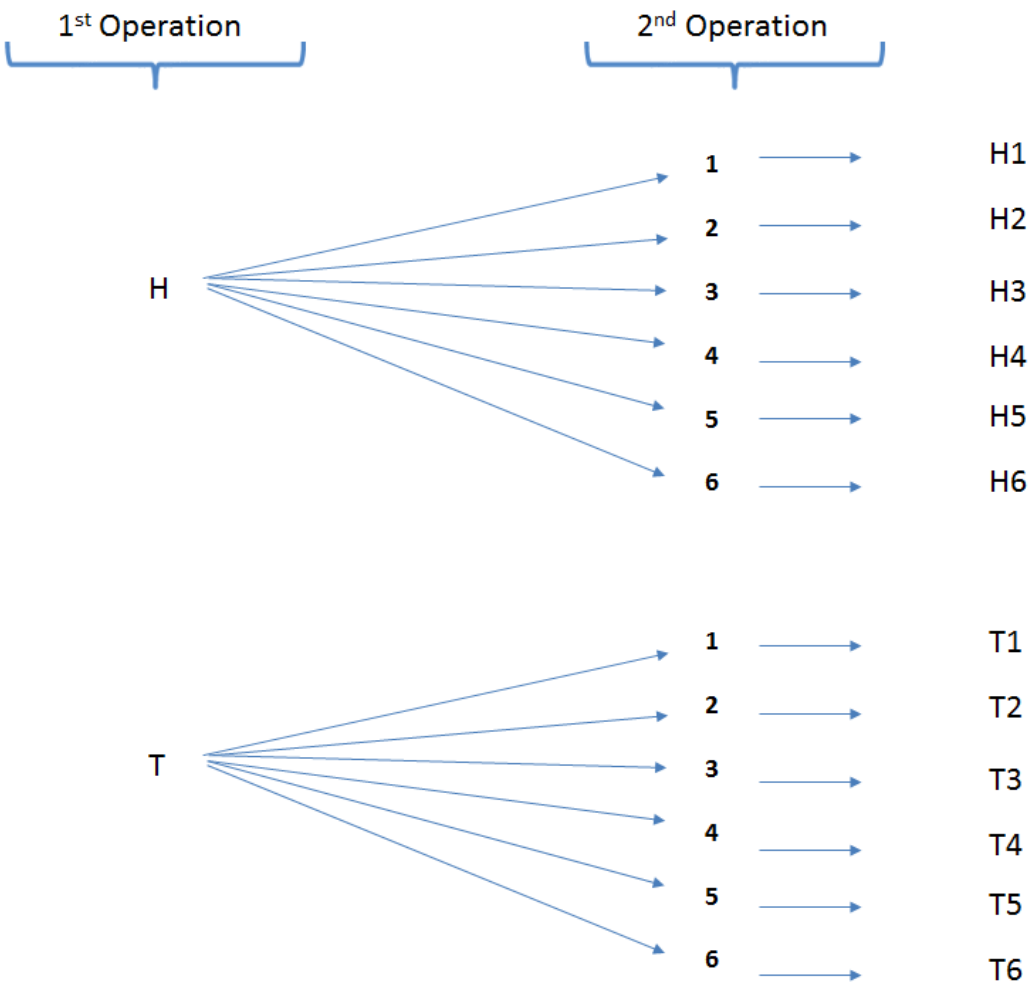
Fall 2022, QUIZ - III

Name & Surname:
ID Number:

Q 1. If an experiment consists of flipping a coin and then tossing a die, show what sample points exist in the sample space, **by drawing tree-diagram**?

(30 pt.)

SOLUTION:



Q 2. (40 pt.) A committee of size is to be selected from a group of 6 men and 9 women. So, how many ways does the sample space occur for the selection consist of 3 men and 2 women?

SOLUTION:

The first operation is to select 3 men among 6 men, and the second one is to select 2 women among 9 women. So, for the first operation, 6 men should be partitioned into 3-people and the other 3-people parts. For the first operation, the sample space consists of some ways as below;

$$\#S_1 = \frac{6!}{(3!)(3!)} = \frac{(6)(5)(4)(3!)}{(3!)(3)(2)(1)} = 20$$

For the second operation, 9 women should be partitioned into 2-people and the other 7-people parts. So, for the second operation, the sample space consists of some ways as below;

$$\#S_2 = \frac{9!}{(2!)(7!)} = \frac{(9)(8)(7!)}{(2)(1)(7!)} = 36$$

Then, to find the number of the whole sample space, we can apply the multiplication rule;

$$\#S = (20)(36) = 720$$

Q 3. (30 pt.) A system is composed of four components, each of which is either working or failed. Consider an experiment that consists of observing the status of each component, and let the outcome of the experiment be given by the vector (X_1, X_2, X_3, X_4) where X_i is equal to 1 if component *i* is working and is equal to 0 if component *i* is failed?

SOLUTION:

We have 4-digit vector. Each digit can be 1 or 0 numbers. So, the number of the sample space can be calculated as below;

$$\#S = (2)(2)(2)(2) = 16$$