بسم الله الرحمن الرحيم

chapter 4.1

Basics of probability

probability is the chance that a particular event occur

The probability value will be in the range 0 – 1 → P(success) = 0.80 رقم عشري محصور بين الصفر والواحد

A value of 0 means that the event Will Not Occur (Impossible) حدث مستحيل

P(7) = 0

A probability of 1 means that the event will occur (sure) حدث مؤكد

P(H or T) = 1

Probability Cannot be negative P(6) = -0.4 ✗✗

Probability Cannot be greater than 1 P(6) = 1.2 ✗✗

Experiment

A process that produces a single outcome whose result can not be predicted with certainly

Event حدث لا يمكن التنبؤ به

is the outcome of an experiment.

Events = {1, 2, 3, 4, 5, 6}

Event حدث

Sample space $SS = \{\}$ فضاء العينة

The collection of outcomes that can result

The basics of probability examples

Probability:. chance of a new business succeeding P(Succeed) = 0.25 ← النتائج المتوقعة

Experiment: (Activities associated with starting a new business) ✓

Sample space: (business succeeds,Business fails) ✓ النتيجة المحتملة وحيدة نتيجة التجربة

Probability:- (chance of a new hire quitting within first month on the job)
P (Quit) = 0.10 ← الاحتمال المتوقع

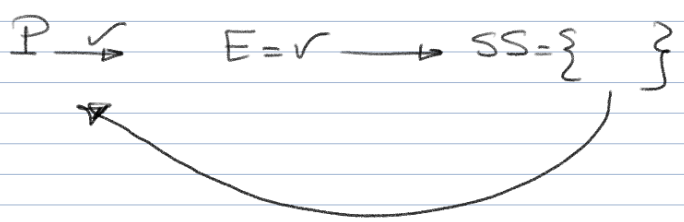
Experiment:- Employee is hired and begins work التجربة

Sample space:. (Employee quits, Employee does not quit) وحيدة نتيجة التجربة

Probability:- likelihood of an oil well containing oil P (oil)=0.60 الاحتمال المتوقع

Experiment:- Drill an oil well اعمل التجربة

Sample space:. {strike oil, Not strike oil} احدى نتيجة التجربة



Probability:- chance of producing 3 or more defects in one hour P (x>3)=0.20

Experiment:- produce products for one hour and inspect for defects

Sample space:. {x =0, 1,2, 3 Or more}

Defining the sample space

فضاء العينة

① Define the experiment

Ex:- The sale the item of interest is the product sold

② Define the outcomes for one trial of experiment

e1=Hamburger e2=cheeseburger e3:=bacon burger

③ Define the Sample space

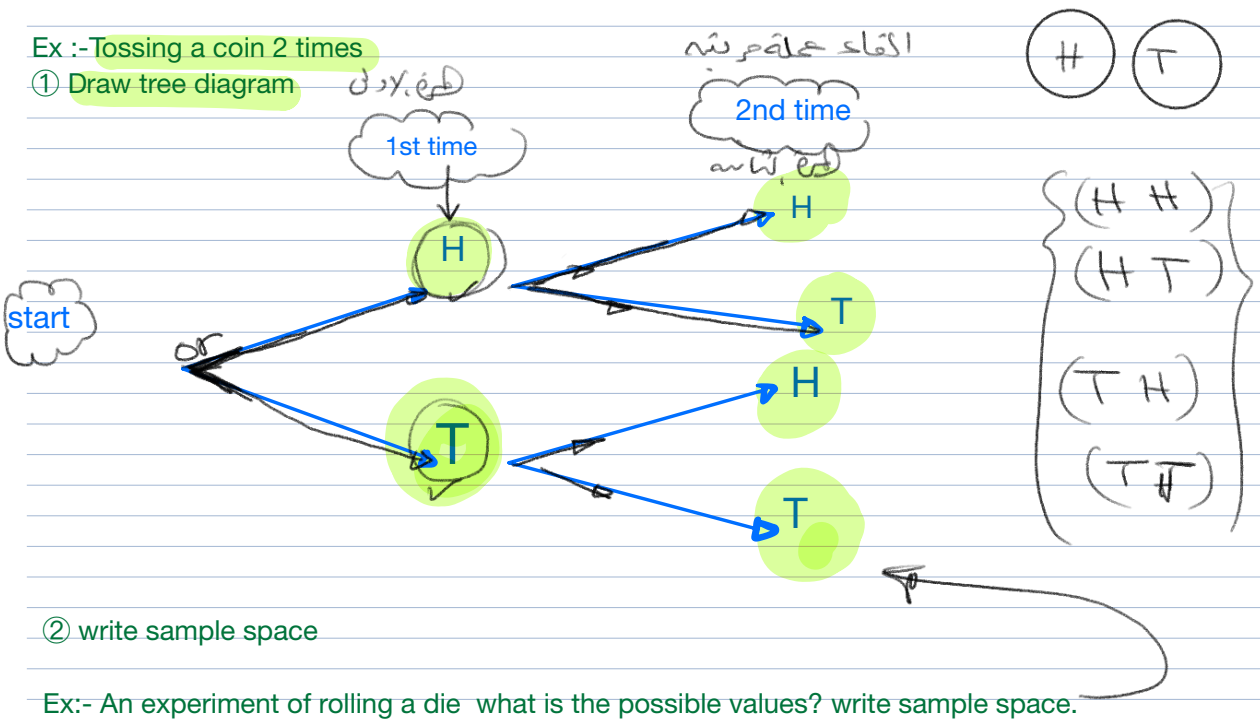
$$SS = \{e_1, e_2, e_3\}$$

Tree diagram

is a useful way to define the sample space for an experiment that helps ensure no outcomes are omitted or repeated

Ex :-Tossing a coin 2 times

① Draw tree diagram



② write sample space

Ex:- An experiment of rolling a die what is the possible values? write sample space.

Die:-

SS= $\{1, 2, 3, 4, 5, 6\}$

possible value = 6

Ex :-An experiment of rolling a die and tossing a coin write sample space.

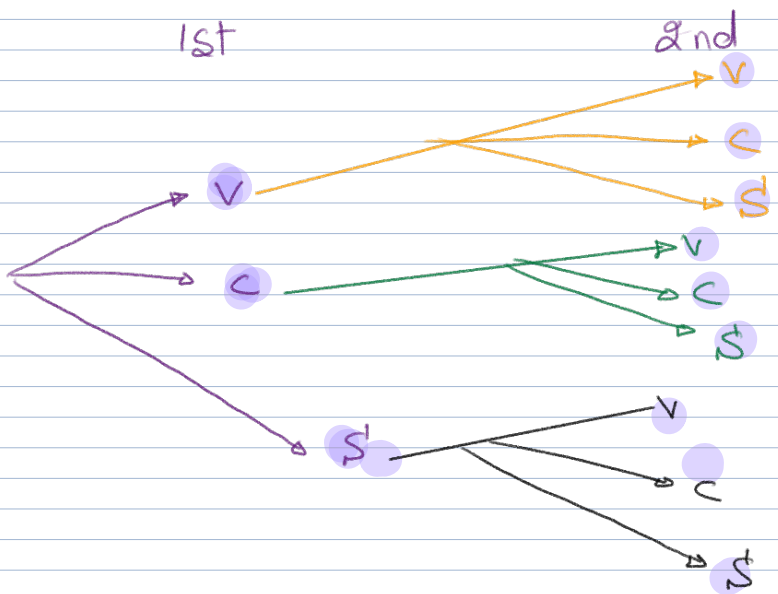
SS. $\{(1, H)(1, T), (2, H), (2, T), (3, H), (3, T), (4, H), (4, T), (5, H), (5, T), (6, H), (6, T)\}$

$$SS = \{(1,H)(1,T)(2,H)(2,T)(3,H)(3,T)$$
$$(4,H)(4,T)(5,H)(5,T)(6,H)(6,T)\}$$

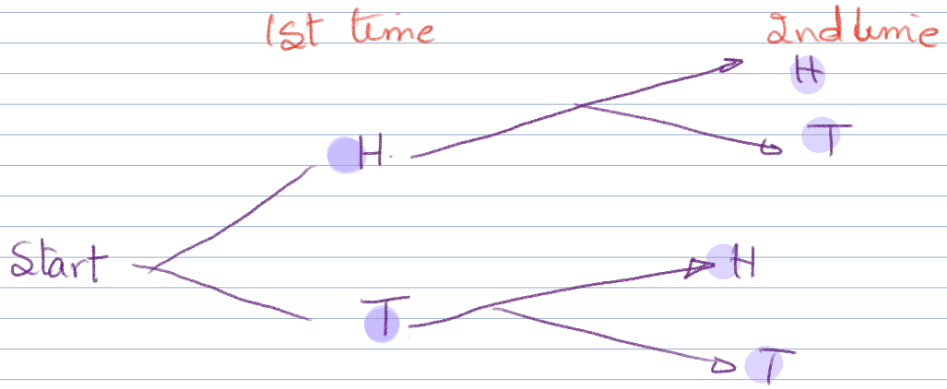
H.W Write sample space of an experiment Tossing a coin then Rolling a die ?

4-3. If two customers are asked to list their choice of ice cream flavor from among vanilla, chocolate, and strawberry, list the sample space showing the possible outcomes.

SS = {(V,V) (V,C) (V,S)
(C,V) (C,C) (C,S)
(S,V) (S,C) (S,S)}



Write a sample space of tossing coin 2 times



$$SS = \{(H,H)\ (H,T)\ (T,H)\ (T,T)\}$$

H.W write S.S and draw tree diagram for an Experiment of tossing coin 3 times