PROBABILITY

INTRODUCTION

Definisi:

Probability is the chance of an event

Manfaat:

are calculated the probability benefits are help making the right decision, because there is no perfect in the world.

Example:

1. **stock prices based on the analysis of stock price**
2. **opportunities for products launched (successfully or not), etc..**

INTRODUCTION

Probability :

A measure of the posibility event will happen in the future. Probability expressed between 0 to 1 or a percentage.

Experimen:

Observations of some activity or process that allows at least two event without watch which events will occur

***Outcome* :**

Outcome from experiment

***Event* :**

A collection of one or more results that occur in an experiment or activity.

Probability meaning

experiment

Experiment	football match at the Stadium Persita VS PSIS Tangerang, March 5, 2010
outcomes	Persita win Persita lose draw -- Persita no lose or win
event	Persita win

PROBABILITY APPROACH

1. CLASICAL
2. RELATIVE
3. SUBJECTIVE

Classical Approach

Classical probability is predicated on the assumption that the outcomes of an experiment are equally likely to happen. The classical probability utilizes rules and laws. It involves an experiment. The following equation is used to assign classical probability:

Formula :

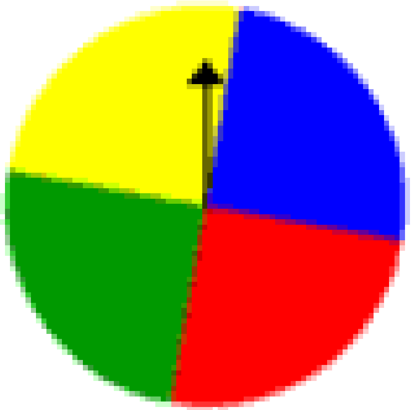
$$probability = \frac{\text{Number of favorable outcomes}}{\text{Total number of possible outcomes}}$$

classic

Experiment 1: A spinner has 4 equal sectors colored yellow, blue, green and red. After spinning the spinner, what is the probability of landing on each color?

Outcomes: The possible outcomes of this experiment are yellow, blue, green, and red.

Probabilities:



$$P(\text{yellow}) = \frac{\text{\# of ways to land on yellow}}{\text{total \# of colors}} = \frac{1}{4}$$

$$P(\text{blue}) = \frac{\text{\# of ways to land on blue}}{\text{total \# of colors}} = \frac{1}{4}$$

$$P(\text{green}) = \frac{\text{\# of ways to land on green}}{\text{total \# of colors}} = \frac{1}{4}$$

$$P(\text{red}) = \frac{\text{\# of ways to land on red}}{\text{total \# of colors}} = \frac{1}{4}$$

Relative Frequency Approach:

- Relative probability is based on cumulated historical data. The following equation is used to assign this type of probability:

$$probability = \frac{\text{Number of times an event occurred in the pasts}}{\text{Total number of opportunities for the event to occur}}$$

For example,

- Your company wants to decide on the probability that its inspectors are going to reject the next batch of raw materials from a supplier. Data collected from your company record books show that the supplier had sent your company 80 batches in the past, and inspectors had rejected 15 of them. By the method of relative probability, the probability of the inspectors rejecting the next batch is 15/80, or 0.19. If the next batch is rejected, the relative probability for the subsequent shipment would change to 16/81 = 0.20

Subjective Approach

The subjective probability is based on personal judgment, accumulation of knowledge, and experience.

For example

Medical doctors sometimes assign subjective probabilities to the length of life expectancy for people having cancer. Weather forecasting is another example of subjective probability.

- **Event (Outcome):**

  An event is a possible outcome of an experiment. For example, if the experiment is to sample six lamps coming off a production line, an event could be to get one defective and five good ones.

Elementary Events:

- Elementary events are those types of events that cannot be broken into other events. For example, suppose that the experiment is to roll a die. The elementary events for this experiment are to roll a 1 or a 2, and so on, i.e., there are six elementary events (1, 2, 3, 4, 5, 6). Note that rolling an even number is an event, but it is not an elementary event, because the even number can be broken down further into events 2, 4, and 6.

Sample Space:

A sample space is a complete set of all events of an experiment. The sample space for the roll of a single die is 1, 2, 3, 4, 5, and 6. The sample space of the experiment of tossing a coin three times is:

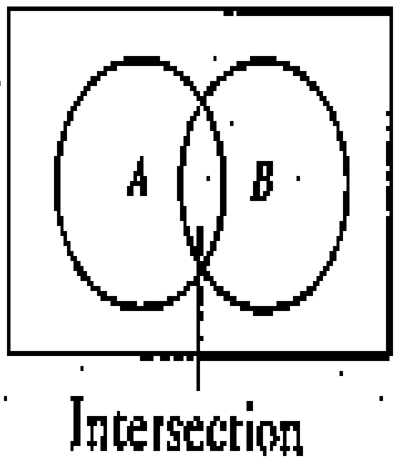
First toss.........T T T T H H H H
Second toss.....T T H H T T H H
Third toss........T H T H T H T H

Sample space can aid in finding probabilities. However, using the sample space to express probabilities is hard when the sample space is large. Hence, we usually use other approaches to determine probability.

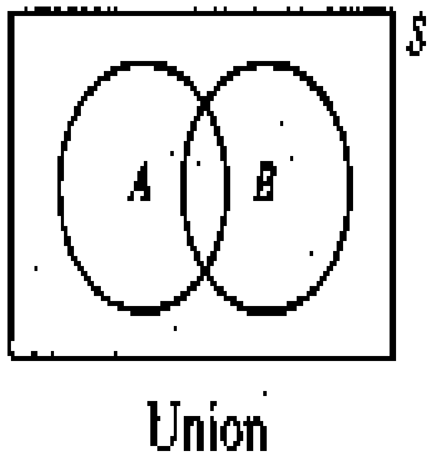
Unions & Intersections:

- An element qualifies for the **union** of X, Y if it is in either X or Y or in both X and Y. For example, if X=(2, 8, 14, 18) and Y=(4, 6, 8, 10, 12), then the union of (X,Y)=(2, 4, 6, 8, 10, 12, 14, 18). The key word indicating the union of two or more events is *or.*

- An element qualifies for the **intersection** of X,Y if it is in *both* X and Y. For example, if X=(2, 8, 14, 18) and Y=(4, 6, 8, 10, 12), then the intersection of (X,Y)=8. The key word indicating the intersection of two or more events is *and.* See the following figures:



(a) Event "A and B"



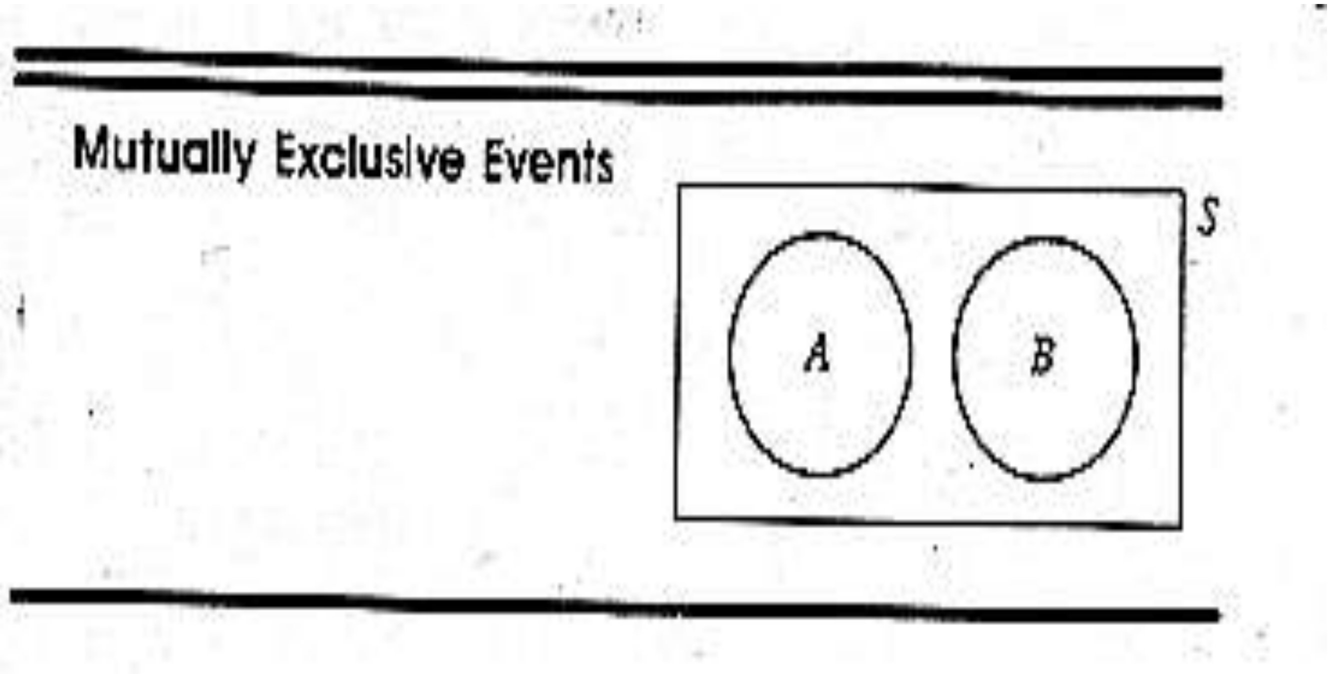
(b) Event "A or B"

Events "A and B" and "A or B" When A and B Are *Not* Mutually Exclusive

Mutually Exclusive Events:

- Those events that cannot happen together are called mutually exclusive events. For example, in the toss of a single coin, the events of heads and tails are mutually exclusive. The probability of two mutually exclusive events occurring at the same time is zero.

See the following figure:



Independent Events:

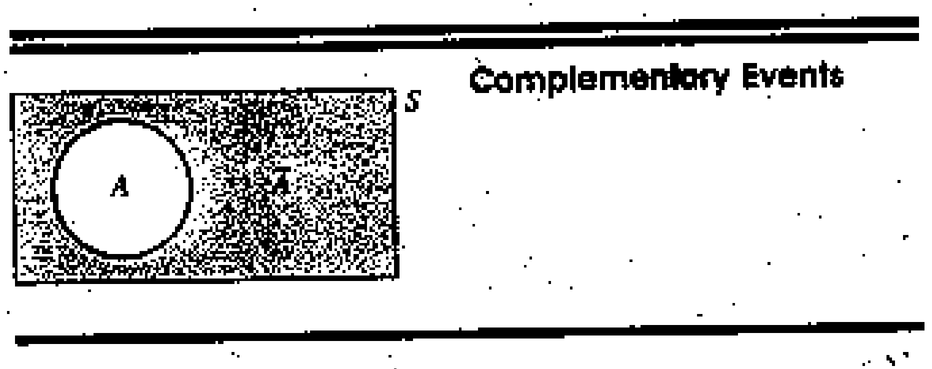
- Two or more events are called independent events when the occurrence or nonoccurrence of one of the events does not affect the occurrence or nonoccurrence of the others. Thus, when two events are independent, the probability of attaining the second event is the same regardless of the outcome of the first event.
- For example, the probability of tossing a head is always 0.5, regardless of what was tossed previously. Note that in these types of experiments, the events are independent if sampling is done with *replacement.*

Collectively Exhaustive Events:

- A list of collectively exhaustive events contains all possible elementary events for an experiment.
- For example, for the die-tossing experiment, the set of events consists of 1, 2, 3, 4, 5, and 6. The set is collectively exhaustive because it includes all possible outcomes. Thus, all sample spaces are collectively exhaustive.

Complementary Events:

The complement of an event such as A consists of all events *not included* in A. For example, if in rolling a die, event A is getting an odd number, the complement of A is getting an even number. Thus, the complement of event A contains whatever portion of the sample space that event A does not contain. See the following figure:



Reference

- http://www.analyzemath.com/statistics/discrete_pro_distribution.html