Leadership Development

Meeting-13 SM III
2019-2020

DECISION TREE DIAGRAM

Students can understand and know decision tree diagram

Meeting-13 Semester-3/Odd
Year: 2019-2020

UNDERSTANDING OF DIAGRAM

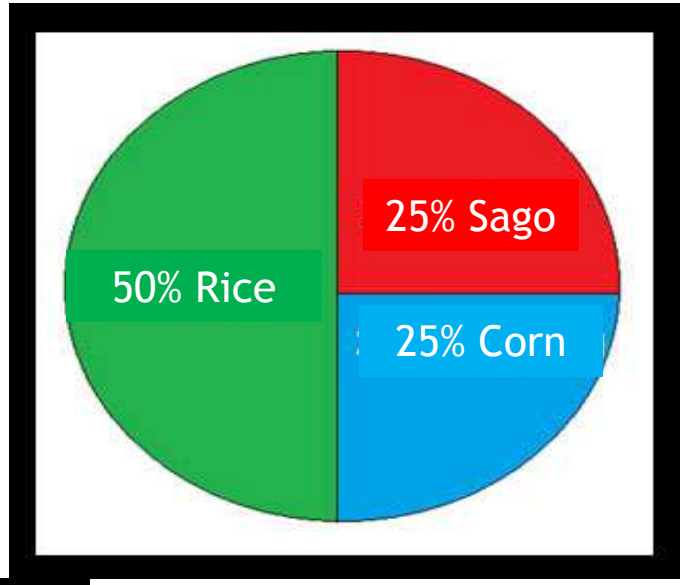
- Diagram is a picture to show or explain a data that will be presented.
- Other diagram definition is certain symbols that can be used to explain the facilities, procedures and activities that are normally carried out in a system

TYPES OF DIAGRAMS

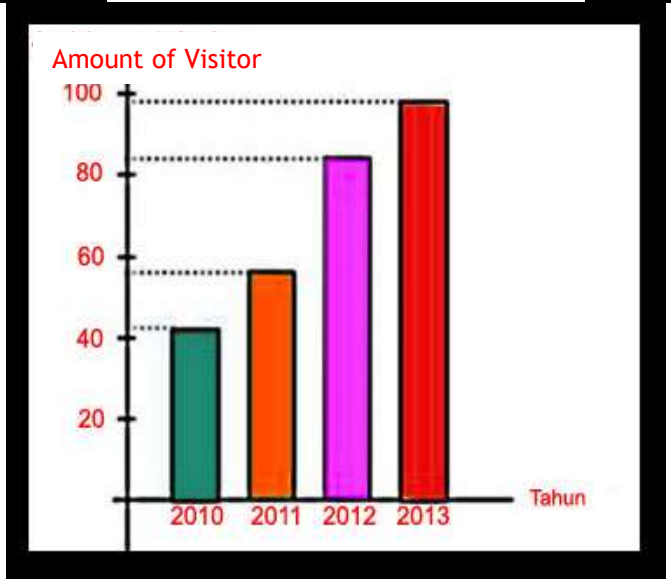
a. Line Chart
b. Pie Chart
c. Bar Chart
d. Stem Chart (stem-leaf chart)
e. Line-Grid Diagram

EXAMPLES OF DIAGRAM

LINE CHART



PIE CHART

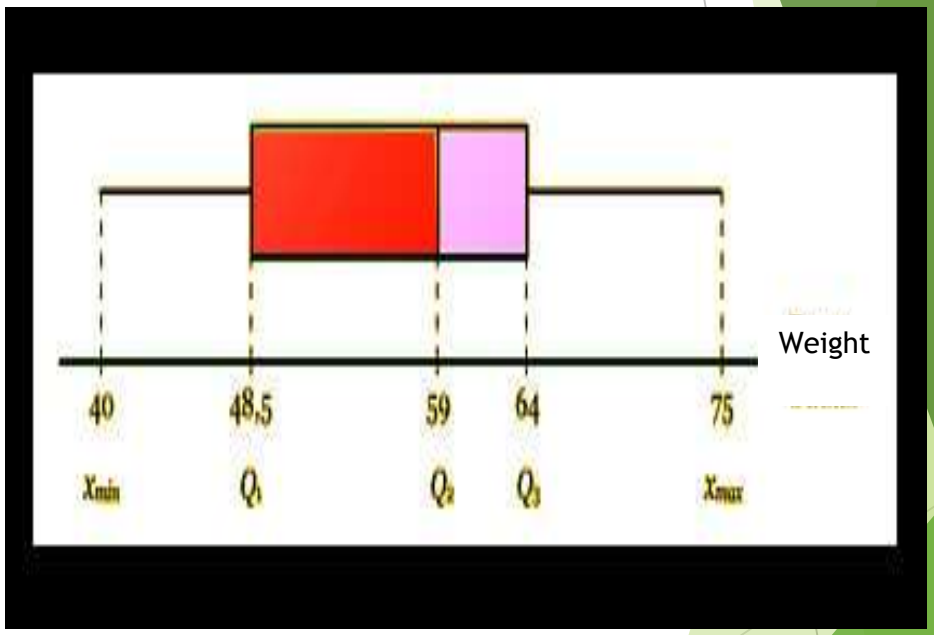


BAR CHART

EXAMPLES OF DIAGRAM

Stem	Leaf
1	0 5 6 6 6
2	0 1 1 1 6 7
3	1 2 6 8 9
4	2 2 7
5	1 1 1 8
6	1

STEM-LEAF DIAGRAM



LINE-GRID CHART

EXAMPLE: IMPLEMENTATION OF STEAM-LEAF CHART

Scores of Mid Test (UTS) from 36 students are as follows:

44	56	63	65	61	70	74	71	76	71	72	73
75	76	84	83	84	85	85	89	94	91	95	97
47	59	66	68	64	71	75	73	79	71	73	76

If the data is made in Steam-Leaf Chart form, so we can see the tendency and the spread as follow:

Stem	Leaf
4	4 7
5	6 9
6	1 3 4 5 6 8
7	0 1 1 1 1 2 3 3 3 4 5 5 6 6 6 9
8	3 4 4 5 5 9
9	1 4 5 7

EXAMPLE: IMPLEMENTATION OF LINE-GRID CHART

The following are weight data (in kg) from 36 students chosen randomly

47	44	40	50	63	64	67	56	58	60	63	64
70	60	58	62	58	52	75	41	57	54	55	45
65	69	64	68	63	67	42	66	61	47	44	47

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Sort the weight data from smallest to largest

40	41	42	44	44	45	47	47	47	50	52	54
55	56	57	58	58	58	60	60	61	62	63	63
63	64	64	64	65	66	67	67	68	69	70	75

- ✓ After the data is sorted, the smallest and largest weights are obtained respectively **40** and **75.**
- ✓ The overall data is 36, so **the bottom quartile** is in data to **(36 + 1) / 4 = 9.25,** which is located between **the 9th and 10th** data.
- ✓ Q1 is the average of the 9th and 10th data, namely **Q1 = (x9 + x10) / 2 = (47 + 50) / 2 = 48.5.**
- ✓ While the median lies in the data to **(36 + 1) / 2 = 18.5**, so **Q2 = (x18 + x19) / 2 = (58 + 60) / 2 = 59.**
- ✓ And the upper quartile lies in the data to **3/4 * (36 + 1) = 27.75** ie **Q3 = (x27 + x28) / 2 = (64 + 64) / 2 = 64.**

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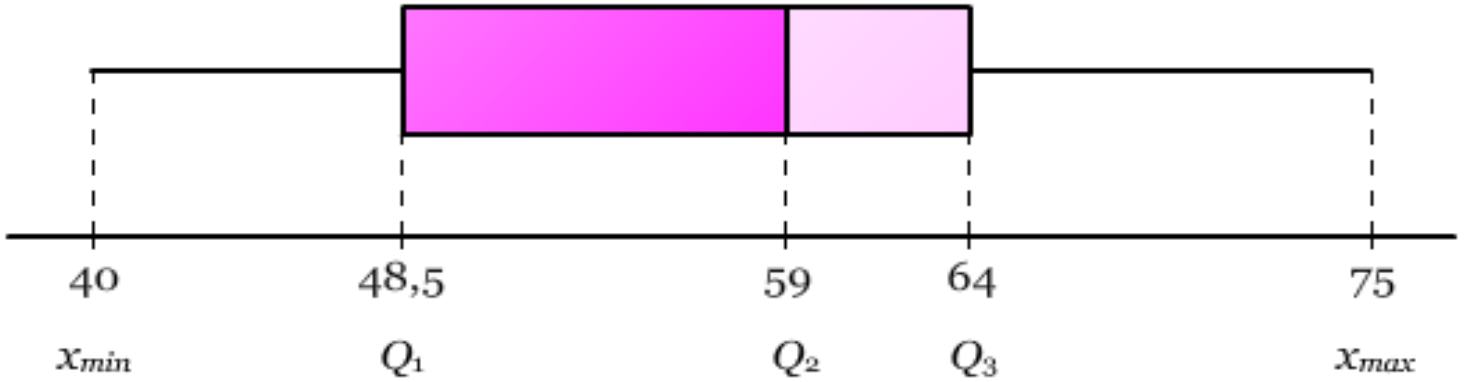
Line Box Diagram Of Weight Data



The information that can be obtained is as follows:

- The largest weight **(75)** is further to **Q3 (64)** than the smallest weight **(40)** to **Q1 (48.5)**, means that **the data distribution tends to the right.**
- 25% of the data lies between the smallest weight **(40) to Q1 (48.5),** and 25% of the data lies between **Q3 (64) and maximum weight (75).**
- The box contains 50% of the data, but **the data between Q1 and Q2 is more spread out than between Q2 and Q3**.

DECISION TREE DIAGRAM

DECISION TREE DIAGRAM

- A diagram that systematically and comprehensively illustrates the relationship between alternative decisions/ actions with uncertain events (covering each alternative and alternative outcomes that is chosen)
- It is a chronological sequence about what conditions might occur for each alternative decision
- Aims to facilitate the drawing of decisions that is made step by step

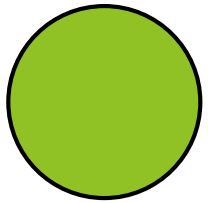
DECISION DIAGRAM NOTATION

NEED TO BE DIFFERENT BETWEEN:

- When one of the alternatives available is chosen *we have control in acting (we have the power to choose)*
- When the occurrence of uncertain events that will determine the results and alternatives *(we can't control it)*

NOTATION USED

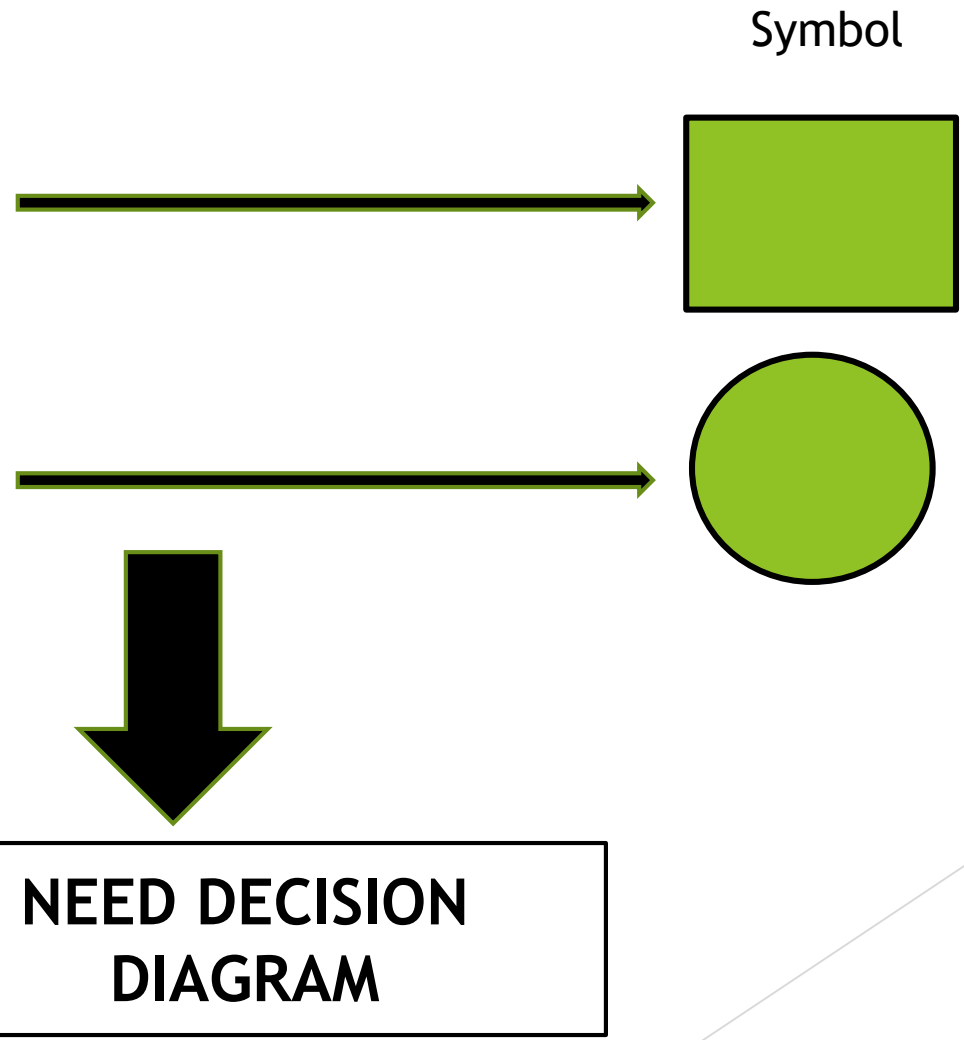
ALTERNATIVE/ OPTIONS NODE/ SYMBOL



UNCERTAINTY EVENT NODE/ SYMBOL

DECISION SITUATION

1. ALTERNATIVE
2. UNCERTAINTY



EXAMPLE

Lottery games

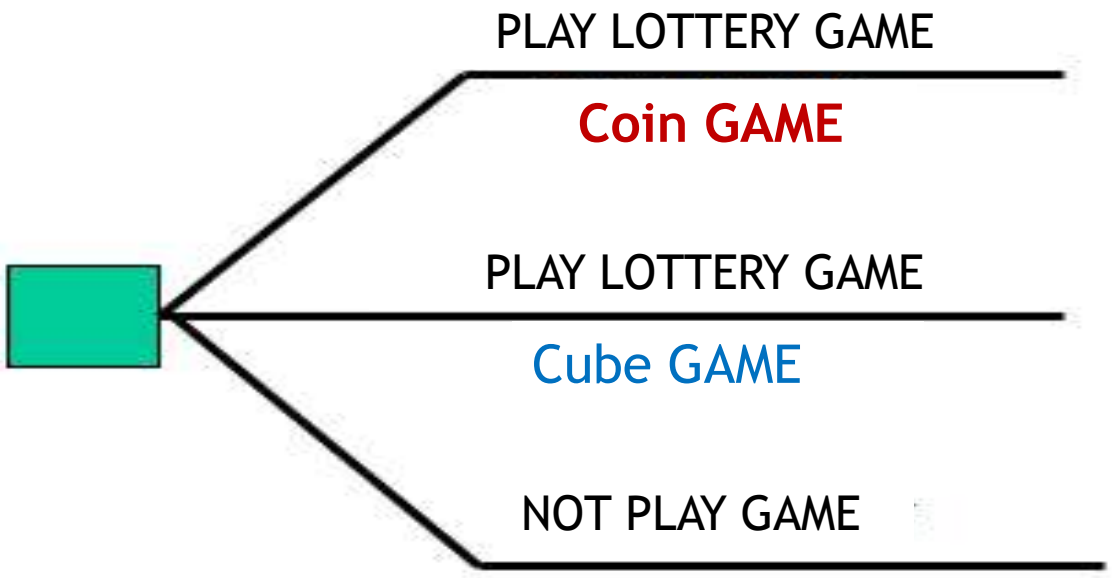
There two games:

1) Coin Games 

2) Cube Games 

Try to describe the alternative/ option model using the decision node

Alternative Node (Choice)



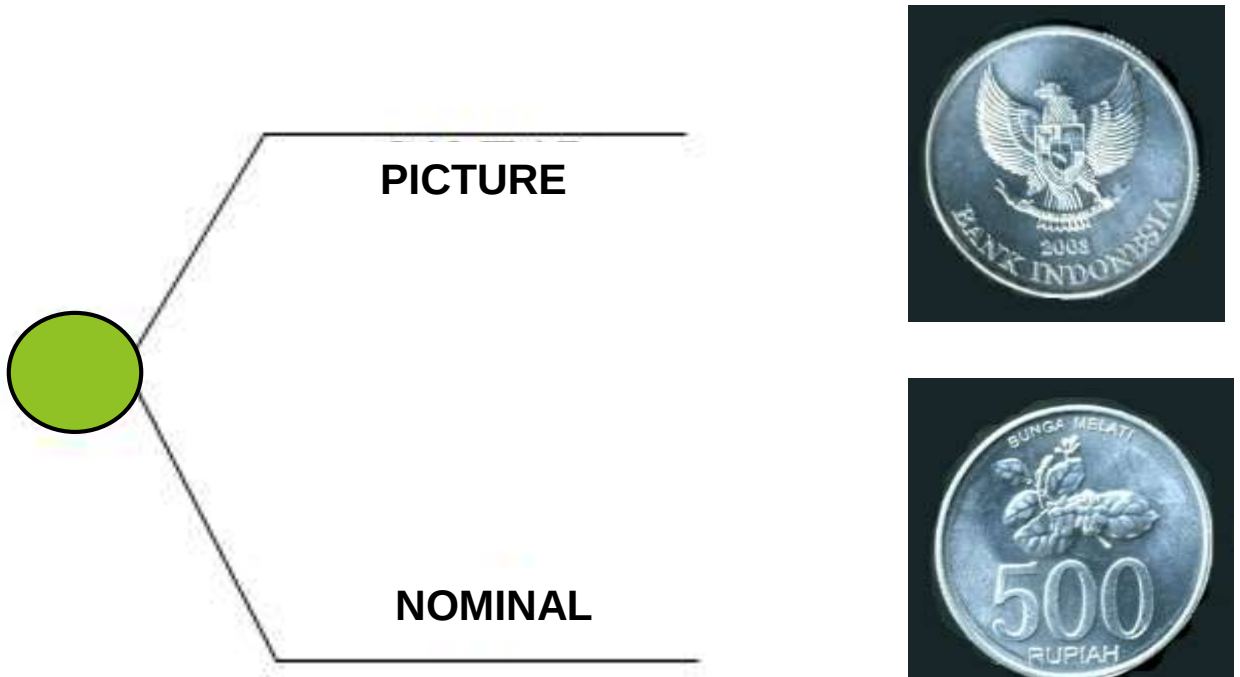
Uncertainty Event Node

DRAW UNCERTAINTY EVENT NODE

SYMBOL

1) PLAYING COIN
2) PLAYING CUBE/ DICE

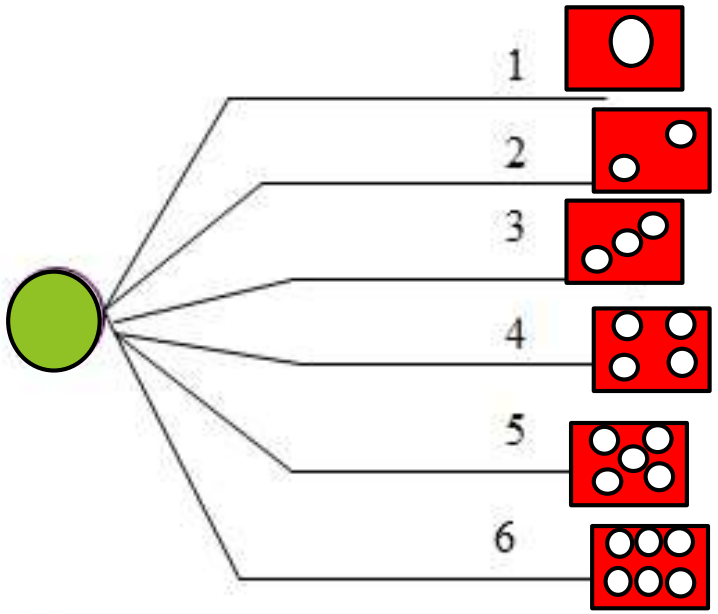
Uncertainty Node



UNCERTAINTY EVEN

Uncertainty Node

CUBE GAME

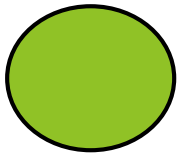


UNCERTAINTY EVEN

DECISION SITUATION

- Decision situation is so complex → It consist of *a collection of alternatives*, where in *each alternative there are uncertain conditions*
- It needs to be described in an alternative and comprehensive manner which is a chronological sequence about what conditions might occur for each alternative decision → called *Decision Diagram*

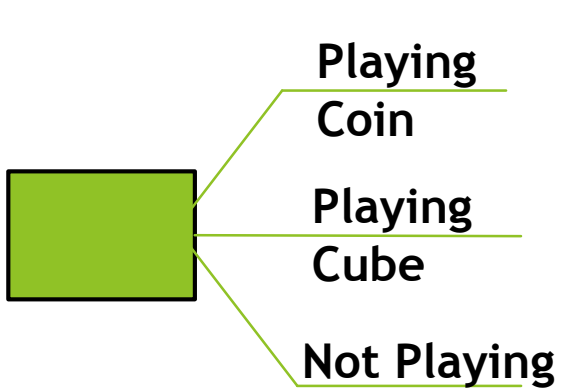
Decision Node -> *where we have control in acting*

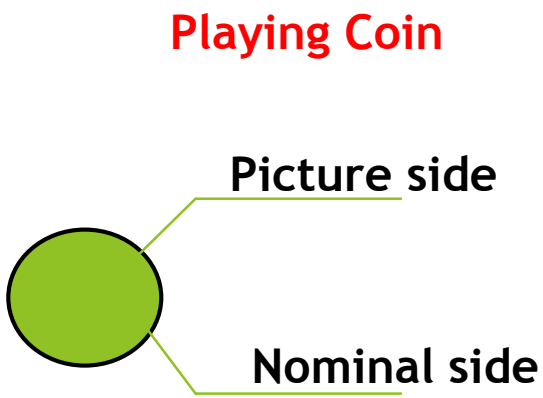


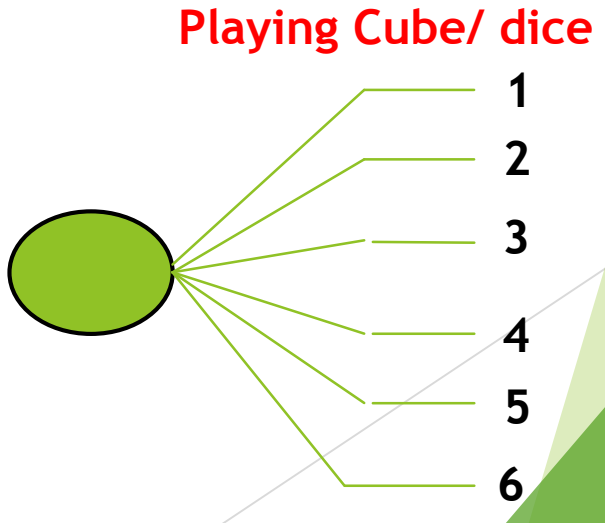
Event Fork (Uncertainty event node) → *where we have no control in acting*

EXAMPLE

- Someone went to the night market and saw two lottery booths.
- Stand I: Lottery throws coin
- Stand II: Lottery throws cube/ dice
- Someone interested in trying the lottery game, but hesitated







Example 1:

CHOICE OF EVENTS

For example, to take part in the two types of lotteries, each must pay Rp 100, - while the prizes that may be received from both games are as follows:

- **If you win Coin : prize is Rp 150, -**
- **If you win Cube: price is Rp. 400, -**

Which game to choose (Coin or Cube/ Dice) ??

Solution:

- ✓ Possibility of Coin prizes = **(1/2)** x Rp 150 = **Rp 75**
- ✓ Possibility of Dice prizes = **(1/6)** x Rp 400 = **Rp 66.66**
- ✓ **So, Choose to play COIN**

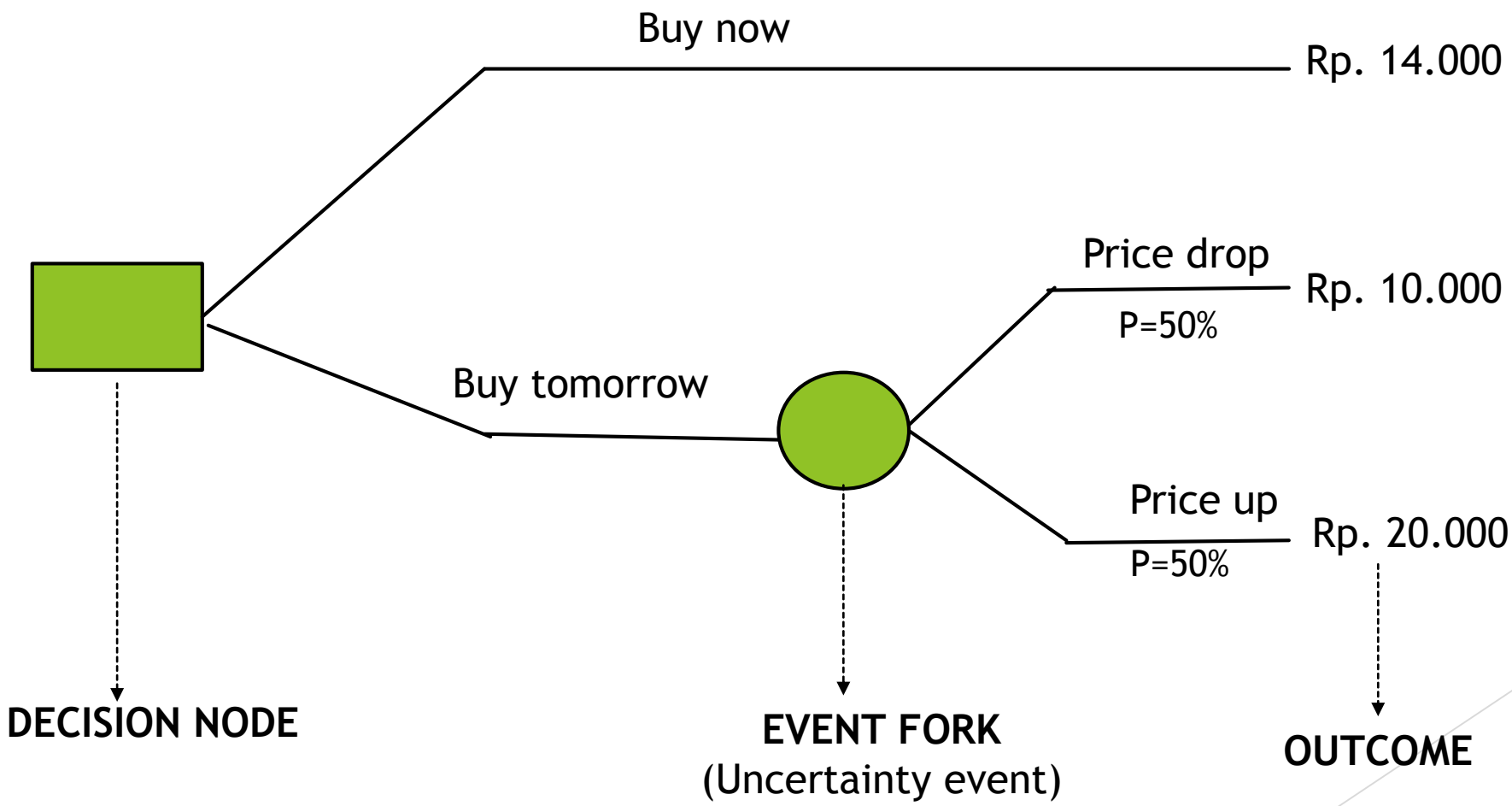
DECISION TREE DIAGRAM

Example 2:

A company will decide to buy raw materials **now** or **tomorrow**. Each action gives a different result. If you buy now, the material price per unit is **Rp. 14,000**. If you will buy it tomorrow there are two possibilities that occur, **the price drops to Rp. 10,000** or **up to Rp. 20,000** with a **50% chance** of each. Draw the decision tree

What will you choose, buy now or tomorrow???

DECISION TREE DIAGRAM



DECISION TREE DIAGRAM (CONT')

What will you choose, buy now or tomorrow???

EV (Buy now) = Rp. 14.000

EV (Buy tomorrow) = (50% x Rp. 10.000) + (50% x Rp. 20.000)
= Rp. 15.000

Choice → BUY NOW

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