



Information and Communication Technology:

The INFORMATION THEORY (an INTRODUCTION)

The **INFORMATION THEORY**



presented by: **Rhiza S. Sadjad**

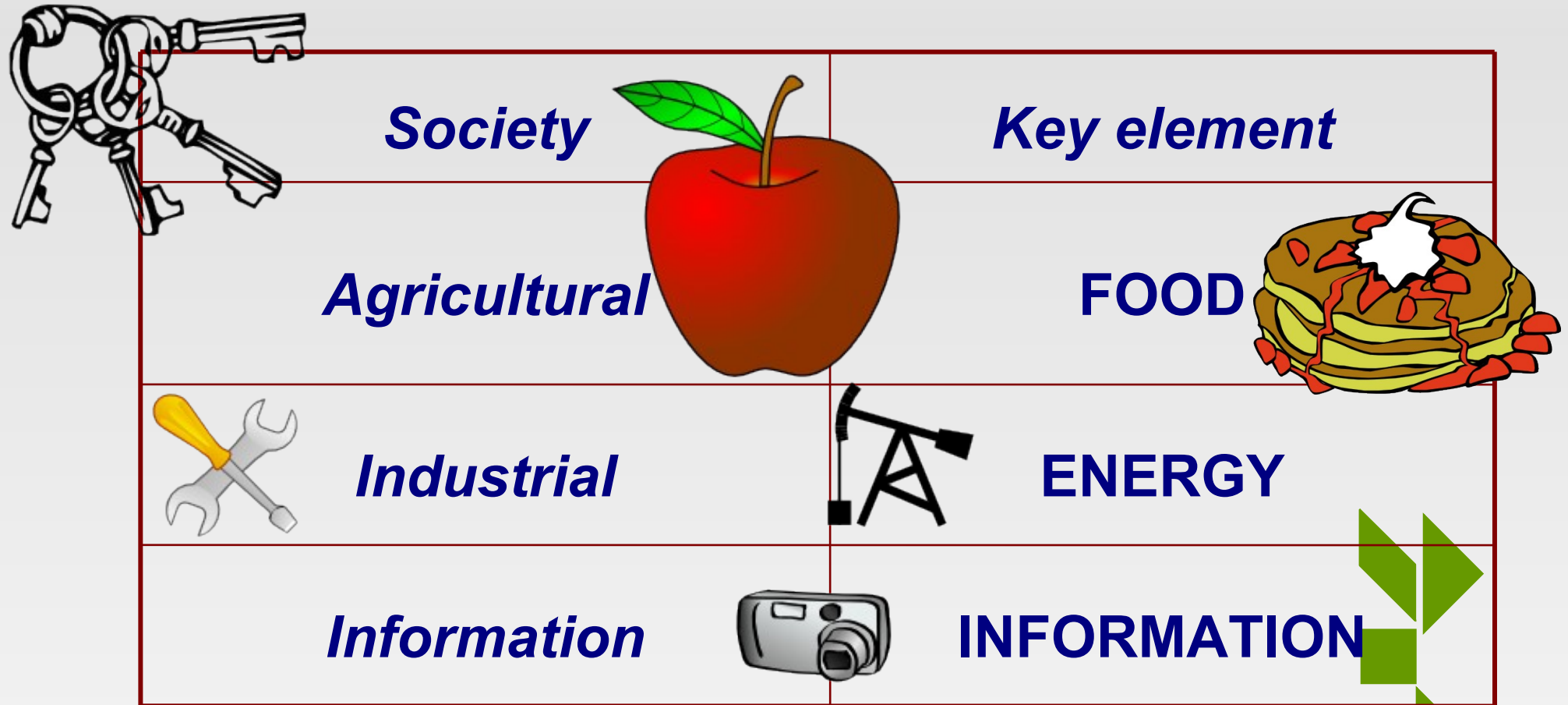
rhiza@unhas.ac.id <http://www.unhas.ac.id/rhiza/>

Yet, another extended meaning of INFORMATION

The UNIT of INFORMATION

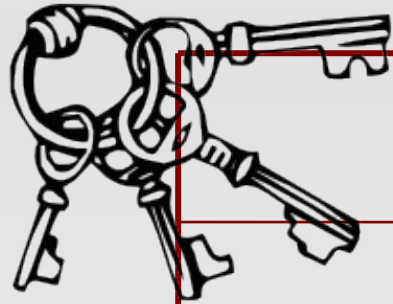
The UNIT of INFORMATION

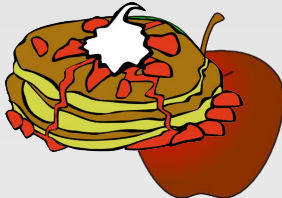
Key element/basic resource

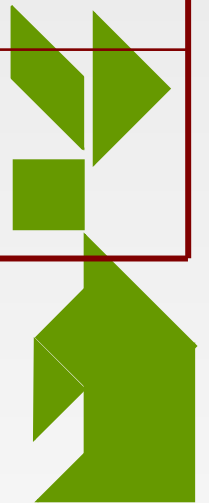


(Source: Everett M. Rogers, [1986], “ *Communication Technology*”, page. 13)

Key element/basic resource



<i>Key element</i>	UNIT
<i>FOOD</i> 	kg, lbs, liter, oz
 <i>ENERGY</i> 	kWh, Joule,barrel
<i>INFORMATION</i> 	?????????



The *SMALLEST UNIT* of *INFORMATION*

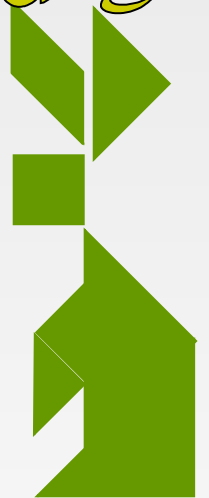


The **SIMPLEST FORM** of **INFORMATION**

YES	NO
RIGHT	WRONG
TRUE	FALSE
ON	OFF
WHITE	BLACK
TURN ON	SHUT DOWN
YES	NO
1	0

1 0

1 BIT
(Binary digit)



The *VALUE* of an *INFORMATION*



1 BIT =

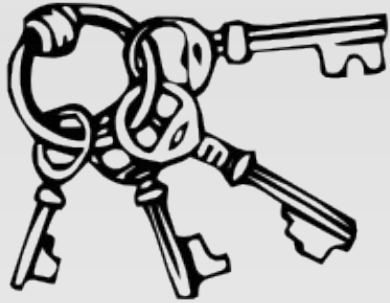
YA	TIDAK
BENAR	SALAH
TRUE	FALSE
ON	OFF
HITAM	PUTIH
NYALA	PADAM
YES	NO

1 0

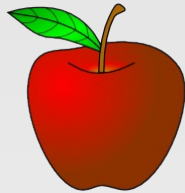
differs 2 things



The *VALUE* of an *INFORMATION*



2 BITS⁼⁼
could differ 4 things



00



01



10



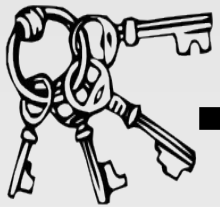
11



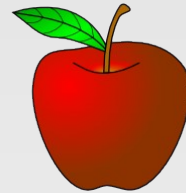
The *VALUE* of an *INFORMATION*



3 BITS
could differ up to 8 things



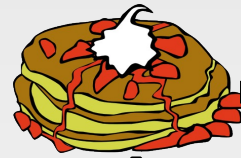
→ 000



→ 100



→ 001



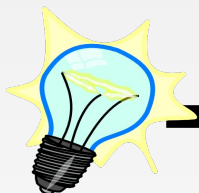
→ 101



→ 010



→ 110



→ 011



→ 111

The VALUE of an INFORMATION



n BITS =

could differ up to 2^n things:

0000	0100	1000	1100
0001	0101	1001	1101
0010	0110	1010	1110
0011	0111	1011	1111

The VALUE of an INFORMATION



ASCII Code =

American Standard Code for Information Interchange

a b c d e x y z

A B C D E F G H

10 kinds of Chinese

abcdefghijklmnopqrstuvwxyz
 ABCDEFGHIJKLMNOPQRSTUVWXYZ
 0123456789
 !@#\$%^&*()_-=+|\}{[\"';?/.,<

All kinds of character

examples

H = 01001000

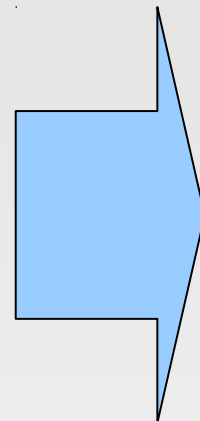
a = 01100001

\ = 01011100

b = 01100010

h = 01101000

Z = 01011010



8 BIT codes

from

00000000

up to 11

11111111

The *VALUE* of an *INFORMATION*



For example.....

How much information is in a 275-page book ????

How many characters???

550.000

X

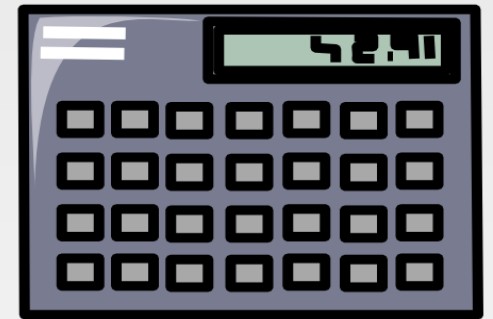
8 BIT

275 pages

X 40 lines/page in average

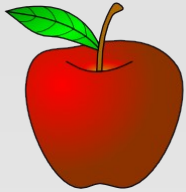
X 10 words/line in average

X 5 characters/word in average



4.400.000
BIT

Larger units of INFORMATION



1000 bit → 1 Kilobit → 1 Kb

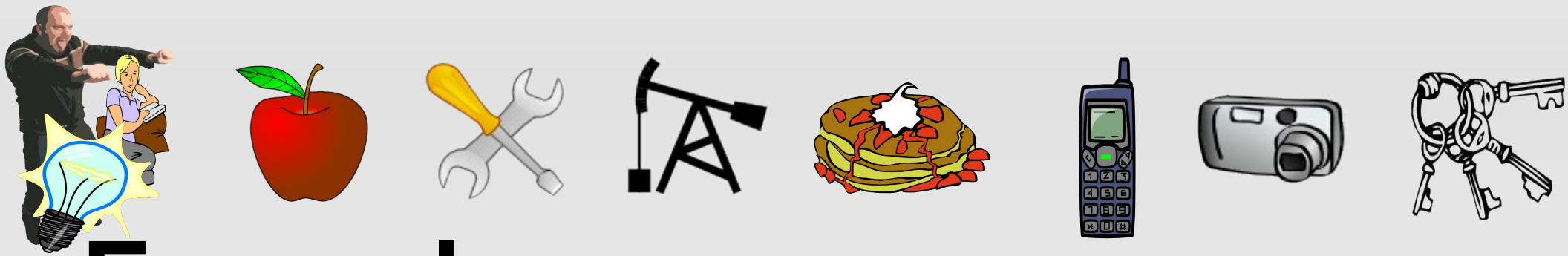
1000 Kb → 1 Megabit → 1 Mb

1000 Mb → 1 Gigabit → 1 Gb

1000 Gb → 1 Terrabit → 1 Tb

1 Byte → 1 B = 8 s/d 10 bit

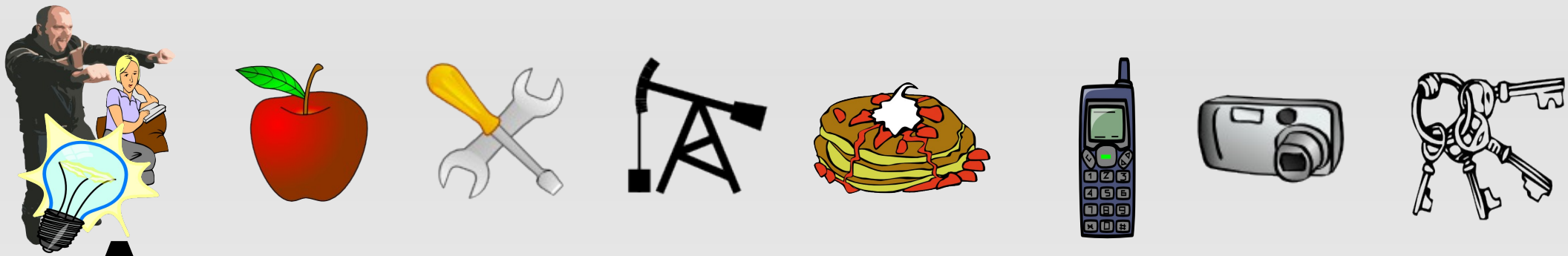
Larger units of INFORMATION



Example:

**A flashdisk has a capacity
of 8 Gb. How many e-
books of 5.5 Mb can be
stored in the flashdisk?**

Larger units of INFORMATION



Answer:

The flashdisk has the capacity of 8 Gb = 8000 Mb. The e-book's “size” is 5.5 Mb. Thus, the flashdisk can be filled up to $8000/5.5$ e-books, or around 1455 e-books ! (Compare to your bag, how many books can you store in it??? 5, 6, 10 books?)

NEXT

The Information Theory

..... to be continued

