# Information and Communication Technology:

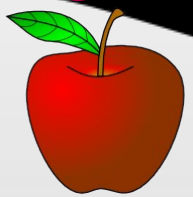
# The INFORMATION THEORY (CONTINUED)




presented by: **Rhiza S. Sadjad**

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

# The INFORMATION CAPACITY or Bit Rate of Data Transmission





**1 bit per second → 1 bps**

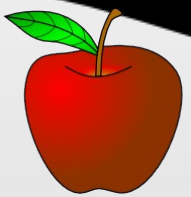
**8 to 10 bit per second → 1 Byte per second**
**1 Bps**

**1000 bit per second → 1 Kbps**

**1000 Kbps → 1 Mbps**

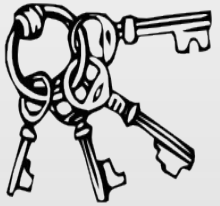
**1000 Mbps → 1 Gbps**

# The Information Capacity (Bit Rate)

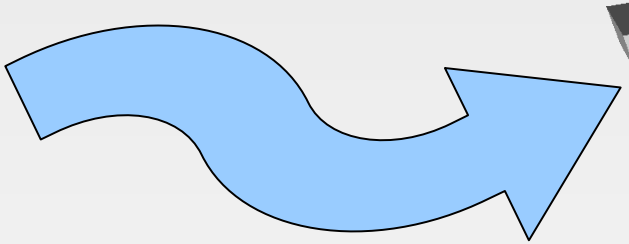






**According to Shannon [1948], there are 2 (two) factors related to the information capacity:**

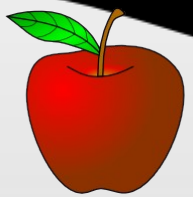
- ***Bandwidth***
- ***Channel Quality*** **(*Signal to Noise Ratio*, S/N atau SNR)**



The Information Theory

# Engineers of Communication

(Everett M. Rogers, [ 1986 ], " *Communication Technology* ", page 72)

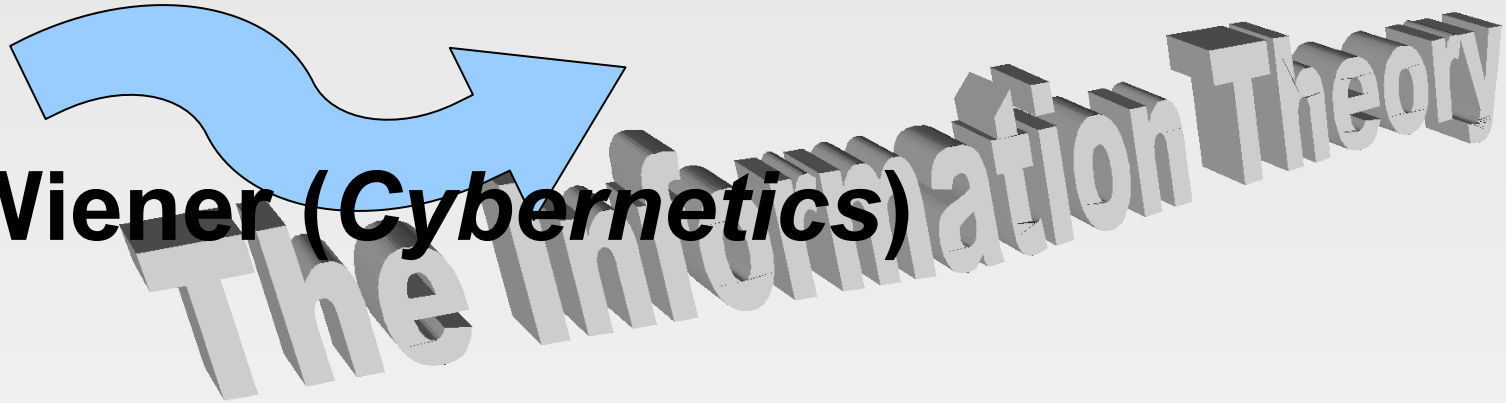







**<u>The two persons</u> considered as** ”*the engineers of communication*” (**Rogers, [1986]**):

- **Claude E. Shannon (*The Information Theory*)**
- **Norbert Wiener (*Cybernetics*)**

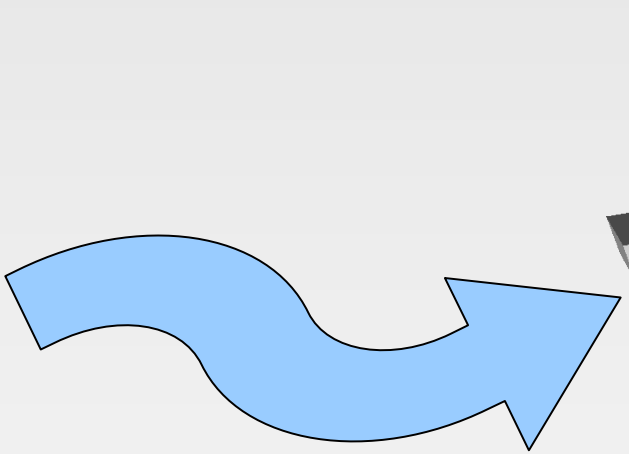


# The Communication Model

**[1948] Claude E. Shannon, "*A Mathematical Theory of Communication*" *(a technical notes)***

*/home/rhiza/Desktop/shannon.pdf*

**[1949] Claude E. Shannon and Warren Weaver, "*The Mathematical Theory of Communication*" (popular version)**



**The Information Theory**

# Communication Model

## *Shannon and Weaver* [1949], **simplex mode**

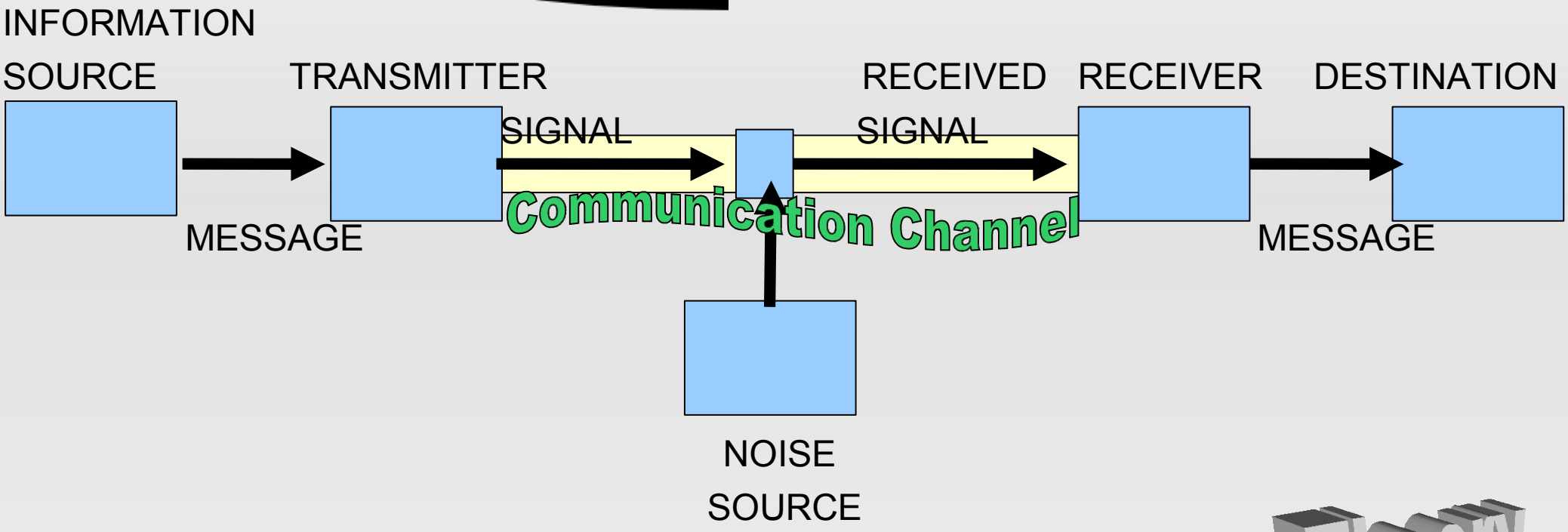
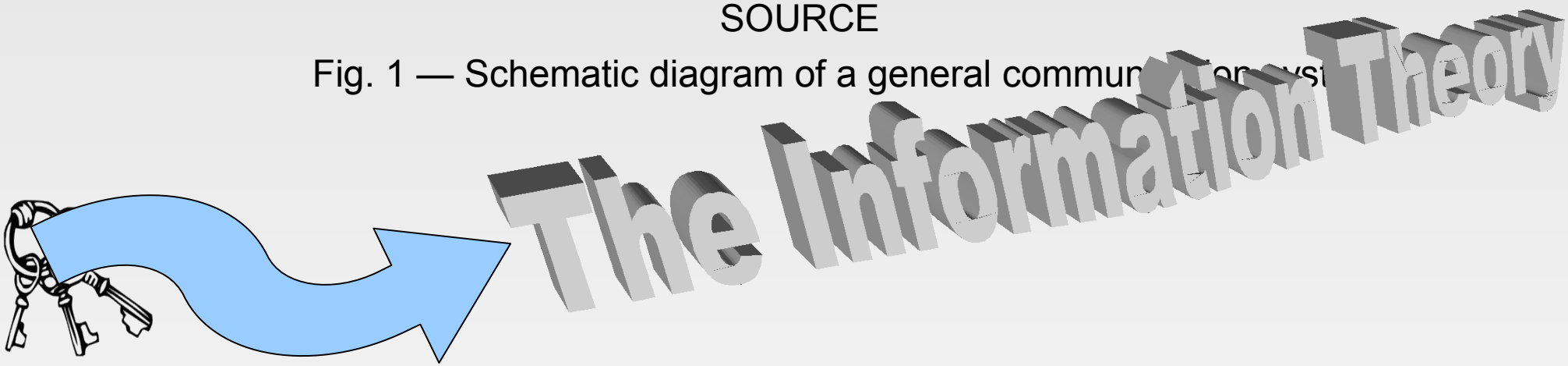



Fig. 1 — Schematic diagram of a general commun[illegible]



# The Information Capacity (Bit Rate)

## *Shannon and Weaver* [1949], **simplex mode**

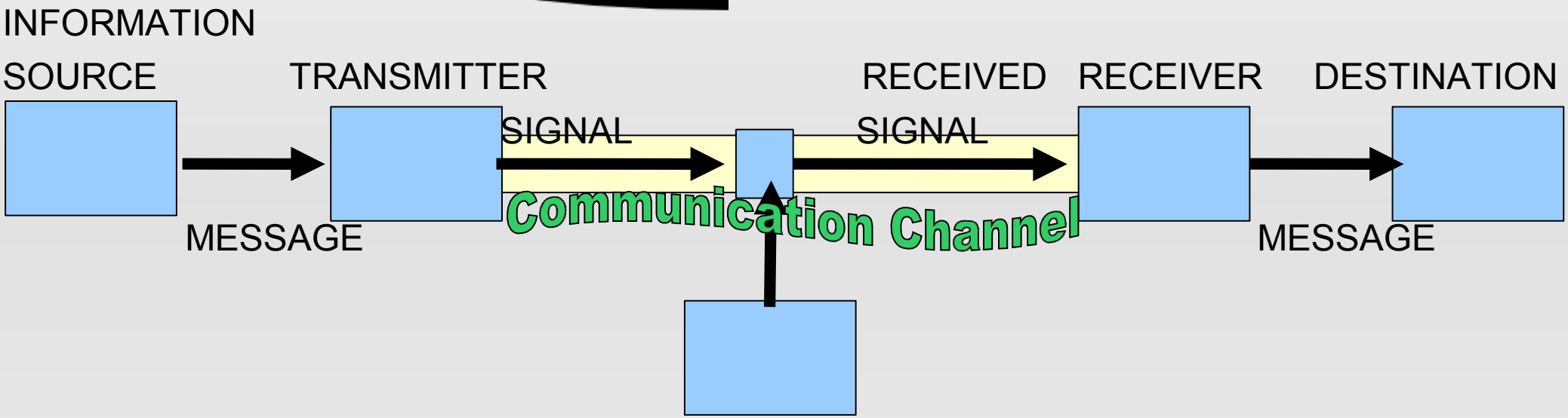



Fig. 1 — Schematic diagram of a general communication system.

**The Shannon** [**1948**] formula to compute the Information Capacity:

**Information Capacity [bps] = (Bandwidthi [Hertz])* $^{2}$log ( 1 + S/N)**

*Schweber*, [**1996**], page **16**

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*Schweber*, [**1996**], page **16**

$$\textit{Bit Rate} = BW * {}^{2}\log ( 1 + S/N)$$

- *Bit Rate* (**The Information Capacity**) : The amount of information transmitted in a unit of time [**bit per second, bps**] through a communication channel
- **BW** (*Bandwidth*) :The spectrum of signals transmittable in the channel [**Hertz**, **getaran per detik**, *cycles per second*, **cps**], the difference between the highest freuency and the lowest frequency
- **S/N** (*Signal to Noise ratio*) : the quality of the channel in terms of the ratio of the transmitted signal power and the noise power

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The Communication Mode