

## 0.1 Worked Example - Defective Electronics

Suppose an electronics assembly subcontractor receives resistors from only two suppliers: A and B

- Suppose we are told that Supplier A supplies 80% of the resistors

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- *Probability that a randomly chosen resistor comes from A is 80 % :  $P(A) = 0.80$*
- Supplier B supplies 20% of the resistors
- *Probability that a randomly chosen resistor comes from B is therefore 20% :  $P(B) = 0.20$*

- We are giving information about the rate of faulty components from each supplier.  
(Faulty : resistor fails some)
- 1% of the resistors supplied by A are faulty
- 3% of the resistors supplied by B are faulty

- We are giving information about the rate of faulty components from each supplier.  
(Faulty : resistor fails some quality test)
- *$P(F)$  probability that randomly selecting component is faulty*
- 1% of the resistors supplied by A are faulty.
- *We write this as  $P(F|A) = 0.01$*
- 3% of the resistors supplied by B are faulty
- *We write this as  $P(F|B) = 0.03$*

### Question 1:

- What is the probability that a randomly selected resistor fails the final test?
- In mathematical terms, compute  $P(F)$

### Law of Total Probability:

- Faulty Resistors are either from Supplier A or Supplier B.
- *Resistors MUST come from one of the two suppliers.*
- *A and B are mutually exclusive.*

$$P(F) = P(F \text{ and } A) + P(F \text{ and } B)$$