CAUSE-EFFECT GRAPHING BASED TESTING

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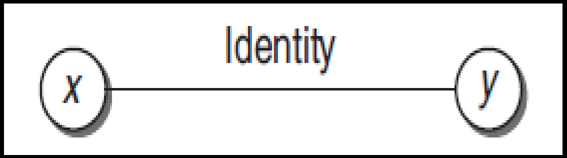
Cause-effect graphing is another technique for combinations of input conditions.

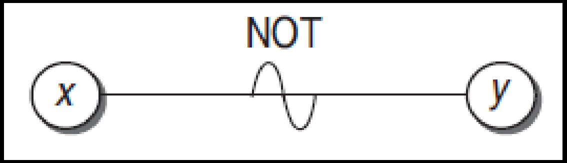
Cause-effect graphing takes the help of decision table to design a test case.

BASIC NOTATIONS FOR CAUSE-EFFECT GRAPH:

(1) Identity: According to the identity function, if x is 1, y is 1; else y is 0.



(2) NOT: This function states that if x is 1, y is 0; else y is 1.



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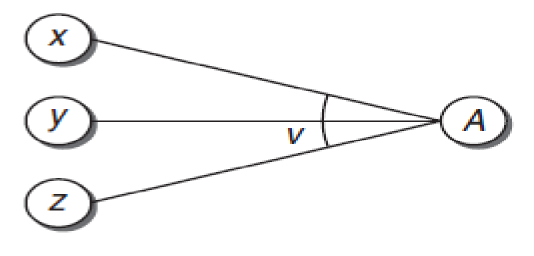
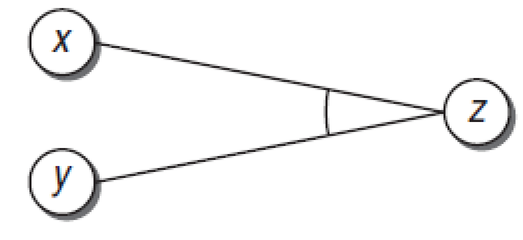
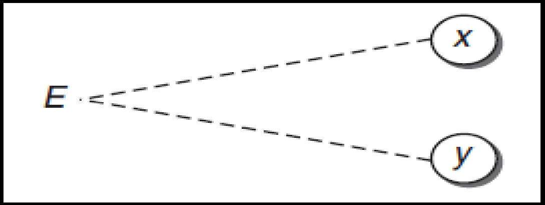
(3) **OR:** The OR function states that if x or y or z is 1, A is 1; else A is 0.



(4) **AND:** This function states that if both x and y are 1, z is 1; else z is 0.



(5) **Exclusive:** Two causes cannot be set to 1 simultaneously.
Example: either x or y can be 1, i.e. x and y cannot be 1 simultaneously.



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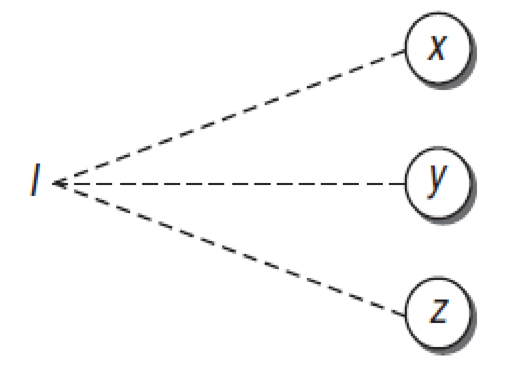
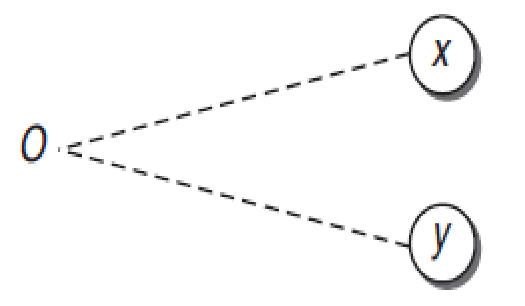
(6) Inclusive: It states that at least one of x, y, and z must always be 1 (x, y, and z cannot be 0 simultaneously).



(7) One and Only One: It states that one and only one of x and y must be 1.



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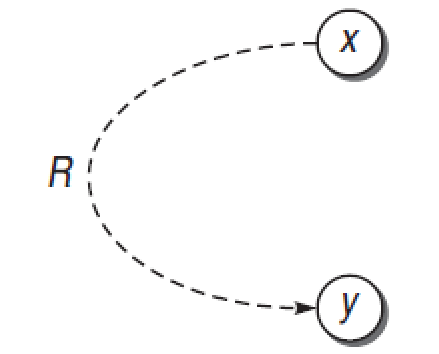
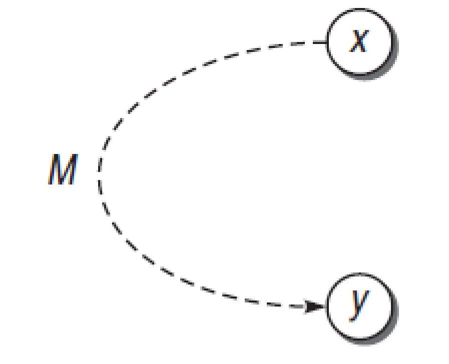
(8) **Requires:** It states that for x to be 1, y must be 1, i.e. it is impossible for x to be 1 and y to be 0.



(9) **Mask:** It states that if x is 1, y is forced to 0.



EXAMPLE:1

A software that reads two characters and depending on the values a message is to be printed.

C1: 1st character must be ‘A' or ‘B'

C2: 2nd character must be a digit

C3: If 1st character is ‘A' or ‘B' and 2nd character is a digit, then the file must be updated

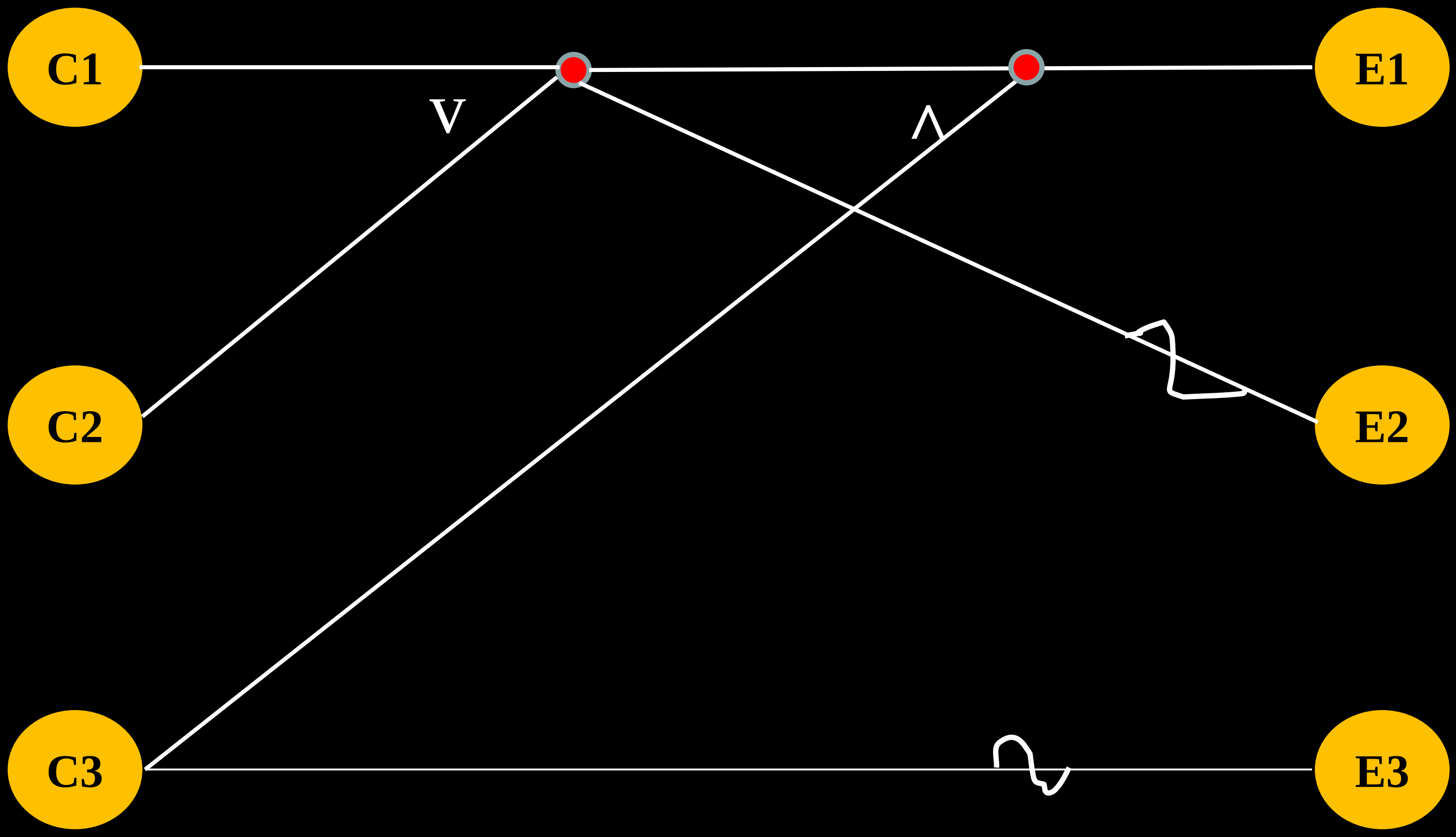
C4: If the 1st character is incorrect, then message 'X' to be printed

C5: If the 2nd character is incorrect, then message 'Y' to be printed

Decision Table

	R1	R2	R3	R4	R5	R6
C1: 1st Char ‘A’	T	F	F	F	T	F
C2: 1st Char ‘B’	F	T	F	F	F	T
C3: 2nd digit	T	T	F	T	F	F
E1: File update	X	X	-	-	-	-
E2: ‘X’	-	-	X	X	-	-
E3: ‘Y’	-	-	-	-	X	X

CAUSE-EFFECT GRAPH



EXAMPLE:2

In a given network, the send file command is used to send a file to a user on a different file server.

The send file command takes three arguments:

The first argument should be an existing file in the sender’s home directory,

The second argument should be the name of the receiver’s file server, and

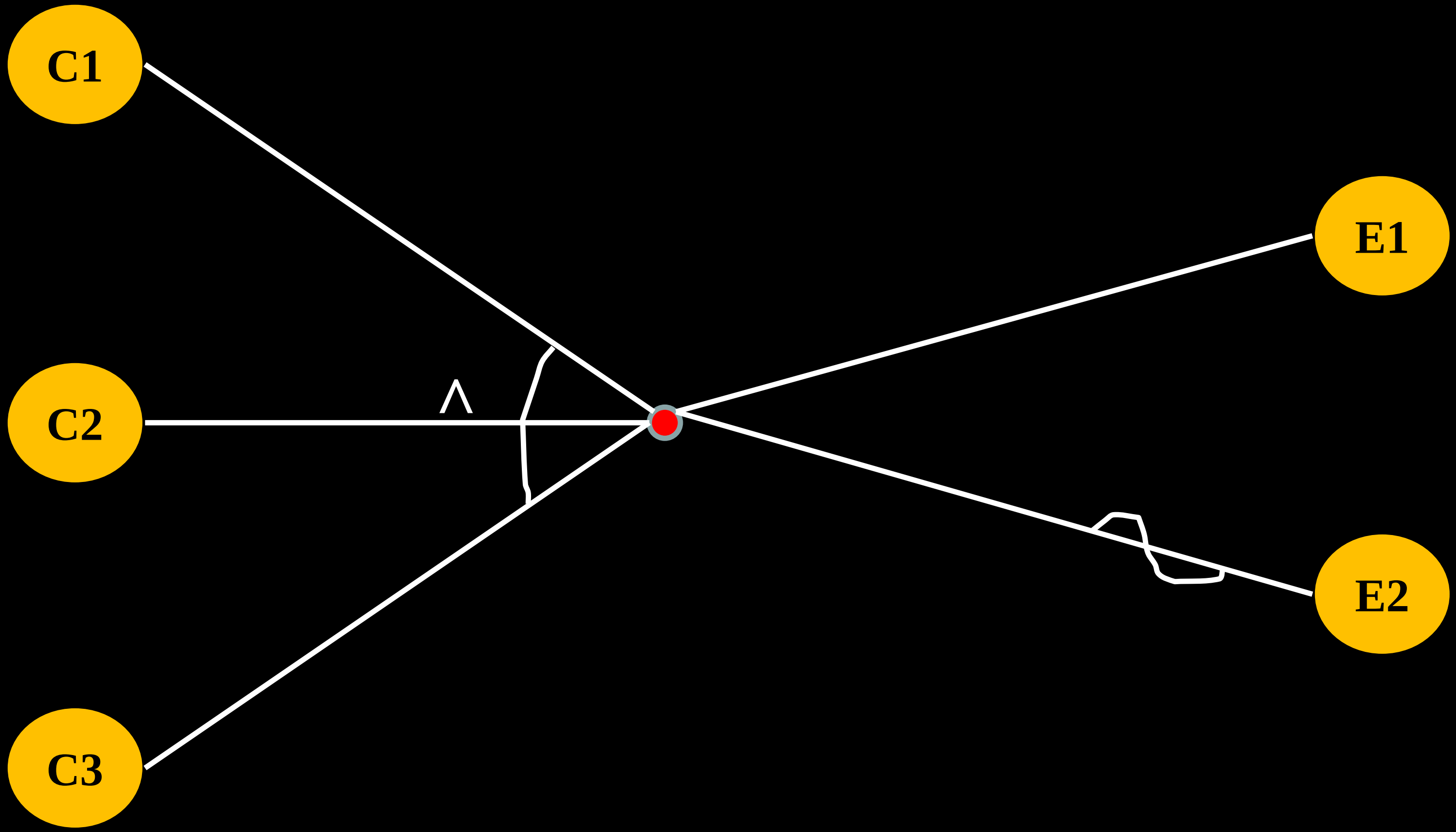
The third argument should be the receiver’s userid.

If all the arguments are correct, then the file is successfully sent;

otherwise the sender obtains an error message

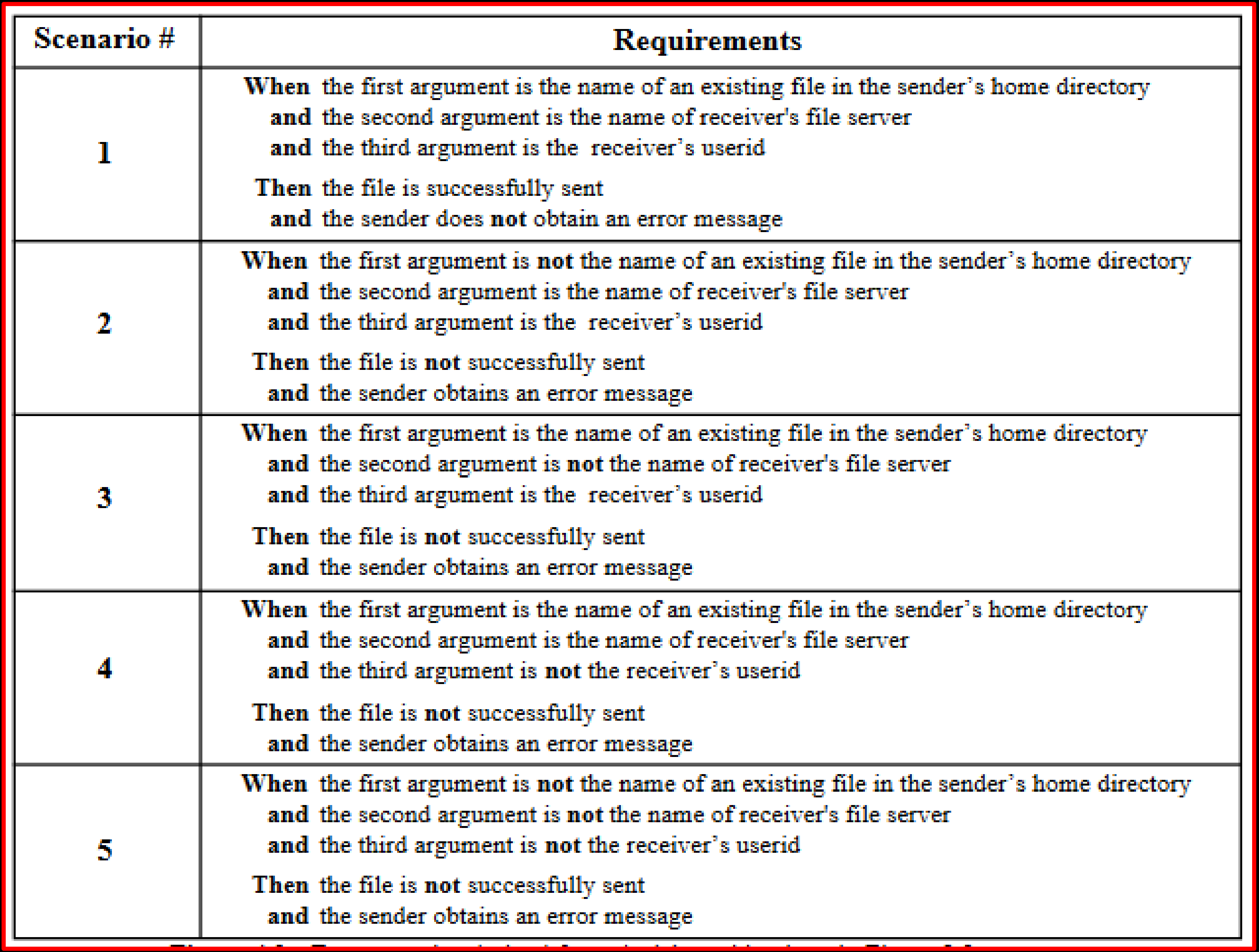
Causes	**Effects**
C1: The first argument is the **name of an existing file** in the sender’s home directory.	**E1:** The file is **successfully sent**.
C2: The second argument is the **name** of **receiver’s file server**.	**E2:** The sender obtains an **error message**.
C3: The third argument is the **receiver’s userid.**	

CAUSE-EFFECT GRAPH



	R1	R2	R3	R4	R5	R6	R7	R8
C1:	1	0	1	0	0	1	1	0
C2:	1	0	0	1	0	1	0	1
C3:	1	0	0	0	1	0	1	1
E1:	X	-	-	-	-	-	-	-
E2:	-	X	X	X	X	X	X	X

CAUSE-EFFECT GRAPHING BASED TESTING

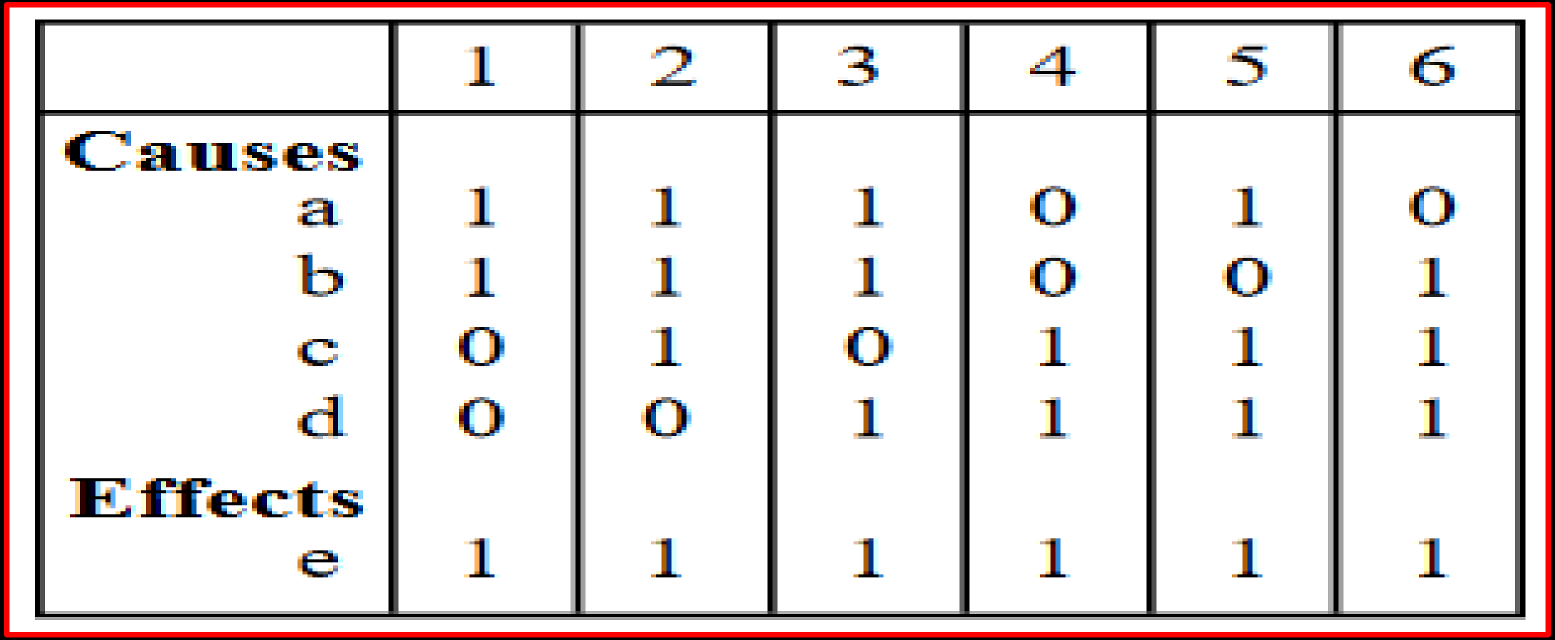


Scenario #	Requirements
1	**When** the first argument is the name of an existing file in the sender's home directory **and** the second argument is the name of receiver's file server **and** the third argument is the receiver's userid **Then** the file is successfully sent **and** the sender does **not** obtain an error message
2	**When** the first argument is **not** the name of an existing file in the sender's home directory **and** the second argument is the name of receiver's file server **and** the third argument is the receiver's userid **Then** the file is **not** successfully sent **and** the sender obtains an error message
3	**When** the first argument is the name of an existing file in the sender's home directory **and** the second argument is **not** the name of receiver's file server **and** the third argument is the receiver's userid **Then** the file is **not** successfully sent **and** the sender obtains an error message
4	**When** the first argument is the name of an existing file in the sender's home directory **and** the second argument is the name of receiver's file server **and** the third argument is **not** the receiver's userid **Then** the file is **not** successfully sent **and** the sender obtains an error message
5	**When** the first argument is **not** the name of an existing file in the sender's home directory **and** the second argument is **not** the name of receiver's file server **and** the third argument is **not** the receiver's userid **Then** the file is **not** successfully sent **and** the sender obtains an error message

EXAMPLE:3

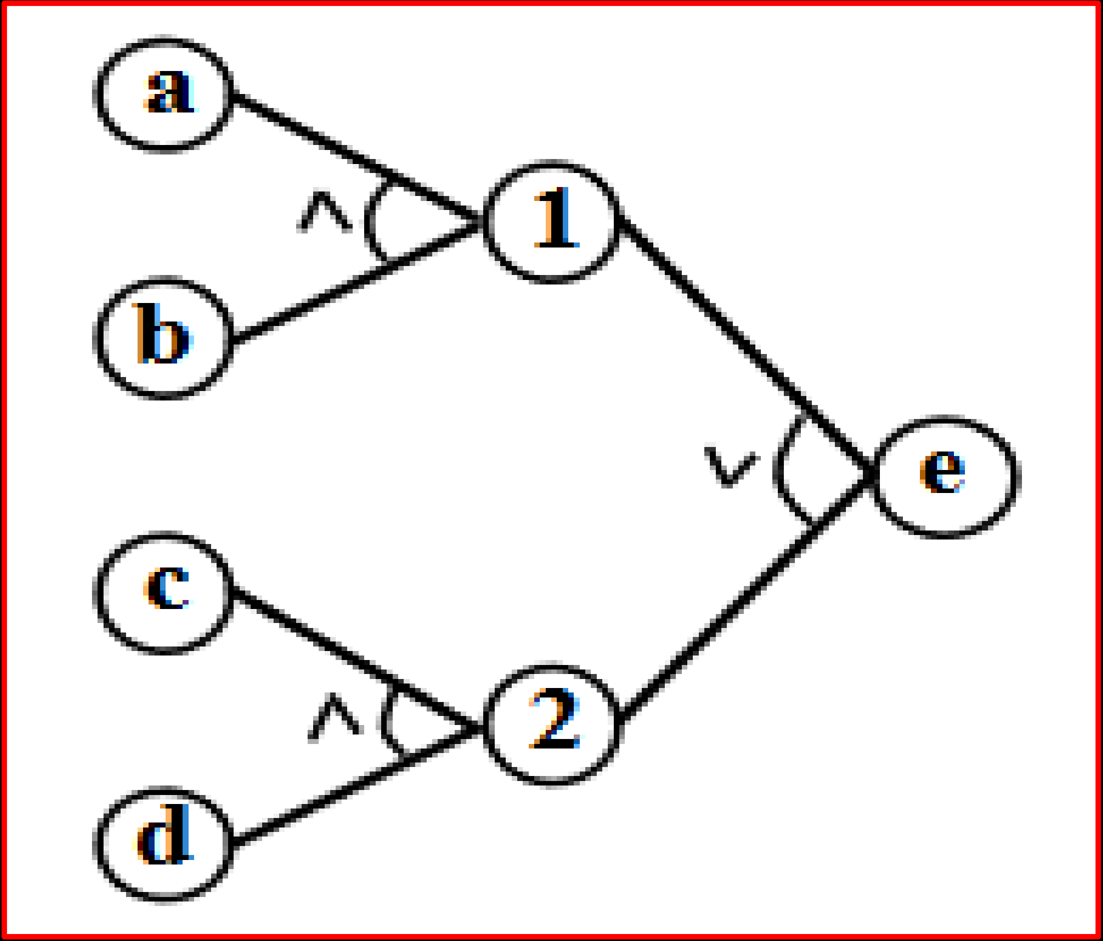
Construct a CEG representing an effect e given by:

e = (a and b) or (c and d)



	1	2	3	4	5	6
Causes						
a	1	1	1	0	1	0
b	1	1	1	0	0	1
c	0	1	0	1	1	1
d	0	0	1	1	1	1
Effects						
e	1	1	1	1	1	1

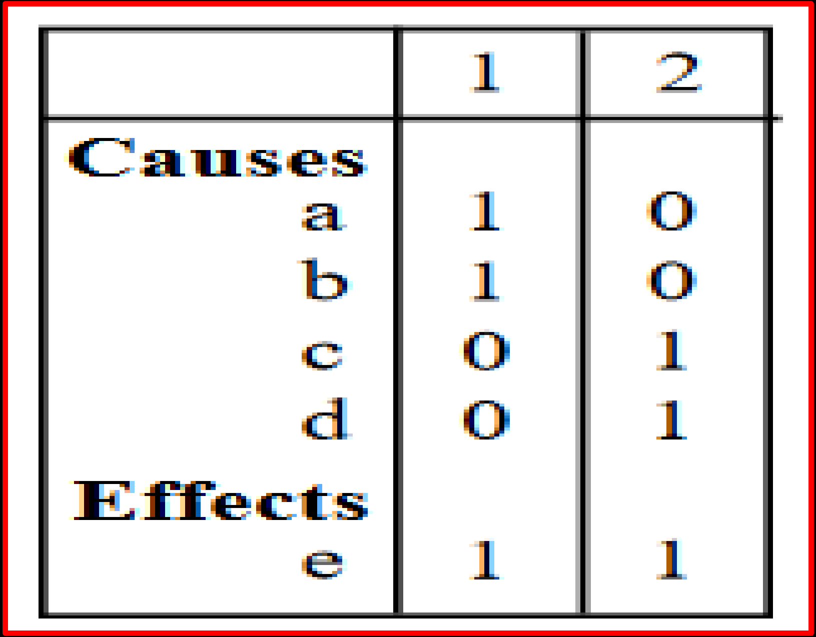
CAUSE-EFFECT GRAPH



EXAMPLE:4

Construct a CEG representing an effect e given by:

e = (a or c) and (a or d) and (b or c) and (b or d)



	1	2
Causes		
a	1	0
b	1	0
c	0	1
d	0	1
Effects		
e	1	1

CAUSE-EFFECT GRAPH