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COURSE: DISCRETE MATHEMATICS
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Problem:
Ex. no: 12

Question:

Are these system specifications consistent? "If the file system is not locked, then new messages will be queued. If the file system is not locked, then the system is functioning normally, and conversely. If new messages are not queued, then they will be sent to the message buffer. If the file system is not locked, then new messages will be sent to the message buffer. New messages will not be sent to the message buffer."

ANSWER:

To determine whether these specifications are consistent, we first express them using logical expression. Let,

p : the file system is locked
q : new messages are queued
r : the file system is functioning normally
s : new messages are sent to the message buffer

From the given passage, we get the expressions like this,

1. !p -> q
2. ! p <-> r
3. ! q -> s
4. ! p-> s
5. ! s

1. If the file system is not locked, then new messages will be queued.

2. If the file system is not locked, then the system is functioning normally, and conversely.

3. If new messages are not queued, then they will be sent to the message buffer.

4. If the file system is not locked, then new messages will be sent to the message buffer.

5. New messages will not be sent to the message buffer."

If negation 5 is T. Therefore:

! s is T
then s is F
p is T

q is T

r is F

Assuming 5 is T, we check the other statements.

if ! s is true, then s is false.

4. For this statement to be T, ! p must be F. So p is T.

F -> F concludes in T.

3. This statement is T if q is T.

F -> F concludes in T.

2. This statement is T if r is F.

F <-> F concludes in T.

1. This statement is T if q is T.

F -> T concludes in T.

So, this system specifications are consistent if p is true, q is true, r is false and s is false.