CHAPTER – 1

SECTION – 2

Problem – 8

Express these system specifications using the propositions p “The user enters a valid password,” q “Access is granted,” and r “The user has paid the subscription fee” and logical connectives (including negations).

a) “The user has paid the subscription fee, but does not enter a valid password.”

b) “Access is granted whenever the user has paid the subscription fee and enters a valid password.”

c) “Access is denied if the user has not paid the subscription fee.”

d) “If the user has not entered a valid password but has paid the subscription fee, then access is granted.”

Solution

a) The “but” in the given sentence implies “and”. “The user has paid the subscription fee, but does not enter a valid password” can be rewritten as “r and not p”, or rewritten as:

$$r \wedge \neg p$$

b) “q whenever p” in the given sentence implies that, “if p, then q.”

The sentence can be rewritten as “if (p and r), then q” or rewritten as:

$$(p \wedge r) \rightarrow q$$

c) “q if p” in the sentence implies that, “if p, then q.”

The sentence can be rewritten as , “if not r, then not q”, or rewritten as:

$$\neg r \rightarrow \neg q$$

d) The “but” in the given sentence implies “and”

The sentence can be rewritten as, “if (not p and r), then q”, or simply rewritten as:

$$(\neg p \wedge r) \rightarrow q$$

SUBMITTED BY-

MUHTASIM NOOR

STUDENT ID. 1705108

CSE, BUET