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Discrete Mathematical Structures
Tutorial Week-3

Portions

- **Rules of Inference**

1. Test the validity of the following arguments.

   1. If I drive to work, then I will arrive tired.I do not drive to work.
      ∴ I will not arrive tired

   2. If I have talent and work hard, then I will become successful in life.If I become successful in life then I will be happy.
      ∴ If I will not be happy, then I did not work hard or I do not have talent

   3. I will become famous or I will not become a musician.I will become a musician.
      ∴ I will become famous.

   4. If I study, then I do not fail in the examination.
      If I do not fail in the examination, my father gifts a two wheeler to me.
      ∴ If I study then my father gifts a two wheeler to me.

   5. $$\begin{array}{l} p \rightarrow r \\ \neg p \rightarrow q \\ q \rightarrow s \\ \hline \therefore \neg r \rightarrow s \end{array}$$

   6. Consider each of the following arguments. If the argument is valid, identify the rule ofinference that establishes the validity.

Andrea can program in Pascal, and she can program in FORTRAN.
Therefore Andrea can program in Pascal.

2. Show that following arguments are valid.

$[p \wedge (p \rightarrow q) \wedge (s \vee r) \wedge (r \rightarrow \neg q)] \rightarrow (s \vee t)$

$[p \wedge (p \rightarrow q) \wedge (\neg q \vee r)] \rightarrow r$

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

$p \rightarrow (q \rightarrow r)$
$p \vee s$
$t \rightarrow q$
$\neg s$
$\therefore \neg r \rightarrow \neg t$