RAMAIAH Institute of Technology

Department of Computer Science and Engineering

Discrete Mathematical Structures
Tutorial Week-3

Portions

- **Rules of Inference**

1. Test the validity of the following arguments.
   1. If a person is poor, he is unhappy.
      If a person is unhappy, he dies young.

      ∴ If a person is poor then he dies young.

   2. If Ravi studies, then he will pass in Discrete Mathematics paper.If Ravi does not play cricket, then he will study.
      Ravi failed in Discrete Mathematics paper.

      ∴ Ravi played cricket

   3. If Sachin hits a century, then he gets a free car.Sachin hits a century.

      ∴ Sachin gets a free car

   4. Rita is baking a cake.
      If Rita is baking a cake, then she is not practicing her flute.
      If Rita is not practicing her flute, then her father will not pay for her car insurance.

      ∴ Rita's father will not pay for her car insurance.

2. Test the validity of the following arguments.
   1. $p \rightarrow q$
      $q \rightarrow (r \wedge s)$
      $\neg r \vee (\neg t \vee u)$
      $p \wedge t$

      $\therefore u$

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

b) A sufficient condition for Bubbles to win the golf tournament is that her opponent Meg not sink a birdie on the last hole.
Bubbles won the golf tournament.
Therefore Bubbles' opponent Meg did not sink a birdie on the last hole.

4. Show that following arguments are valid.

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

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

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

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