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Coimbatore- 49

DEPARTMENT OF MATHEMATICS

25UCU303-Discrete Mathematics with Probability and Hypothesis Testing

LOGIC CONNECTIVES

Dr.K.Sasikala
Assistant Professor, Department of Mathematics

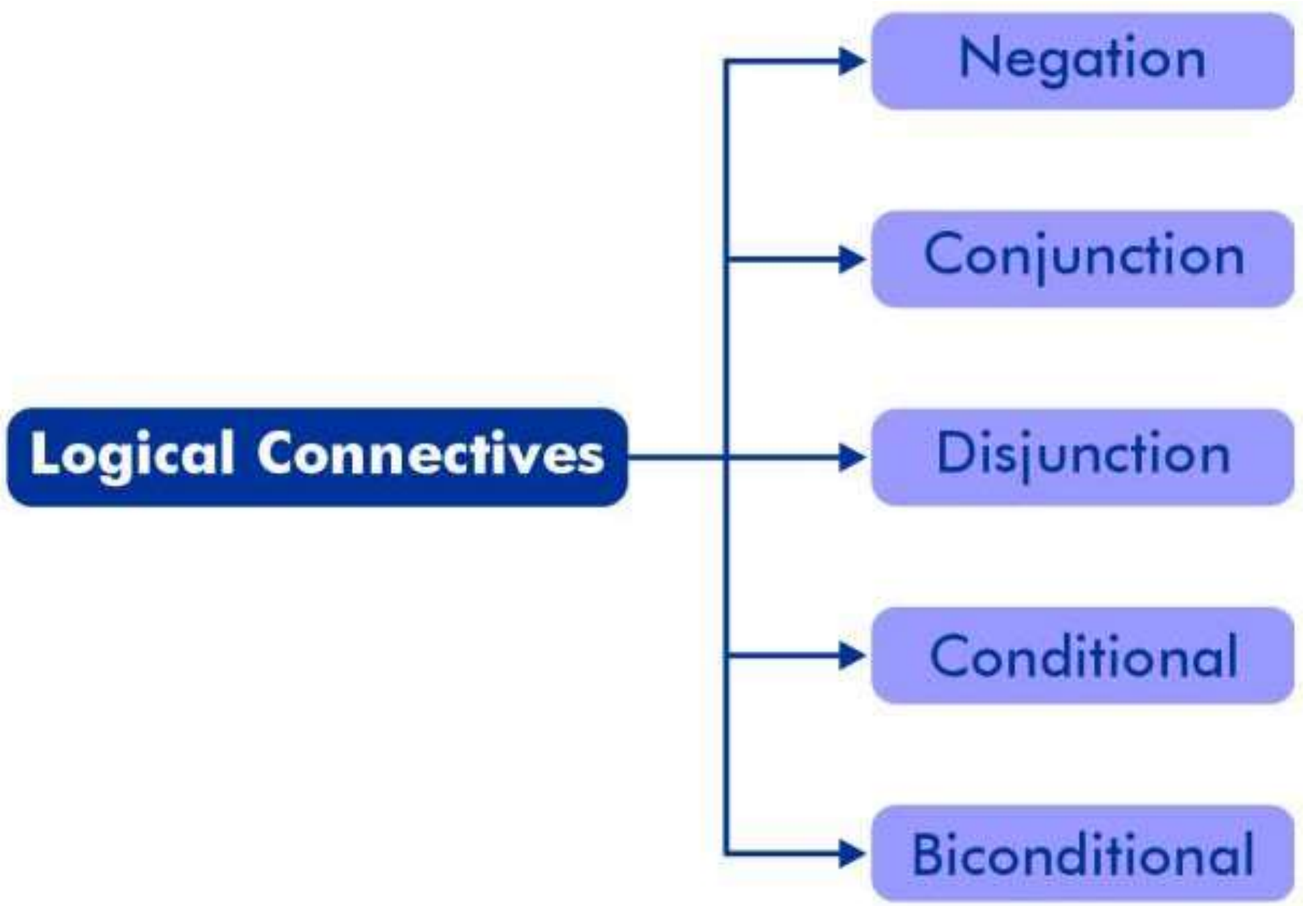
LOGIC CONNECTIVES

Logical connectivity

Logical connectivity can be described as the operators that are used to connect one or more than one propositions or predicate logic. On the basis of the input logic and connectivity, which is used to connect the propositions, we will get the resultant logic. The propositional logic is used to contain 5 basic connectives, which are described as follows:

1. Negation
2. Conjunction
3. Disjunction
4. Conditional
5. Bi-conditional

LOGIC CONNECTIVES



LOGIC CONNECTIVES

Name of Connective	Connective Word	Symbol
Negation	Not	] or ~ or ' or -
Conjunction	And	∧
Disjunction	Or	∨
Conditional	If-then	→
Bi-conditional	If and only if	↔

LOGIC CONNECTIVES

Negation

The symbol ~ is used to indicate the negation. If there is a proposition p, then the negation of p will also be a proposition, which contains the following properties:

- When p is true, then the negation of p will be false.
- When p is false, then the negation of p will be true.

Truth table:

The truth table of negation is shown below:

p	~p
T	F
F	T

Logic Connectives

Conjunction

The conjunction is indicated by the symbol $\wedge$. If there are two propositions, p and q, then the conjunction of p and q will also be a proposition, which contains the following properties:

- When p and q are true, then the conjunction of them will be true.
- When p and q are false, then the conjunction of them will be false.

Truth table:

The truth table of conjunction is shown below:

p	q	$p \wedge q$
T	T	T
T	F	F
F	T	F
F	F	F

Logic Connectives

Disjunction:

Disjunction is indicated by the symbol ∨. If there are two propositions, p and q, then the disjunction of p and q will also be a proposition, which contains the following properties:

- When p and q are false, then the disjunction of them will be false.
- When either p or q or both are true, then the disjunction of them will be true.

Truth table:

The truth table of disjunction is shown below:

p	q	p ∨ q
T	T	T
T	F	T
F	T	T
F	F	F

Logic Connectives

Bi-conditional:

The bi-conditional propositional is also known as the bi-implication proposition. It is indicated by the symbol ↔. If there are two propositions, p and q, then the bi-conditional of p and q will also be a proposition, which contains the following properties:

- If there is a proposition that has the form "p if and only if q", then that type of proposition will be known as a bi-implication or bi-conditional proposition.
- When both p and q are true, or p and q both are false, then the bi-implication of them will be true.
- In all the other cases, then the bi-conditional of them will be false.

Truth table:

The truth table of bi-implication is shown below:

p	q	p ↔ q
T	T	T
T	F	F
F	T	F
F	F	T

Logic Connectives

Conditional:

The conditional propositional is also known as the implication proposition. It is indicated by the symbol →. If there are two propositions, p and q, then the conditional of p and q will also be a proposition, which contains the following properties:

- If there is a proposition that has the form "if p then q", then that type of proposition will be known as the implication or conditional proposition.
- When p is false, or p and q are true, then the implication of them will be true.
- When p is true, and q is false, then the implication of them will be false.

Truth table:

The truth table of implication is shown below:

p	q	p → q
T	T	T
T	F	F
F	T	T
F	F	T

THANK YOU