1. **Negation - “ Not “ *First***

|  |  |  |  |
| --- | --- | --- | --- |
| **p** | **~p** |  | The statement is true when the input statement is false  The statement is false when the input statement is true |
| **T** | **F** |  |
| **F** | **T** |  |
|  |  |  | If p represents the statement “John scored a goal”, then ~p would represent “John did not score a goal.” |

1. **Conjunction – “and” *Second* (Do according to the parentheses)**

|  |  |  |  |
| --- | --- | --- | --- |
| **p** | **q** | **p Λ q** | The statement is true when the when both input statements are true  Otherwise the statement is false  If p represents the statement “John scored a goal” and q represents the statement “John won the game”, then p^q would represent the statement “John scored a goal and won the game” |
| **T** | **T** | **T** |
| **T** | **F** | **F** |
| **F** | **T** | **F** |
| **F** | **F** | **F** |

1. **Disjunction – “or” *Second* (Do according to the parentheses)**

|  |  |  |  |
| --- | --- | --- | --- |
| **p** | **q** | **p V q** | The statement is false when both input statements are false  Otherwise the statement is true  If p represents the statement “John scored a goal” and q represents the statement “John won the game”, then pVq would represent the statement “John scored a goal or won the game” |
| **T** | **T** | **T** |
| **T** | **F** | **T** |
| **F** | **T** | **T** |
| **F** | **F** | **F** |

1. **Conditional – “if ….. then” *Third***

|  |  |  |  |
| --- | --- | --- | --- |
| **p** | **q** | **p → q** | The statement is false when the first input statement is true and the second input statement is false  Otherwise the statement is true  If p represents the statement “John scored a goal” and q represents the statement “John won the game”, then p**→**q would represent the statement “John scored a goal then won the game” |
| **T** | **T** | **T** |
| **T** | **F** | **F** |
| **F** | **T** | **T** |
| **F** | **F** | **T** |

1. **Biconditional – “if and only if” *Last***

|  |  |  |  |
| --- | --- | --- | --- |
| **p** | **q** | **p ↔ q** | The statement is true when both input statements are both true or both false  Otherwise the statement is false  If p represents the statement “John scored a goal” and q represents the statement “John won the game”, then p**→**q would represent the statement “John scored a goal or won the game” |
| **T** | **T** | **T** |
| **T** | **F** | **F** |
| **F** | **T** | **F** |
| **F** | **F** | **T** |

The term statement may also refer to premise or expression, depending on context.

To construct a truth table for a compound statement that consists of two simple statements, begin by listing the four true-false cases shown below:

|  |  |
| --- | --- |
| **p** | **q** |
| **T** | **T** |
| **T** | **F** |
| **F** | **T** |
| **F** | **F** |

To construct a truth table for a compound statement that consists of three simple statements, begin by listing the eight true-false cases shown below:

|  |  |  |
| --- | --- | --- |
| **p** | **q** | **r** |
| **T** | **T** | **T** |
| **T** | **T** | **F** |
| **T** | **F** | **T** |
| **T** | **F** | **F** |
| **F** | **T** | **T** |
| **F** | **T** | **F** |
| **F** | **F** | **T** |
| **F** | **F** | **F** |