# Boolean Logic

# Computing Is About Boolean Logic

The rules of the logic tell us how to manipulate inputs and produce outputs.

We define the rules so that we get answers that are useful to us.

# Boolean Operators

## NOT

| P | NOT P |
|---|---|
| *True* | |
| *False* | |

# Boolean Operators

## NOT

| P | NOT P |
|---|---|
| *True* | *False* |
| *False* | *True* |

# Boolean Operators

## AND

| P | Q | P AND Q |
|---|---|---------|
| *True* | *True* | |
| *True* | *False* | |
| *False* | *True* | |
| *False* | *False* | |

# Boolean Operators

## AND

| P | Q | P AND Q |
|---|---|---|
| *True* | *True* | *True* |
| *True* | *False* | *False* |
| *False* | *True* | *False* |
| *False* | *False* | *False* |

# Boolean Operators

## OR

| P | Q | P OR Q |
|---|---|---|
| True | True | |
| True | False | |
| False | True | |
| False | False | |

# Boolean Operators

OR

| P | Q | P OR Q |
|---|---|---|
| True | True | True |
| True | False | True |
| False | True | True |
| False | False | False |

# Boolean Operators

## If, Then

| P | Q | If P Then Q |
|---|---|---|
| *True* | *True* | |
| *True* | *False* | |
| *False* | *True* | |
| *False* | *False* | |

# Boolean Operators

## If, Then

| P | Q | If P Then Q |
|---|---|---|
| *True* | *True* | *True* |
| *True* | *False* | *False* |
| *False* | *True* | *True* |
| *False* | *False* | *True* |

# Boolean Operators

## EQUIVALENCE

| P | Q | P == Q |
|---|---|--------|
| *True* | *True* | |
| *True* | *False* | |
| *False* | *True* | |
| *False* | *False* | |

# Boolean Operators

## EQUIVALENCE

| P | Q | P==Q |
|---|---|------|
| *True* | *True* | *True* |
| *True* | *False* | *False* |
| *False* | *True* | *False* |
| *False* | *False* | *True* |

# Boolean Logic

| P | Q | Not P | P OR Q | P AND Q | If P Then Q | P==Q |
|---|---|-------|--------|---------|-------------|------|
| True | True | False | True | True | True | True |
| True | False | False | True | False | False | False |
| False | True | True | True | False | True | False |
| False | False | True | False | False | True | True |

# Using Boolean Logic

| P | Q | If (P OR Q) THEN Q | (NOT P) AND (IF (P OR Q) THEN Q) |
|---|---|---|---|
| True | True | True | False |
| True | False | False | False |
| False | True | True | True |
| False | False | True | True |