

C++ Programming

Truth Table

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Teaching, Training and Coaching since more than a decade!

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AND Logical Operators

- Let say I am 30 years old, salary = 7000 and weight = 110 kg
- Mostafa > 25 years and salary < 8000? True
- Mostafa > 27 years and salary > 9000? False
- Mostafa > 35 years and salary < 8500? False
- Mostafa > 35 years and salary > 9000? False
- Summary
 - Only 1 case is True: when both conditions are true
 - In discrete mathematics: $p \wedge q$

OR Logical Operators

- Let say I am 30 years old, salary = 7000 and weight = 110 kg
- Mostafa > 25 years or salary < 8000? True
- Mostafa > 27 years or salary > 9000? True
- Mostafa > 35 years or salary < 8500? True
- Mostafa > 35 years or salary > 9000? False
- Summary
 - Only 1 case is False: when both conditions are false
 - In discrete mathematics: $p \vee q$

Logical Tables 2 variables

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

p	q	$p \vee q$
T	T	T
T	F	T
F	T	T
F	F	F

p	$\sim p$
T	F
F	T

Logical Tables 3 variables

AND truth table

INPUTS			OUTPUT
W	X	Y	Z
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

OR truth table

INPUTS			OUTPUT
W	X	Y	Z
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

Logical Tables 3 variables

- Let say I am 30 years old, salary = 7000 and weight = 110 kg
- Mostafa > 25 years and salary < 8000 and weight < 150kg? True
 - T and T and T
- Mostafa > 25 years and salary < 8000 and weight > 70kg? True
 - T and T and T
- Mostafa > 25 years and salary < 8000 and weight > 200kg? False
 - T and T and F
- Mostafa > 35 years or salary < 8000 **or** weight > 200kg? True
 - F or T or F
- Mostafa > 35 years or salary > 9000 **or** weight > 200kg? False
 - F or F or F

Mixing Logical Operators

- **Precedence:** AND before OR
- Let say I am 30 years old, salary = 7000 and weight = 110 kg
- Mostafa > 35 years or salary > 6000 or weight > 200kg? True
 - F or T or F = T
- Mostafa > 35 years and salary > 6000 or weight > 200kg? False
 - F and T or F
 - Reduce every subgroup of ANDS first
 - F and T = F
 - F or F \Rightarrow F
- Mostafa > 20 years and salary > 10 and salary < 8000 or weight > 200kg?
 - T and T and T or F
 - T or F \Rightarrow T

So

- All conditions are **ANDed**
 - True IFF all **ANDed** conditions are true
- All conditions are **ORed**
 - True if any condition is true. False if all are false
- Mixed ORs and ANDs
 - Find each subgroup of ANDs and evaluate first.
 - Do ORing for the remaining
- Study & **memorize** well before next session

“Acquire knowledge and impart it to the people.”

“Seek knowledge from the Cradle to the Grave.”