Python 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 $\land$ 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 v q

Logical Tables 2 variables

p	q	p∧q
T	T	T
T	F	F
F	T	F
F	F	F

p	q	p∨q
T	T	T
T	F	T
F	T	T
F	F	F

p	~p
T	F
F	T

Img Src

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

Img Src

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 ⇒ F
- Mostafa > 20 years and salary > 10 and salary < 8000 **or** weight > 200kg?
  - **T and T and T** or F
  - T or F ⇒ T

So

- All conditions are **AND**ed
  - True IFF all **AND**ed conditions are true
- All conditions are **OR**ed
  - 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."