

Ex. TurtleFunction1.py

" " 2.py

" " 3.py

Ex. Function4.py

chap 5: Conditionals

A Boolean value is either

True

or False

A Boolean expression is an expr.
that evaluates to True or False.

Interactive mode

Comparison operators

name

$x == y$

cmp. for eq.

$x != y$

not equals

$x < y$

l.t.

$x > y$

g.t.

$x <= y$

l.t. eq.

$x >= y$

g.t. eq.

Boolean operators

name in math/logic

and

conjunction

or

disjunction (inclusive or)

not

negation

Let A, B be boolean expressions

A	B	A and B
F	T	F
F	F	F
T	T	T
T	F	F

binary op.

A	B	A or B
T	T	T
T	F	T
F	T	T
F	F	F

binary op.

A	not A
F	T
T	F

unary op.

Boolean Algebra is the algebra of boolean expressions

Identities:

$$\left. \begin{array}{l} A \text{ and } B == B \text{ and } A \\ \text{or} \qquad \qquad \text{or} \end{array} \right\} \underline{\text{commutative}}$$

$$\left. \begin{array}{l} A \text{ and } (B \text{ and } C) == (A \text{ and } B) \text{ and } C \\ \text{or} \quad \text{or} \qquad \qquad \text{or} \quad \text{or} \end{array} \right\} \underline{\text{associative}}$$

$$\left. \begin{array}{l} A \text{ and } (B \text{ or } C) == (A \text{ and } B) \text{ or } (A \text{ and } C) \\ \text{or} \quad \text{and} \qquad \qquad \text{or} \quad \text{and} \quad \text{or} \end{array} \right\} \underline{\text{distributive}}$$

$$\left. \begin{array}{l} \text{not } (A \text{ and } B) == (\text{not } A) \text{ or } (\text{not } B) \\ \text{or} \qquad \qquad \qquad \text{and} \end{array} \right\} \underline{\text{DeMorgan}}$$

$$\begin{cases} A \text{ and } \text{False} == \text{False} \\ A \text{ or } \text{True} == \text{True} \end{cases}$$

$$\begin{cases} A \text{ or } \text{False} == A \\ A \text{ and } \text{True} == A \end{cases}$$

$$\begin{cases} A \text{ and } A == A \\ \text{or} \end{cases}$$

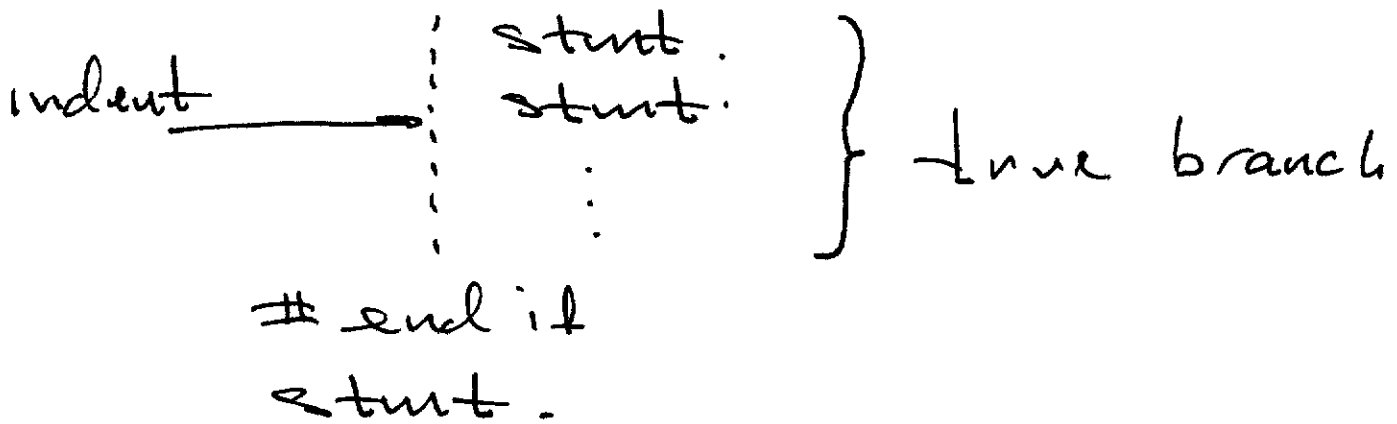
$$\text{not}(\text{not } A) == A$$

conditional operations

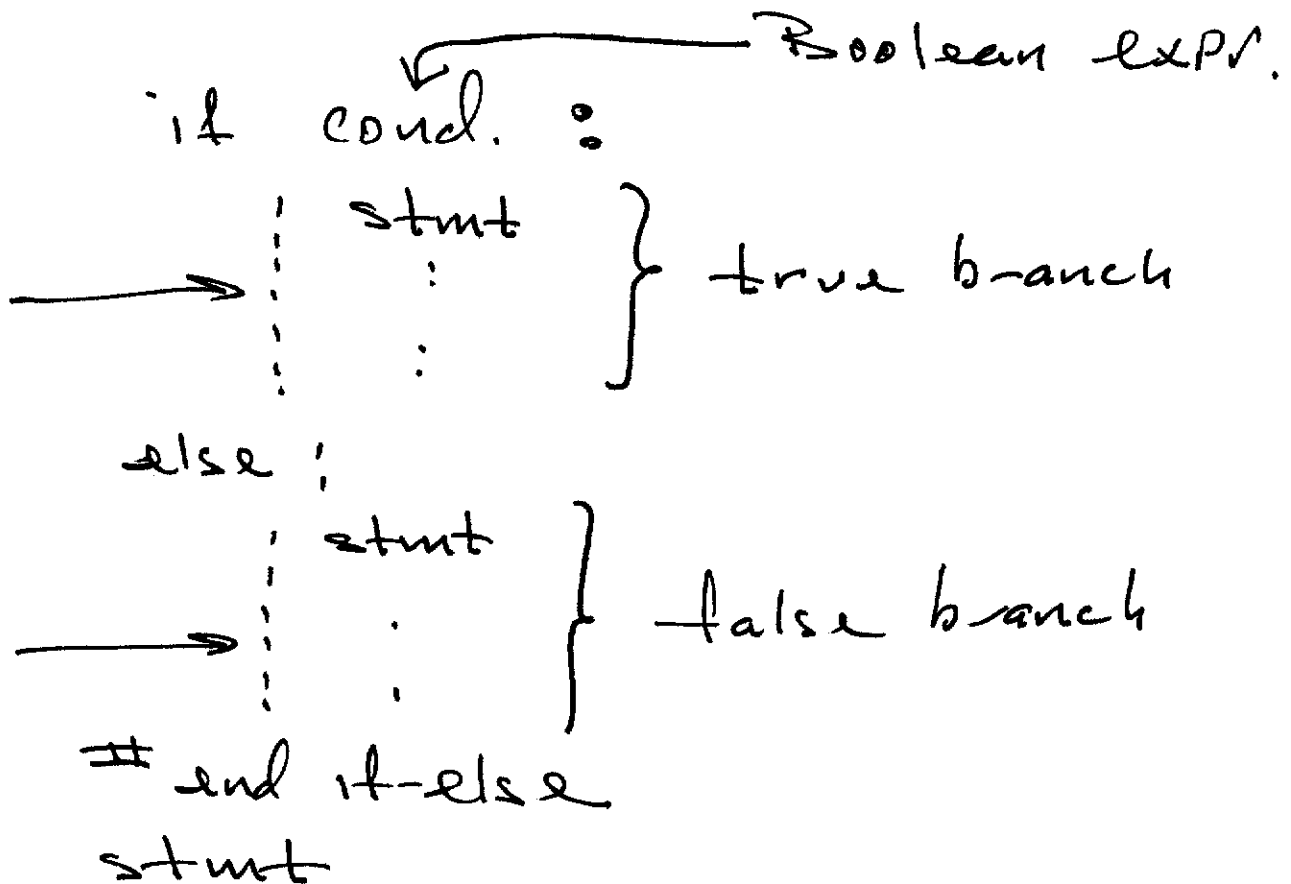
alter flow of execution based on the value of a Boolean expression.

o if statement

if condition : Boolean expression



o if with else clause



Ex. Extrema.py

- chained conditionals
if - elif - - else

```

if cond1:
    → starts
    .
    .
elif cond2:
    → starts
    .
    .
elif cond3:
    → starts
    .
    .
else:           # optional
    → starts
    .
    .
# end
starts.

```

Ex. Sort.py

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Ex. Better-Sort.py

swap $x \rightleftharpoons y$

temp = x

x = y

y = temp

<u>x</u>	<u>y</u>	<u>temp</u>
6	7	
6	7	6
7	7	6
7	6	6