Conditional Statements

Python
Conditional Statements

• Sometimes a statement (or a block of statements) should only be executed if a condition is true.

• Conditional execution is implemented with the if-statement

• Form of the if-statement:
Conditional Statements

- `if` — is a keyword
- Condition: a Boolean, something that is either True or False
- Statement: a single or block of statements, all indented
  - Indents are tricky, you can use white spaces or tabs, but not both. Many editors convert tabs to white spaces
  - The number of positions for the indent is between 3 and 8, depending on the style that you are using. Most important, keep it consistent.
Example

```python
a = int(input("a number, please: "))
if a < 5:
    print("that is a small number."")
```

- First line asks user for integer input.
- Second line checks whether user input is smaller than 5.
- In this case only, the program comments on the number.
Example

- Here we calculate the absolute value of the input.
- The third line is indented.
- The fourth line is not, it is always executed.
Example

- Here, lines 3 and 4 are indented and are executed if the input is a negative integer.
- The last line, line 5, is always executed since it is not part of the if-statement
Alternative statements

- Very often, we use a condition to decide which one of several branches of execution to pursue.
- The else-statement after the indented block of an if-statement creates an alternative route through the program.
Alternative Statements

• The if-else statement has the following form:

```
if Condition:
  Statement Block 1

else:
  Statement Block 2
```

• We add the keyword else, followed by a colon

• Then add a second set of statements, indented once

• If the condition is true, then Block 1 is executed, otherwise, Block 2.
Examples

- I can test equality by using the double `=` sign.
- To check whether a number \( n \) is even, I take the remainder modulo 2 and then compare with 0.

```python
number = int(input("Enter a number: "))
if number%2 ==0:
    print("The number is even.")
    print("Its square is", number**2)
else:
    print("The number is odd.")
    print("Its square-root is", number**0.5)
```
Alternative Statements

- Often, we have more than two alternative streams of execution.
- Instead of nesting if expressions, we can just use the keyword “elif”, a contraction of else if.
Alternative Statements

- One of the statement blocks is going to be executed
- The else block contains the default action, if none of the conditions are true
Alternative Statements

• Here, there is no else statement, so it is possible that none of the blocks is executed.
Examples

• Categorization of temperatures

```python
if temperature < -25.0:
    feeling = "arctic"
elif temperature < -10.0:
    feeling = "Wisconsin in winter"
elif temperature < 0.0:
    feeling = "freezing"
elif temperature < 15.0:
    feeling = "cold"
elif temperature < 25.0:
    feeling = "comfortable"
elif temperature < 35.0:
    feeling = "hot"
elif temperature < 45.0:
    feeling = "Ahmedabad in the summer"
else:
    feeling = "hot as in hell"
```
Boolean Expressions

- Nested loops to implement decision tree:

```python
if x<10:
    if y<3:
        if x<2:
            result=0
        else:
            result=1
    else:
        result=0
else:
    if y<2:
        result=1
    else:
        result=0
```