Assignment 3, Flowcharts

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Contents

1 Compare function

This function used to be in Python 2 standard library, but for no real reason it was removed fro Python 3. Here we give a possible implementation

1.1 Algorithm

This algorithm relies on the fact that Python will convert logical values into integers when they are used as arguments to arithmetic operations, specifically, subtraction. Thus:

1. `True - False = 1`
2. `True - True = 0`
3. `False - False = 0`
4. `False - True = -1`

Algorithm 1 Three-way comparison function a.k.a. arithmetic if (Fortran)

Require: x and y are drawn from a set with some (partial or total) ordering

function COMPARE(x, y)
    $z \leftarrow x < y$ ▷ z is still a logical variable
    $q \leftarrow x > y$ ▷ q will only equal to z if neither $x > y$ nor $x < y$
    return $z - q$
end function

1.2 Implementation

The implementation of the algorithm given above:

```
def compare(a, b):
    '''
    Arguments ``a`` and ``b`` are drawn from the same ordered set.
    This function makes no assumptions about whether the order is
    total or partial.

    This function returns:
        1  if a < b
        -1 if a > b
        0  if a = b

    :param a: Must be comparable to ``b``.
    :param b: Must be comparable to ``a``.
    '''
    return ((a > b) - (a < b))
```