

# The if statement

If statements can be used to control which instructions are executed. Here is the general form:

```
if expression1:
    body1
[elif expression2:      0 or more clauses
    body2]
[else:                  0 or 1 clause
    bodyN]
```

elif stands for "else if", so this forms a chain of conditions.

To execute an if statement, evaluate each expression in order from top to bottom. If an expression produces True, execute the body of that clause and then skip the rest of the if statement. If there is an else, and none of the expressions produce True, then execute the body of the else.

For example, given this function:

```
def report_status(scheduled_time, estimated_time):
    """ (float, float) -> str """
    if scheduled_time == estimated_time:
        return 'on time'
    elif scheduled_time > estimated_time:
        return 'early'
    else:
        return 'delayed'
```

In the shell:

```
>>> report_status(14.3, 14.3)
'on time'
>>> report_status(12.5, 11.5)
'early'
>>> report_status(9.0, 9.5)
'delayed'
```

## A note on None

When execution of a function body ends without having executed a return statement, the function returns value None. The type of None is NoneType.

For example, consider this function:

```
def report_status(scheduled_time, estimated_time):
    """ (float, float) -> str

    Return the flight status (on time, early, delayed) for a flight that was
    scheduled to arrive at scheduled_time, but is now estimated to arrive
    at estimated_time.

    Pre-condition: 0.0 <= scheduled_time < 24.0 and 0.0 <= estimated_time < 24.0

    >>> report_status(14.3, 14.3)
    'on_time'
    >>> report_status(12.5, 11.5)
    'early'
    >>> report_status(9.0, 9.5)
    'delayed'
    """

    if scheduled_time == estimated_time:
        return 'on time'
```

In the shell:

```
>>> report_status(14.3, 14.3)
'on time'
>>> report_status(12.5, 11.5)
>>> print(report_status(12.5, 11.5))
None
```

Because the type of None is NoneType, not str, this breaks the Type Contract. To fix this, we would need to complete the rest of the function.

