Exercises

2.12 Write Python expressions corresponding to these statements:
   (a) The sum of the first seven positive integers
   (b) The average age of Sara (age 65), Fatima (57), and Mark (age 45)
   (c) 2 to the 20th power
   (d) The number of times 61 goes into 4356
   (e) The remainder when 4365 is divided by 61

2.13 Start by evaluating, in the interactive shell, the assignment:

```python
>>> s1 = '-'
>>> s2 = '+'
```

Now write string expressions involving `s1` and `s2` and string operators `+` and `*` that evaluate to:
   (a) `'–+'`
   (b) `'–+'`
   (c) `'+––'`
   (d) `'+–––'`
   (e) `'+––––––––––––––––––––––––––––––––––––––––––––––––––––––––––'`
   (f) `'+–+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++––+++

Try to make your string expressions as succinct as you can.

2.14 Start by running, in the shell, the following assignment statement:

```python
>>> s = 'abcdefghijklmnopqrstuvwxyz'
```

Now write expressions using string `s` and the indexing operator that evaluate to `'a'`, `'c'`, `'z'`, `'y'`, and `'q'`.

2.15 Start by executing

```python
s = 'goodbye'
```

Then write a Boolean expression that check whether:
   (a) The first character of string `s` is `'g'`
   (b) The seventh character of `s` is `g`
   (c) The first two characters of `s` are `g` and `a`
   (d) The next to last character of `s` is `x`
   (e) The middle character of `s` is `d`
   (f) The first and last characters of string `s` are equal
   (g) The last 4 characters of string `s` match the string `'tion'`

Note: These seven statements should evaluate to `True`, `False`, `False`, `False`, `True`, `False`, and `False`, respectively.

2.16 Write the corresponding Python assignment statements:
   (a) Assign 6 to variable `a` and 7 to variable `b`.
   (b) Assign to variable `c` the average of variables `a` and `b`. 

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(c) Assign to variable `inventory` the list containing strings 'paper', 'staples', and 'pencils'.
(d) Assign to variables `first`, `middle` and `last` the strings 'John', 'Fitzgerald', and 'Kennedy'.
(e) Assign to variable `fullname` the concatenation of string variables `first`, `middle`, and `last`. Make sure you incorporate blank spaces appropriately.

2.17 Write Boolean expressions corresponding to the following logical statements and evaluate the expressions:
(a) The sum of 17 and -9 is less than 10.
(b) The length of list `inventory` is more than five times the length of string `fullname`.
(c) c is no more than 24.
(d) 6.75 is between the values of integers a and b.
(e) The length of string `middle` is larger than the length of string `first` and smaller than the length string `last`.
(f) Either the list `inventory` is empty or it has more than 10 objects in it.

2.18 Write Python statements corresponding to the following:
(a) Assign to variable `flowers` a list containing strings 'rose', 'bougainvillea', 'yucca', 'marigold', 'daylily', and 'lilly of the valley'.
(b) Write a Boolean expression that evaluates to True if string 'potato' is in list `flowers`, and evaluate the expression.
(c) Assign to list `thorny` the sublist of list `flowers` consisting of the first three objects in the list.
(d) Assign to list `poisonous` the sublist of list `flowers` consisting of just the last object of list `flowers`.
(e) Assign to list `dangerous` the concatenation of lists `thorny` and `poisonous`.

2.19 A dartboard of radius 10 and the wall it is hanging on are represented using the two-dimensional coordinate system, with the board’s center at coordinate (0,0). Variables x and y store the x- and y-coordinate of a dart hit. Write an expression using variables x and y that evaluates to True if the dart hits (is within) the dartboard, and evaluate the expression for these dart coordinates:
(a) (0,0)
(b) (10,10)
(c) (6, 6)
(d) (7,8)

2.20 A ladder put up right against a wall will fall over unless put up at a certain angle less than 90 degrees. Given variables `length` and `angle` storing the length of the ladder and the angle that it forms with the ground as it leans against the wall, write a Python expression involving `length` and `angle` that computes the height reached by the ladder. Evaluate the expression for these values of `length` and `angle`:
(a) 16 feet and 75 degrees
(b) 20 feet and 0 degrees
(c) 24 feet and 45 degrees
(d) 24 feet and 80 degrees