Objects and Data Structures Assessment Test

Test your knowledge.

** Answer the following questions **

Write a brief description of all the following Object Types and Data Structures we've learned about:

```
Numbers: Integers  - Whole numbers, Floats - Numbers with decimals

Strings: Ordered sequence of characters

Lists: Ordered sequence of objects that are mutable

Tuples: Ordered sequence of object that are immutable

Dictionaries: Key-value pair that is unordered
```

Numbers

Write an equation that uses multiplication, division, an exponent, addition, and subtraction that is equal to 100.25.

Hint: This is just to test your memory of the basic arithmetic commands, work backwards from 100.25

In [1]:

```
(60 + (10 ** 2) / 4 * 7) - 134.75
```

Out[1]:

```
100.25
```

Answer these 3 questions without typing code. Then type code to check your answer.

    What is the value of the expression 4 * (6 + 5)

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In [2]:

```
4 * (6 + 5)
```

Out[2]:

```
44
```

In [3]:

```
4 * 6 + 5
```

Out[3]:

```
29
```

In [4]:

```
4 + 6 * 5
```

Out[4]:

```
34
```

What is the *type* of the result of the expression 3 + 1.5 + 4?

In [ ]:

```
# float
```

What would you use to find a number's square root, as well as its square?

In [5]:

```
# Square root:
100 ** 0.5
```

Out[5]:

```
10.0
```

In [6]:

```
# Square:
10 ** 2
```

Out[6]:

```
100
```

Strings

Given the string 'hello' give an index command that returns 'e'. Enter your code in the cell below:

In [7]:

```
s = 'hello'
# Print out 'e' using indexing

s[1]
```

Out[7]:

```
'e'
```

Reverse the string 'hello' using slicing:

In [ ]:

```
s ='hello'
# Reverse the string using slicing
```

Given the string hello, give two methods of producing the letter 'o' using indexing.

In [10]:

```
s ='hello'
# Print out the 'o'

# Method 1:
s[4]
```

Out[10]:

```
'o'
```

In [9]:

```
# Method 2:
s[-1]
```

Out[9]:

```
'o'
```

Lists

Build this list [0,0,0] two separate ways.

In [11]:

```
# Method 1:
[0]*3
```

Out[11]:

```
[0, 0, 0]
```

In [12]:

```
# Method 2:
list2 = [0,0,0]
list2
```

Out[12]:

```
[0, 0, 0]
```

Reassign 'hello' in this nested list to say 'goodbye' instead:

In [13]:

```
list3 = [1,2,[3,4,'hello']]
list3[2][2] = 'goodbye'
list3
```

Out[13]:

```
[1, 2, [3, 4, 'goodbye']]
```

Sort the list below:

In [14]:

```
list4 = [5,3,4,6,1]
list4.sort()
list4
```

Out[14]:

```
[1, 3, 4, 5, 6]
```

Dictionaries

Using keys and indexing, grab the 'hello' from the following dictionaries:

In [15]:

```
d = {'simple_key':'hello'}
# Grab 'hello'
d['simple_key']
```

Out[15]:

```
'hello'
```

In [16]:

```
d = {'k1':{'k2':'hello'}}
# Grab 'hello'
d['k1']['k2']
```

Out[16]:

```
'hello'
```

In [22]:

```
# Getting a little tricker
d = {'k1':[{'nest_key':['this is deep',['hello']]}]}

#Grab hello
d['k1'][0]['nest_key'][1][0]
```

Out[22]:

```
'hello'
```

In [27]:

```
# This will be hard and annoying!
d = {'k1':[1,2,{'k2':['this is tricky',{'tough':[1,2,['hello']]}]}]}
d['k1'][2]['k2'][1]['tough'][2][0]
```

Out[27]:

```
'hello'
```

Can you sort a dictionary? Why or why not?

In [ ]:

```
# No, because it are mappins not sequences
```

Tuples

What is the major difference between tuples and lists?

In [ ]:

```
# tuples are immutable while lists are
```

How do you create a tuple?

In [28]:

```
x = (1,2,3)
```

Sets

What is unique about a set?

In [ ]:

```
# They contain unique objects so no duplicates
```

Use a set to find the unique values of the list below:

In [32]:

```
list5 = [1,2,2,33,4,4,11,22,3,3,2]

set(list5)
```

Out[32]:

```
{1, 2, 3, 4, 11, 22, 33}
```

Booleans

For the following quiz questions, we will get a preview of comparison operators. In the table below, a=3 and b=4.

Operator	Description	Example
==	If the values of two operands are equal, then the condition becomes true.	(a == b) is not true.
!=	If values of two operands are not equal, then condition becomes true.	(a != b) is true.
>	If the value of left operand is greater than the value of right operand, then condition becomes true.	(a > b) is not true.
<	If the value of left operand is less than the value of right operand, then condition becomes true.	(a < b) is true.
>=	If the value of left operand is greater than or equal to the value of right operand, then condition becomes true.	(a >= b) is not true.
<=	If the value of left operand is less than or equal to the value of right operand, then condition becomes true.	(a <= b) is true.

What will be the resulting Boolean of the following pieces of code (answer fist then check by typing it in!)

In [33]:

```
# Answer before running cell
2 > 3
```

Out[33]:

```
False
```

In [34]:

```
# Answer before running cell
3 <= 2
```

Out[34]:

```
False
```

In [35]:

```
# Answer before running cell
3 == 2.0
```

Out[35]:

```
False
```

In [36]:

```
# Answer before running cell
3.0 == 3
```

Out[36]:

```
True
```

In [37]:

```
# Answer before running cell
4**0.5 != 2
```

Out[37]:

```
False
```

Final Question: What is the boolean output of the cell block below?

In [38]:

```
# two nested lists
l_one = [1,2,[3,4]]
l_two = [1,2,{'k1':4}]

# True or False?
l_one[2][0] >= l_two[2]['k1']
```

Out[38]:

```
False
```

Great Job on your first assessment!