

2.3_solutions

January 26, 2023

1 Solutions

1.0.1 data structures

1. Write a list containing a string, a float number, and a boolean number.

```
[2]: a = ["a string", 5.6, True]
a
```

```
[2]: ['a string', 5.6, True]
```

2. Let $a=[1,2]$ and $b = [5,1]$. what is the result of $c=3*a + b$?

```
[3]: a, b = [1,2], [5,1]
c=3*a+b
print(c)
```

```
[1, 2, 1, 2, 1, 2, 5, 1]
```

3. With the same lists as before, what is the result of $(a==b)*a + (a<b)*b$?

```
[4]: a, b = [1,2], [5,1]
c= (a==b)*a + (a<b)*b
print(c)
```

```
[5, 1]
```

4. Let $a=(6,8,3,0)$ be a tuple. write a program that prints the second and last element of this tuple

```
[7]: a=(6,8,3,0)
print(a[1], a[-1])
```

```
8 0
```

5. transform the previous tuple to a list and store the result in a variable called b .

```
[12]: a=(6,8,3,0)
print('a is a ',type(a))

b=list(a)
print('b is a', type(b))
```

```
a is a <class 'tuple'>
b is a <class 'list'>
```

6. Insert the value "A" in the second position of the list b

```
[13]: b.insert(1,'A')
      print(b)
```

```
[6, 'A', 8, 3, 0]
```

7. Delete the value 8 from the list

```
[16]: b.remove(8)
      print(b)
```

```
[6, 'A', 3, 0]
```

8. Delete the first value of the list

```
[17]: del b[0]
      print(b)
```

```
['A', 3, 0]
```

9. Write a list such that the first element of the list is another list, the second element is a tuple, and the third is a Set.

```
[20]: mixedList= [[1,2,3], (1,2,3), {1,2,3} ]
      print(mixedList)
      print(type(mixedList[0]))
      print(type(mixedList[1]))
      print(type(mixedList[2]))
```

```
[[1, 2, 3], (1, 2, 3), {1, 2, 3}]
<class 'list'>
<class 'tuple'>
<class 'set'>
```

10. Let a=(5,8,2,9, 5, 2) and b=(5,3,0,9, 3, 0) be two tuples. Transform the tuples into sets and find their union, their intersections and the differences of each set with the other.

```
[32]: a=(5,8,2,9, 5, 2)
      b=(5,3,0,9, 3, 0)

      A=set(a)
      B=set(b)

      union=A.union(B)
      intersect=A.intersection(B)
      A_minus_B= A.difference(B)
      B_minus_A= B.difference(A)
```

```
print(union, intersect, A_minus_B, B_minus_A, sep="\n")
```

```
{0, 2, 3, 5, 8, 9}
{9, 5}
{8, 2}
{0, 3}
```

11. Let `names=["one", "two", "three"]` and `numbers=[1,2,3]` two lists. Construct two dictionaries, one in which the names are the keys and the numbers the values, and another in which the numbers are the keys and the names are the values

```
[40]: names=["one", "two", "three"]
      numbers=[1,2,3]
      dict_1 = {"one":1, "two":2, "three":3}
      dict_2 = {1:"one", 2:"two", 3:"three"}
      print(dict_1, dict_2)

# This could be done more efficiently using:
# - zip function
# - for loop
# - list comprehension
# We will see all of them in live class N.1
```

```
{'one': 1, 'two': 2, 'three': 3} {1: 'one', 2: 'two', 3: 'three'}
```

12. Let `mydict` be a dictionary, and let `a=mydict.keys()` . What is the datatype of `a`? How can you make a tuple with all the keys?

```
[44]: # for instance
      mydict = {"one":1, "two":2, "three":3}
      a=mydict.keys()
      print(a, type(a))

      b=tuple(a)
      print(b, type(b))
```

```
dict_keys(['one', 'two', 'three']) <class 'dict_keys'>
('one', 'two', 'three') <class 'tuple'>
```