Lists
Lists

[1,2,3]

["Project", "Homework", "Test", "Exam"]

[8.15, 9.45]

[]

[1, "Homework", 8.15]
Index

\[
\begin{array}{ccccc}
1 & -2 & 3 & -4 & 5 \\
0 & 1 & 2 & 3 & 4 \\
\end{array}
\]

\textit{list[index]}

```python
>>> ourlist = [1,-2,3,-4,5]
>>> element = ourlist[1]
>>> print element
-2
```
Number of elements (or length)

```
1 -2 3 -4 5
0 1 2 3 4

len(list)
```

```python
>>> ourlist = [1,-2,3,-4,5]
>>> len(ourlist)
5
```
Slicing

```python
>>> ourlist = [1,-2,3,-4,5,-6,7,8,-9,1,1]
>>> print ourlist[3:8]
[-4, 5, -6, 7, 8]
>>> print ourlist[4:]
[5, -6, 7, 8, -9, 1, 1]
>>> print ourlist[:9]
[1, -2, 3, -4, 5, -6, 7, 8, -9]
>>> print ourlist[:]
[1, -2, 3, -4, 5, -6, 7, 8, -9, 1, 1]
>>> print ourlist[-3:]
[-9, 1, 1]
```
Operations with lists

• Concatenation +

```python
>>> list1 = [1, 2, 3]
>>> list2 = [-4, -5]
>>> list1 + list2
[1, 2, 3, -4, -5]
```

• Multiplication *

```python
>>> [1, 2, 3] * 3
[1, 2, 3, 1, 2, 3, 1, 2, 3]
```
Function `range`

```python
>>> range(4)
[0, 1, 2, 3]
>>> range(2, 5)
[2, 3, 4]
>>> range(3, 10, 2)
[3, 5, 7, 9]
>>> range(10, 3, -2)
[10, 8, 6, 4]
```
Looping through lists

ourlist = [-1,2,-3,4,-5]
for el in ourlist: #el is element
    print el

for i in range(len(ourlist)): #i is index
    print ourlist[i] #outlist[i] is element
Logical expressions with lists

```python
>>> 1 in [1,2,3]
True
>>> -2 in [1,2,3]
False
>>> 5 not in [1,2,3]
True
>>> [1,2,3] == [3,2,1]
False
>>> [1,2,3] != [3,4,5]
True
```
Lists are mutable

```python
>>> ourlist = [1,-2,3,-4,5]
>>> ourlist[1] = 10
>>> print ourlist
[1, 10, 3, -4, 5]
```
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<thead>
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<th>Functions</th>
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<td>count</td>
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<td>extend</td>
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<td>index</td>
<td>min</td>
</tr>
<tr>
<td>insert</td>
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</tbody>
</table>

```python
orlist.sort()            sum(orlist)
```

[https://docs.python.org/2/tutorial/datastructures.html](https://docs.python.org/2/tutorial/datastructures.html)
[https://docs.python.org/2/library/functions.html](https://docs.python.org/2/library/functions.html)

*Other expressions and operations:* 
- `[1,2]+[2,1]` 
- `[1,2]*2` 
- `2 in [2,1]` 
- `[1,2]==[2,1]`
Building a list

ffile = open("numbers.txt")

numbers = []

for line in ffile:
    number = int(line)
    numbers.append(number)

print(numbers)
List from a string (split)

```python
>>> "Hello world".split()
['Hello', 'world']
>>> date = "27.10.2017"
>>> date.split(".")
['27', '10', '2017']
```
Test 7

Questions?
Homework (Celsius and Fahrenheit, Number of days in months)

Questions?