Six ways to flatten a List

In [ ]:
```
list1 = [[1,2,3],[4,5,6,7],[8,9,10,11]]
new_list = []

for i in list1:
    print("Len of i = ",len(i))
    print("i",i)
    for j in i:
        print("j",j)
        print(f"Appending value {j} to list")
        new_list.append(j)

print(new_list)
```

```
Len of i =  3
i [1, 2, 3]
j 1
Appending value 1 to list
j 2
Appending value 2 to list
j 3
Appending value 3 to list
Len of i =  4
i [4, 5, 6, 7]
j 4
Appending value 4 to list
j 5
Appending value 5 to list
j 6
Appending value 6 to list
j 7
Appending value 7 to list
Len of i =  4
i [8, 9, 10, 11]
j 8
Appending value 8 to list
j 9
Appending value 9 to list
j 10
Appending value 10 to list
j 11
Appending value 11 to list
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
```

In [ ]:
```
list1 = [[1,2,3],[4,5,6,7],[8,9,10,11]]
result = [innerlist for outerlist in list1 for innerlist in outerlist]
print(result)
```

```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
```

In [ ]:
```
from timeit import timeit
print(timeit("[innerlist for outerlist in list1 for innerlist in outerlis
```

```
0.8535068639976089
```

In [ ]:
```
list1 = [[1,2,3],[4,5,6,7],[8,9,10,11]]
new_list = []
```

```
for i in list1:
    print("Len of i = ",len(i))
    print("i",i)
    new_list = new_list + i

print(new_list)
```

```
Len of i =  3
i [1, 2, 3]
Len of i =  4
i [4, 5, 6, 7]
Len of i =  4
i [8, 9, 10, 11]
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
```

In [ ]:
```
list1 = [[1,2,3],[4,5,6,7],[8,9,10,11]]
result2 = sum(list1, [])
print(result2)
```

```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
```

In [ ]:
```
from timeit import timeit
print(timeit("sum(list1, [])", "from __main__ import list1"))
```

```
0.3979934620001586
```

In [ ]:
```
list1 = [[1,2,3],[4,5,6,7],[8,9,10,11]]

from functools import reduce
result4 = reduce(lambda x,y : x+y, list1)
print(result4)
```

```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
```

In [ ]:
```
from timeit import timeit
print(timeit("reduce(lambda x,y: x+y, list1)", "from __main__ import list
```

```
0.4760102359978191
```

In [ ]:
```
list1 = [[1,2,3],[4,5,6,7],[8,9,10,11]]

from functools import reduce
from operator import add
result5 =  reduce(add, list1)
print(result5)
```

```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
```

In [ ]:
```
from timeit import timeit
print(timeit("reduce(add, list1)", "from __main__ import list1; from oper
```

```
0.2977846169997065
```

In [ ]:
```
list1 = [[1,2,3],[4,5,6,7],[8,9,10,11]]

from itertools import chain
result3 = list(chain(*list1))
print(result3)
```

```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
```

In [ ]:
```
from timeit import timeit
print(timeit("list(chain(*list1))", "from __main__ import list1; from ite
```

```
0.5779259410010127
```

In [ ]:
```
list1 = [[1,2,3],[4,5,6,7],[8,9,10,11]]

from itertools import chain
result3 = list(chain.from_iterable(list1))
print(result3)
```

```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
```

In [ ]:
```
from timeit import timeit
print(timeit("list(chain.from_iterable(list1))", "from __main__ import li
```

```
0.6360882539993327
```