

# **Lists, for loops**

**Python basics**

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# learning outcomes

1. How to work through a list using a for loop, how Python uses indentation to structure a program, and how to avoid some common indentation errors.
2. Numerical lists, as well as a few operations you can perform on numerical lists.
3. Slice a list to work with a subset of items and how to copy lists properly using a slice
4. Tuples (which provide a degree of protection to a set of values that shouldn't change) and how to style your increasingly complex code to make it easy to read.

```
# looping through list

courses = ['Agriculture', 'Soil Science', 'Francisation', 'génie civil']
for course in courses:
    print(course)
```

```
Agriculture
Soil Science
Francisation
génie civil
```

## Remarks-

- 1) don't forget indentation in second line
- 2) don't forget to include two dots
- 3) with for loop, we associated course with courses, The output gets printed in separate lines of code
- 4) generic- for item in list\_of\_items

```
for course in courses:
    print(f"{course.title()}, was awesome!")
```

```
Agriculture, was awesome!
Soil Science, was awesome!
Francisation, was awesome!
Génie Civil, was awesome!
```

```
# adding a line in front
for course in courses:
    print (f"I look forward to becoming more smart in {course.title()}.")
```

I look forward to becoming more smart in Agriculture.  
I look forward to becoming more smart in Soil Science.  
I look forward to becoming more smart in Francisation.  
I look forward to becoming more smart in Génie Civil.

```
# adding an empty line after
for course in courses:
    print (f"I will add empty line after {course.title()}.\n")
```

I will add empty line after Agriculture.  
  
I will add empty line after Soil Science.  
  
I will add empty line after Francisation.  
  
I will add empty line after Génie Civil.

```
# way to write multiple lines of code using for loop
for course in courses:
    print(f"{course.title()} was a great subject")
    print(f"I got to learn a lot about {course.title()}.")
    print("Thanks awesome people who came to my life as mentors and changed it.\n")
```

Agriculture was a great subject  
I got to learn a lot about Agriculture.  
Thanks awesome people who came to my life as mentors and changed it.

Soil Science was a great subject  
I got to learn a lot about Soil Science.  
Thanks awesome people who came to my life as mentors and changed it.

Francisation was a great subject  
I got to learn a lot about Francisation.  
Thanks awesome people who came to my life as mentors and changed it.

Génie Civil was a great subject  
I got to learn a lot about Génie Civil.  
Thanks awesome people who came to my life as mentors and changed it.

## Numerical lists

1. we use range function for that

```
for value in range(1,6):  
    print(value)
```

1  
2  
3  
4  
5

```
# printing a list of numbers  
for value in range(1,6):  
    print(list[value])
```

list[1]  
list[2]  
list[3]  
list[4]  
list[5]

```
# printing list of numbers using list function  
numbers = list(range(1,6))  
print(numbers)
```

[1, 2, 3, 4, 5]

```
# printing even numbers  
even_numbers = list(range(0,11,2))  
print(even_numbers)
```

[0, 2, 4, 6, 8, 10]

```
squares = []
for value in range(1,11):
    square = value ** 2
    squares.append(square)
    print(squares)
print (squares)                                #difference between this and previous, wow!

# indentation is important
```

```
[1]
[1, 4]
[1, 4, 9]
[1, 4, 9, 16]
[1, 4, 9, 16, 25]
[1, 4, 9, 16, 25, 36]
[1, 4, 9, 16, 25, 36, 49]
[1, 4, 9, 16, 25, 36, 49, 64]
[1, 4, 9, 16, 25, 36, 49, 64, 81]
[1, 4, 9, 16, 25, 36, 49, 64, 81, 100]
[1, 4, 9, 16, 25, 36, 49, 64, 81, 100]
```

```
print(squares)
```

```
[1, 4, 9, 16, 25, 36, 49, 64, 81, 100]
```

```
# precise way

sq_numbers = []
for a in range(1,11):
    sq_numbers.append(a**2)
print(sq_numbers)
```

```
[1, 4, 9, 16, 25, 36, 49, 64, 81, 100]
```

## List comprehensions

1. extended form of a for loop (result we need in front, followed by for loop)
2. combines for loop and creates new elements in one line

```
sq = [value**2 for value in range(1, 11)]  
print(sq)
```

[1, 4, 9, 16, 25, 36, 49, 64, 81, 100]

```
cubes = [value**3 for value in range(1,11)]  
print(cubes)
```

[1, 8, 27, 64, 125, 216, 343, 512, 729, 1000]

## Looping through a slice

```
universities = ['punjabi', 'pau', 'laval', 'Mcgill']  
print("here are the list of universities, I studied:")  
for university in universities:  
    print(university.title())
```

here are the list of universities, I studied:

Punjabi  
Pau  
Laval  
Mcgill

## Tuples

1. they are immutable lists
2. uses parenthesis instead of square brackets
3. To define a tuple with one element, you need a comma behind

```
Buffet= ('Aloo gobhi', 'matar paneer', 'parantha', 'raita', 'roti',)  
print(Buffet)
```

('Aloo gobhi', 'matar paneer', 'parantha', 'raita', 'roti')

```
Buffet[1]= ('pappad')
```

```
print("Buffet:")
for item in Buffet:
    print(item)
```

```
Buffet:
Aloo gobhi
matar paneer
parantha
raita
roti
```

```
New_buffet = ('raita', 'parantha', 'butternan', 'allogobhi', 'Kasaurimethi')
print('New_buffet:')
for item in New_buffet:
    print(item)
```

```
New_buffet:
raita
parantha
butternan
allogobhi
Kasaurimethi
```

Respecting community; some guidelines 1. Indentation- PEP 8 2. line length- 79 characters long 3. Blank lines - 5 lines of code followed by a blank line is suggested