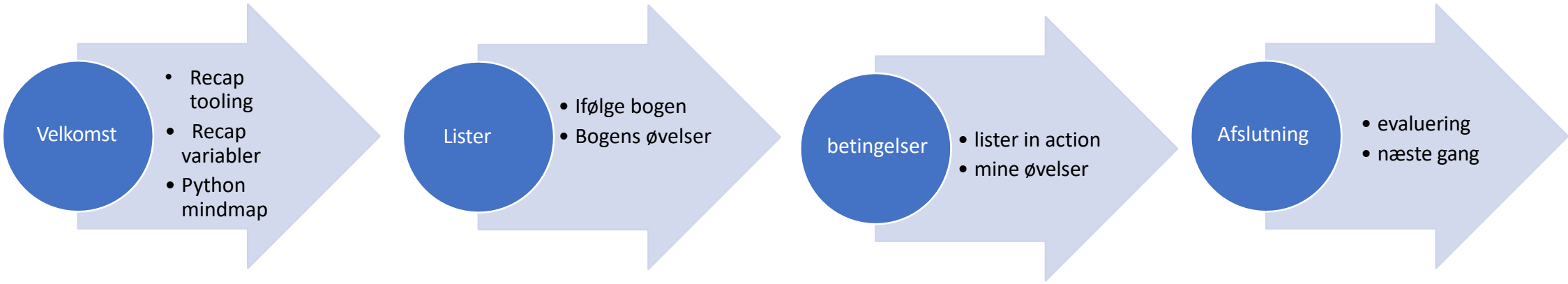
# EVU Python

# Program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• Recap variabler
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• Bogens øvelser
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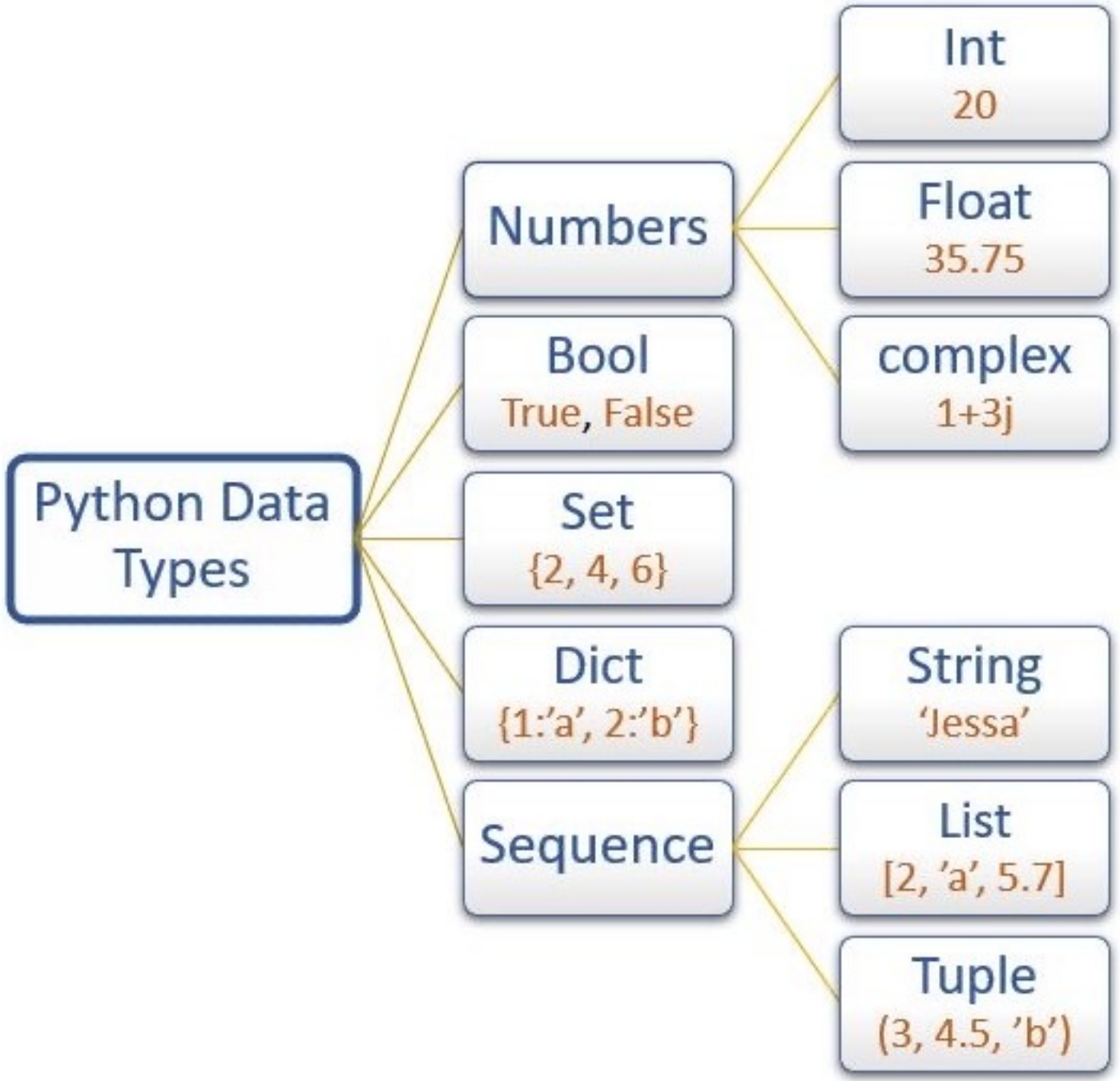
Her forlader vi bogen

Datatyper

”Simple”

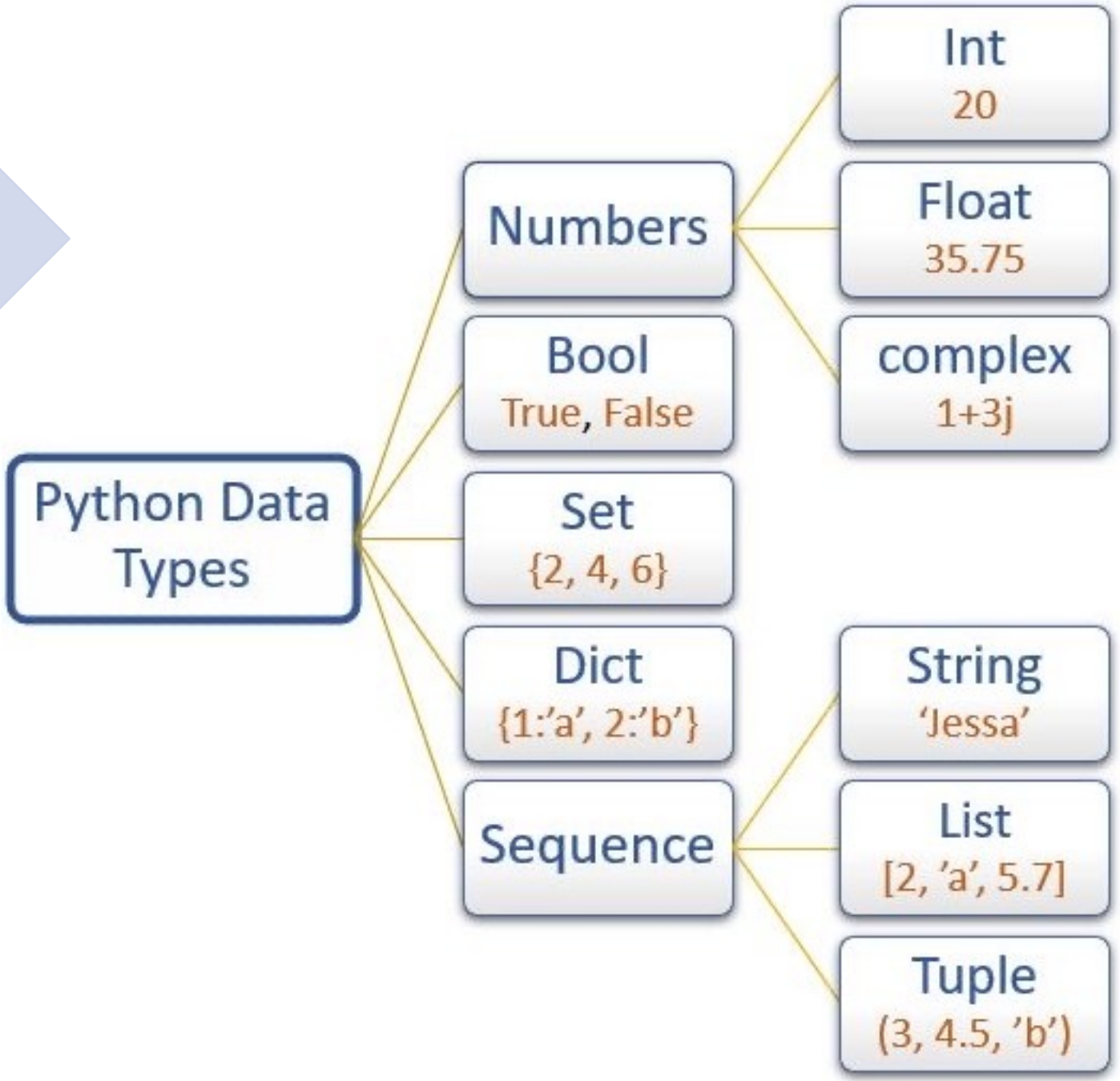



A Python variable is a reserved memory location to store values.

Every value in Python has a datatype.

Datatyper

Sekventielle



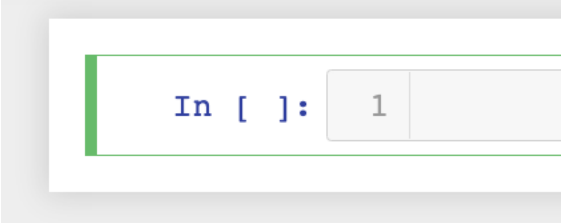
Datatyper

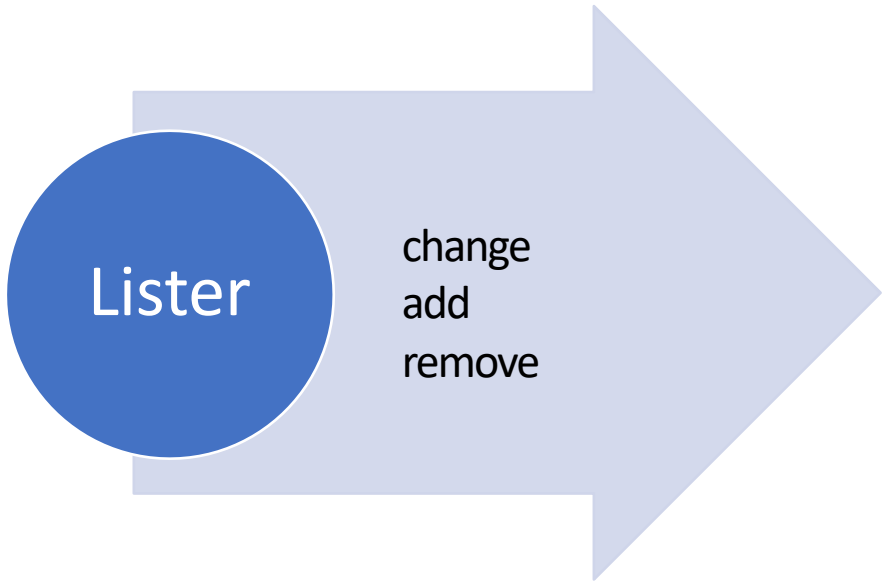
Lister – følger bogen

Lister

what is ..

- A list is a **collection** of items in a **particular** order.
- You can put **anything** you want into a list, and the items in your list **don’t have to be related** in any particular way



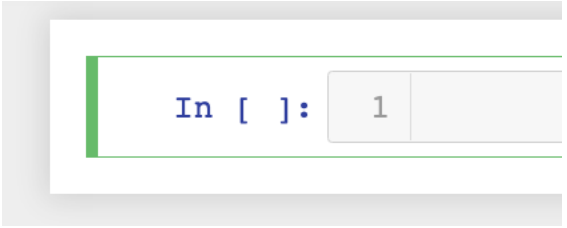


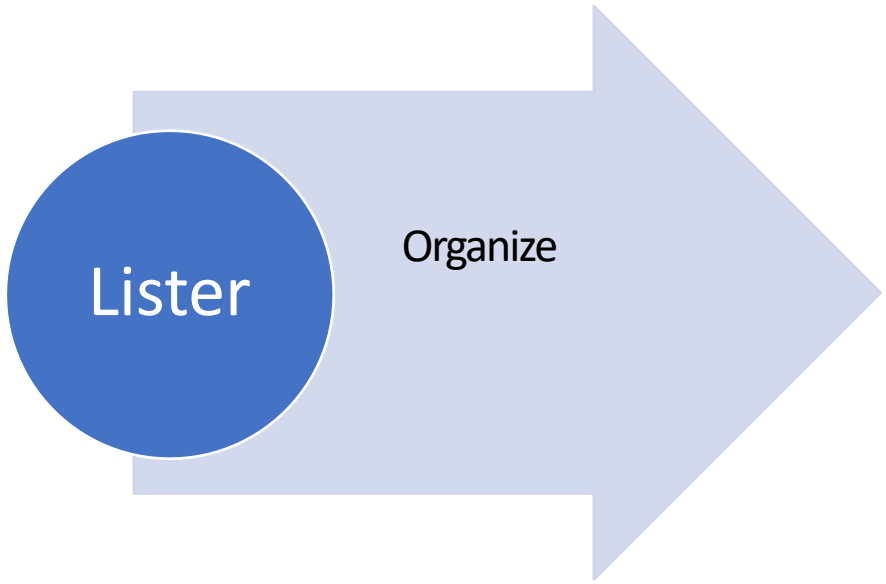

- To change an element, use the **name** of the list followed by the **index** of the element you want to change, and then provide the new **value** you want that item to have

- You can add a new element at any position in your list by using the **insert**()method.

- The **append**() method makes it easy to build lists dynamically.

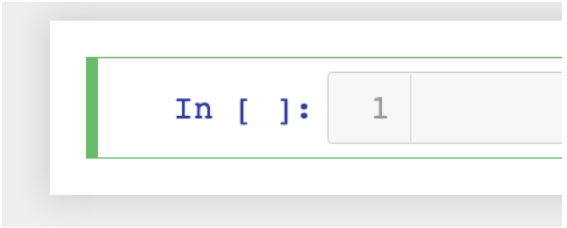
- You can remove an item from
  - any position in a list using the **del** statement if you know its index
  - The **pop**() method removes the last item in a list
  - If you only know the value of the item you want to remove, you can use the **remove**() method.

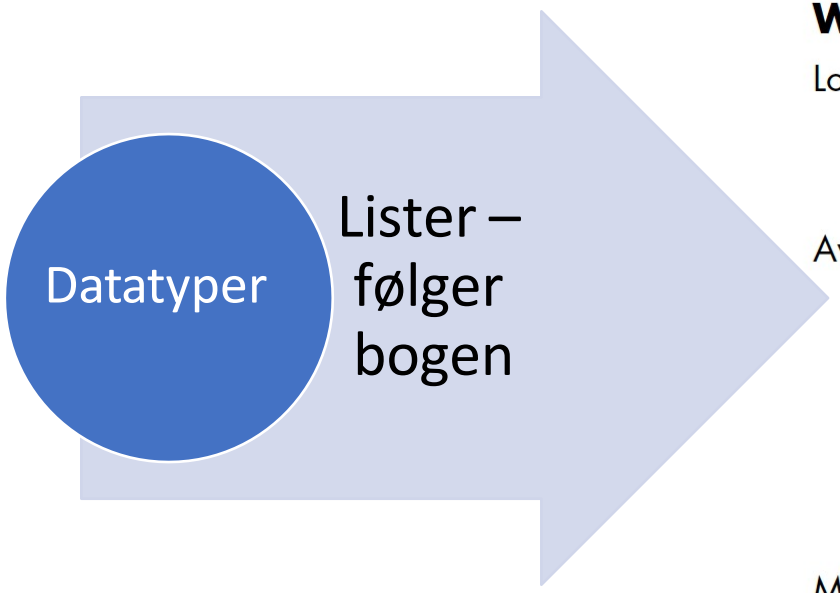





- Python’s **sort**() method makes it easy to sort a list.
  - default alphabtically
  - sort(**reverse**=True)

- To maintain the **original order** of a list but present it in a sorted order, you can use the **sorted**() function.
- To reverse the original order of a list, you can use the **reverse**() method
- You can find the length of a list by using the **len**() function.





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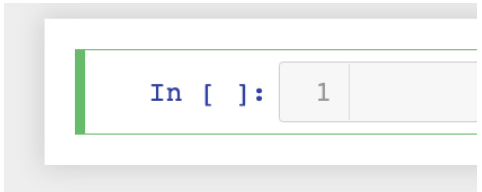
Lister – Looping

**4**
**WORKING WITH LISTS** **49**



Looping allows you to take the **same action**, or set of actions, with every item in a list. As a result, you'll be able to work efficiently with lists **of any length**, including those with thousands or even millions of items

```
magicians = ['alice', 'david', 'carolina']
for magician in magicians:
    print(magician)
```




When you're using loops for the first time, keep in mind that the set of steps is **repeated once for each item** in the list

Python uses **indentation** to determine how a line, or group of lines, is related to the rest of the program

Datatyper

# Lister – Looping



```
In [ ]: 1
```

**NOTE**

Sometimes your loop will run without any errors but won't produce the expected result.

```
In [ ]: 1
```

4-2. Animals:
print out the n

```
In [ ]: 1
```

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Lister – Looping



Lists are ideal for storing **sets of numbers**, and Python provides a variety of **tools** to help you work efficiently with lists of numbers.

- the **range**() function to print a series of numbers
- Using range() to Make a **List of Numbers**
- use the range() function to tell Python to **skip** numbers in agiven range

```
squares = []
for value in range(1, 11):
    square = value ** 2
    squares.append(square)

print(squares)
```

Vigtigt eksempel!

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Lister – comprehension



A list comprehension **combines** the **for** loop and the creation of new elements into one line, and **automatically** appends each new element

```
1 bikemsg = []
2 for bike in mybikes:
3     msg=f"Her er min {bike}"
4     bikemsg.append(msg)
```

```
1 bikemsg = [f"Her er min {bike}" for bike in mybikes]
```

4-3. Counting to Twenty: Use a for loop

```
1 mynumbers=range(1,21)
```

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Lister – slicing



To make a **slice**, you specify the index of the first and last elements you want to work with. Python stops one item **before** the second index you specify

- players[0:3]
- players[:4]
- players[2:]
- players[-3:]

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Lister – slicing



To copy a list, you can make a slice that includes the entire original list by omitting the first index and the second index ([:])

**NOTE**

Basically, if you're trying to work with a copy of a list and you see unexpected behavior, make sure you are copying the list using a slice

Datatyper

# Tuples

A tuple looks just like a list except you use **parentheses** instead of square brackets.

Tuples are **immutable.** Use them when you want to store a set of values that should **not** be changed throughout the life of a program

```
1 size=(600,400)
```

```
1 size[0]
```

```
600
```

```
1 size[0]=122
```

```
---------------------
TypeError
```

# Pause

# Lister

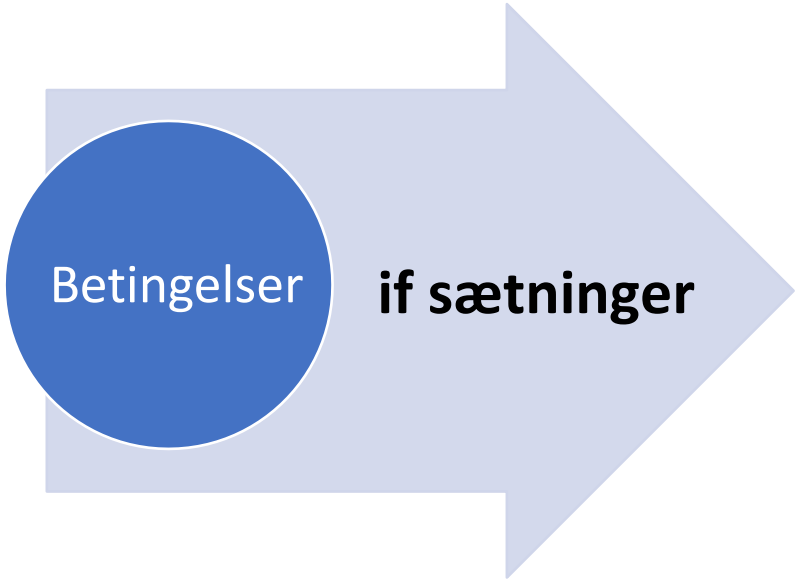
Øvelse

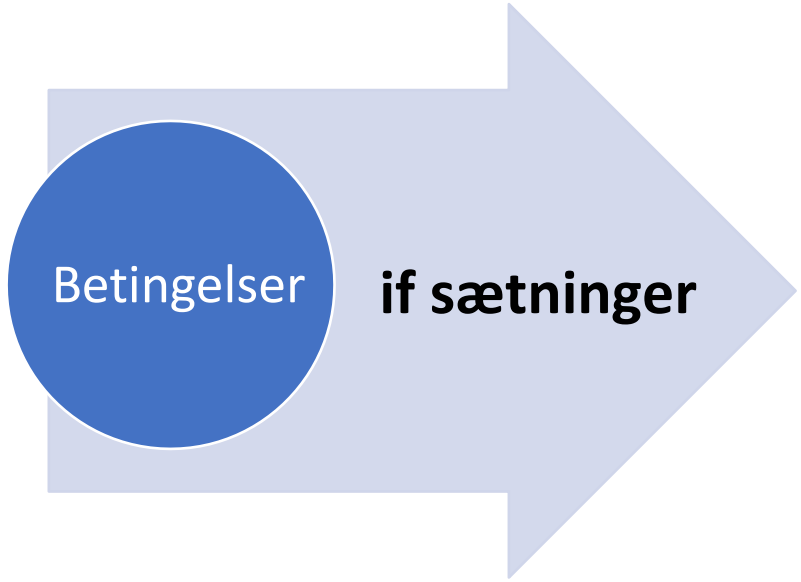
Lav en liste med 1000 tilfældige hele tal mellem 1 og 10.
Læg sammen og beregn gennemsnittet
Lav en ny liste som skal bruges til at beregne standard-afvigelsen (viser derpå Numpy)

## Lister

In [38]:
```
1 boliger=[]
2 fh=open('edc-old.csv','r')
3 lines=fh.readlines()
```

In [ ]:
```
1
```






**Boolean values - True, False -** provide an efficient way to track the **state** of a program or a particular condition that is important in your program.

**5**
**IF STATEMENTS** **71**



At the heart of **every if statement** is an **expression** that can be **evaluated** as **True or False** and is called a conditional test.

- Single condition:
  - if age **==** 18:
  - if age **>** 18:
  - if age **<** 18:
  - if age **!=** 18:
- Multiple conditions
  - if (age > 67) **or** (age < 18):
  - if (age > 67) **and** (age < 18):
- Element in list
  - if ”Trek” **in** mybikes:
  - if ”Trek” **not in** mybikes:

Betingelser

**if sætninger**

**5**
**IF STATEMENTS** **71**



In [22]:
```
1 car="Audi"
2 print(car=="Subaru")
3 print(car.lower()=='audi')
```

```
False
True
```

In [34]:
```
1 ages=list(range(0,100,10))
2 ages.append(32)
3 age_lone=21
4 age_birgit=42
5 age_kurt=21
6 print(age_lone > age_birgit)
7 print(age_lone > age_kurt)
8 print(age_lone >= age_kurt)
9 print(f"is 40 in ages? {40 in ages}")
```

```
False
False
True
is 40 in ages? True
```

Betingelser

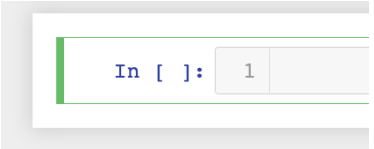
# if sætninger



## *Simple if Statements*

The simplest kind of `if` statement has one test and one action:

```
if conditional_test:
    do something
```




NOTE

**Indentation** plays the same role in if statements as it did in for loops. **All indented lines** after an if statement **will be executed if the test passes**, and the entire block of indented lines will be ignored if the test does not pass.

Betingelser

# if sætninger



Often, you'll want to take one action when a conditional test passes and a different action in all other cases. Python's if-else syntax makes this possible.

if *condition*:
  *action*
else:
  *other action*

if *condition*:
  *action*
elif:
  *action2*
elif:
  *action2*
else:
  *final-action*

NOTE

Python executes only one block in an if-elif-else chain. It runs each conditional test in order until one passes. When a test passes, the code following that test is executed and Python skips the rest of the tests.
The else block is a catchall statement – so you may want to skip it!

Betingelser

**if sætninger**



5-3. Alien Colors #1: Imagine an alien was just sh

In [41]:

```
1 alien_color='green'
2 if alien_color == 'green':
3     print("you got 5")
```

```
you got 5
```

Betingelser

**if & lister**



You can do some interesting work when you combine lists and if statements. You can **watch for special values** that need to be treated differently than other values in the list. You can **manage changing conditions** efficiently, such as the availability of certain items in a restaurant throughout a shift. You can also begin to **prove that your code works** as you expect it to in all possible situations

Betingelser

**if & lister**



**5-10. Checking Usernames:** Do the following to create a program that simulates how websites ensure that everyone has a unique username.

- Make a list of five or more usernames called `current_users`.
- Make another list of five usernames called `new_users`. Make sure one or two of the new usernames are also in the `current_users` list.
- Loop through the `new_users` list to see if each new username has already been used. If it has, print a message that the person will need to enter a new username. If a username has not been used, print a message saying that the username is available.
- Make sure your comparison is case insensitive. If `'John'` has been used, `'JOHN'` should not be accepted. (To do this, you'll need to make a copy of `current_users` containing the lowercase versions of all existing users.)

# Pause

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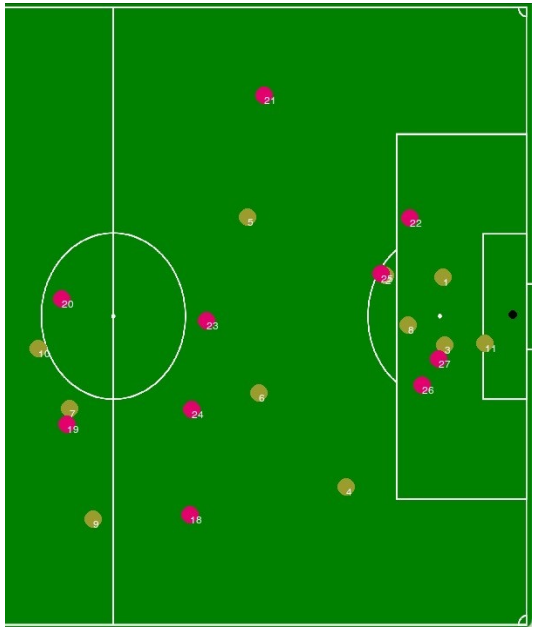
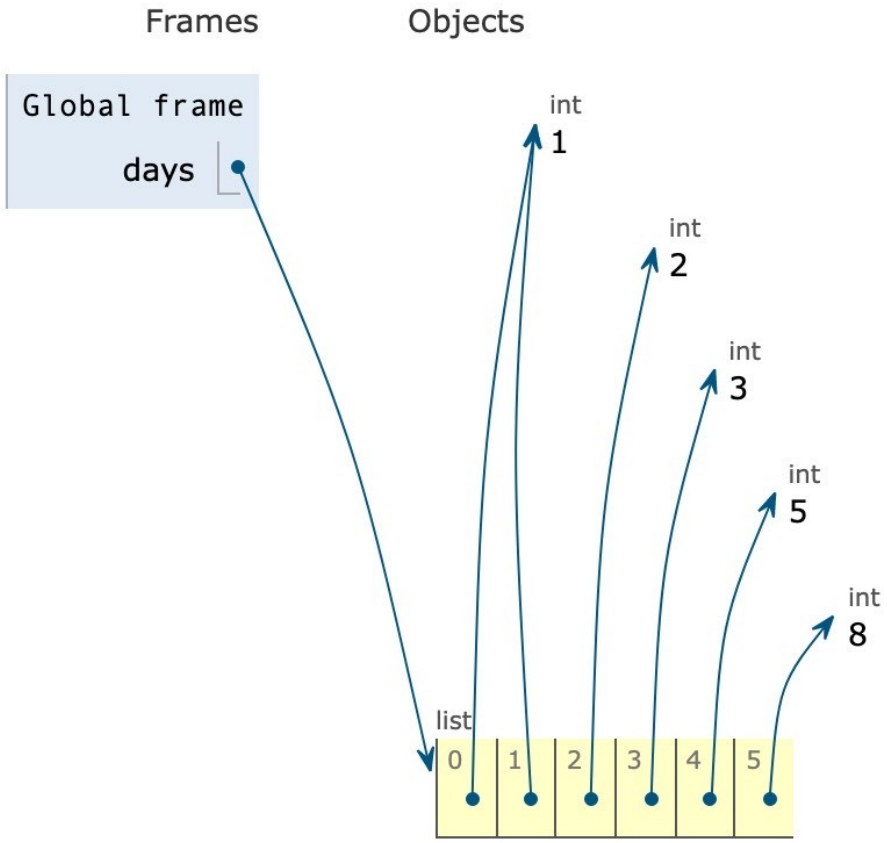
Lister – hvad?

playingPlayers = {list: 22}
- 00 = {str} 'player1_y'
- 01 = {str} 'player2_y'
- 02 = {str} 'player3_y'
- 03 = {str} 'player4_y'
- 04 = {str} 'player5_y'
- 05 = {str} 'player6_y'
- 06 = {str} 'player7_y'
- 07 = {str} 'player8_y'





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# Lister – hvad?

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# Lister - Metoder

| Method | Description | Example |
|---|---|---|
| `lst.append(x)` | Appends element `x` to the list `lst`. | `>>> l = []`<br>`>>> l.append(42)`<br>`>>> l.append(21)`<br>`[42, 21]` |
| `lst.clear()` | Removes all elements from the list lst–which becomes empty. | `>>> lst = [1, 2, 3, 4, 5]`<br>`>>> lst.clear()`<br>`[]` |
| `lst.copy()` | Returns a copy of the list `lst`. Copies only the list, not the elements in the list (shallow copy). | `>>> lst = [1, 2, 3]`<br>`>>> lst.copy()`<br>`[1, 2, 3]` |
| `lst.count(x)` | Counts the number of occurrences of element `x` in the list `lst`. | `>>> lst = [1, 2, 42, 2, 1, 42, 42]`<br>`>>> lst.count(42)`<br>`3`<br>`>>> lst.count(2)`<br>`2` |
| `lst.extend(iter)` | Adds all elements of an iterable `iter` (e.g. another list) to the list `lst`. | `>>> lst = [1, 2, 3]`<br>`>>> lst.extend([4, 5, 6])`<br>`[1, 2, 3, 4, 5, 6]` |
| `lst.index(x)` | Returns the position (index) of the first occurrence of value `x` in the list `lst`. | `>>> lst = ["Alice", 42, "Bob", 99]`<br>`>>> lst.index("Alice")`<br>`0`<br>`>>> lst.index(99, 1, 3)`<br>`ValueError: 99 is not in list` |
| `lst.insert(i, x)` | Inserts element `x` at position (index) `i` in the list `lst`. | `>>> lst = [1, 2, 3, 4]`<br>`>>> lst.insert(3, 99)`<br>`[1, 2, 3, 99, 4]` |
| `lst.pop()` | Removes and returns the final element of the list `lst`. | `>>> lst = [1, 2, 3]`<br>`>>> lst.pop()`<br>`3`<br>`>>> lst`<br>`[1, 2]` |
| `lst.remove(x)` | Removes and returns the first occurrence of element `x` in the list `lst`. | `>>> lst = [1, 2, 99, 4, 99]`<br>`>>> lst.remove(99)`<br>`>>> lst`<br>`[1, 2, 4, 99]` |
| `lst.reverse()` | Reverses the order of elements in the list `lst`. | `>>> lst = [1, 2, 3, 4]`<br>`>>> lst.reverse()`<br>`>>> lst`<br>`[4, 3, 2, 1]` |
| `lst.sort()` | Sorts the elements in the list `lst` in ascending order. | `>>> lst = [88, 12, 42, 11, 2]`<br>`>>> lst.sort()`<br>`# [2, 11, 12, 42, 88]`<br>`>>> lst.sort(key=lambda x: str(x)[0])`<br>`# [11, 12, 2, 42, 88]` |

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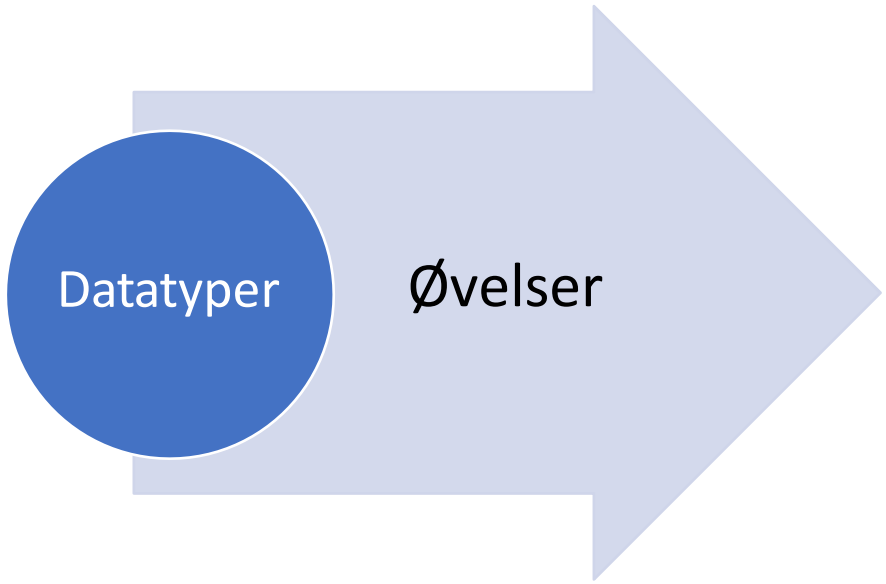
Lister - Funktioner

| | | | | |
|---|---|---|---|---|
| abs() | divmod() | input() | open() | staticmethod() |
| all() | enumerate() | int() | ord() | str() |
| any() | eval() | isinstance() | pow() | sum() |
| basestring() | execfile() | issubclass() | print() | super() |
| bin() | file() | iter() | property() | tuple() |
| bool() | filter() | len() | range() | type() |
| bytearray() | float() | list() | raw_input() | unichr() |
| callable() | format() | locals() | reduce() | unicode() |
| chr() | frozenset() | long() | reload() | vars() |
| classmethod() | getattr() | map() | repr() | xrange() |
| cmp() | globals() | max() | reversed() | zip() |
| compile() | hasattr() | memoryview() | round() | __import__() |
| complex() | hash() | min() | set() | apply() |
| delattr() | help() | next() | setattr() | buffer() |
| dict() | hex() | object() | slice() | coerce() |
| dir() | id() | oct() | sorted() | intern() |




- 3-1 - Venneliste
- 3-2 - Brug listen til velkomst besked
- 3-4 - Gæsteliste
- 3-5 – Ændringer
  - replace
- 3-8 – TopSightsList
  - Print alfabetisk
  - Reverse

# Pause

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Lister in Action

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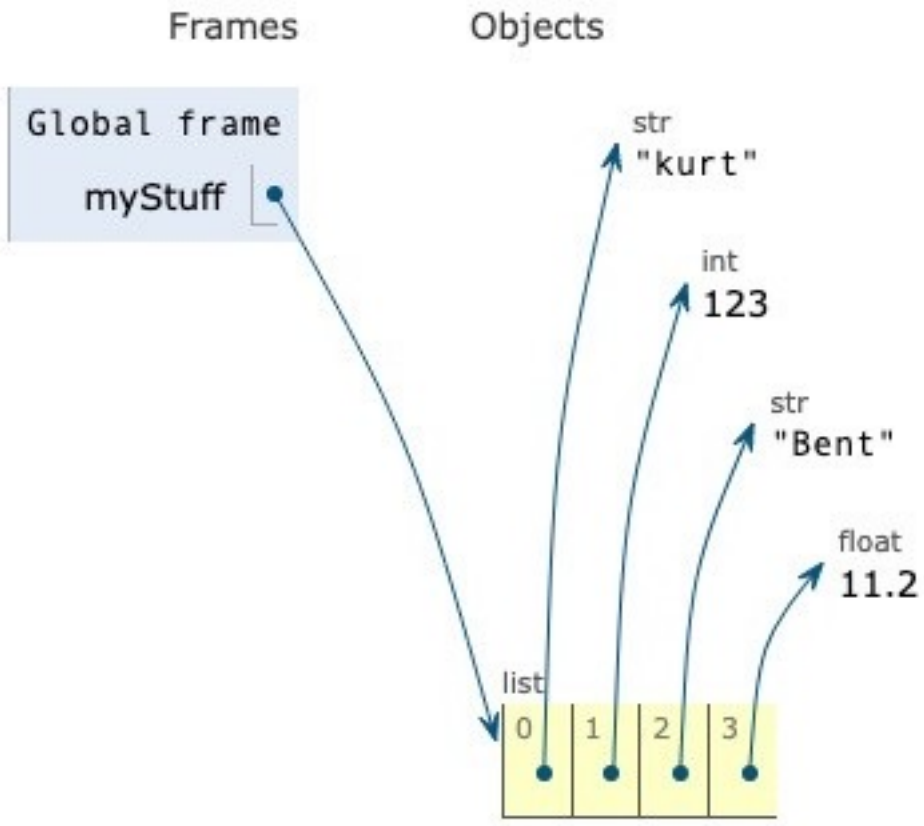
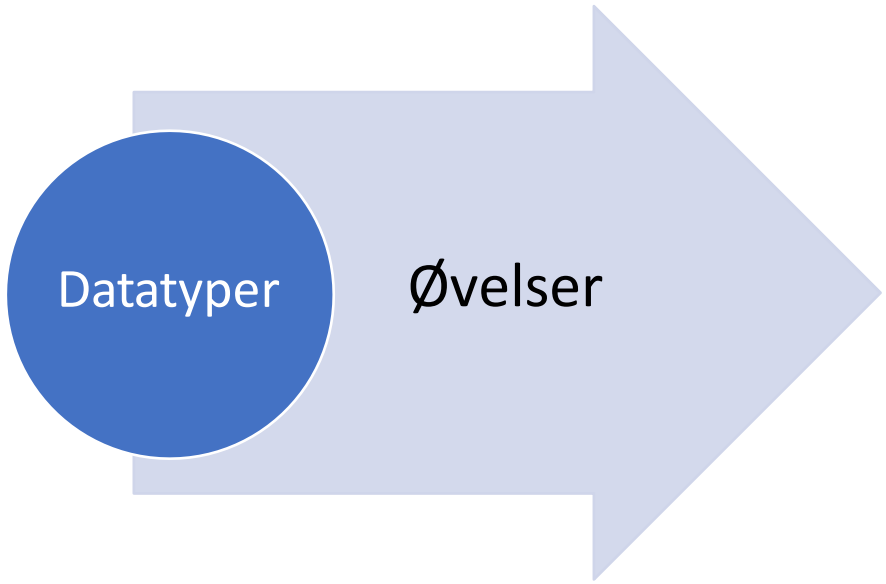
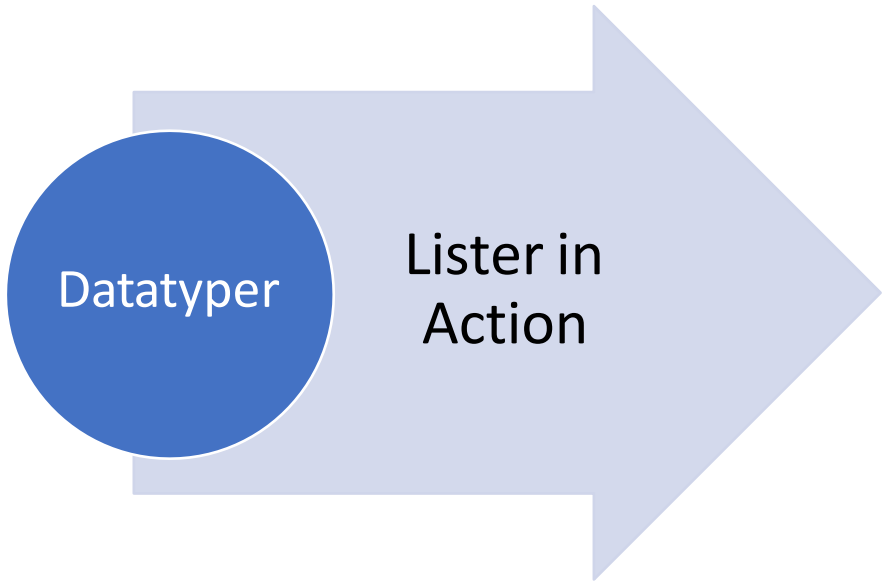
# Lister in Action


```
1  myStuff = ["kurt",123,"Bent",11.2]
2  for item in myStuff:
3      print(item)
4
```






- 4-2 – Dyr med fællestræk
  - Loop
  - konklusion
- 4-3 – Tæl til 20
- 4-6 – Tæl ulige tal
  - range
  - Modulo
  - List comprehension
- 4-10 Slicing pizzas
  - First 3
  - Middle
  - Last
- 4-11 new pizza from copy
  - Add one to both




## Lister - Biler

In [2]:
```
cars=[]
fh=open('/Users/thor/Git/EVUF22LES1/cars.csv','r')
lines=fh.readlines()
```

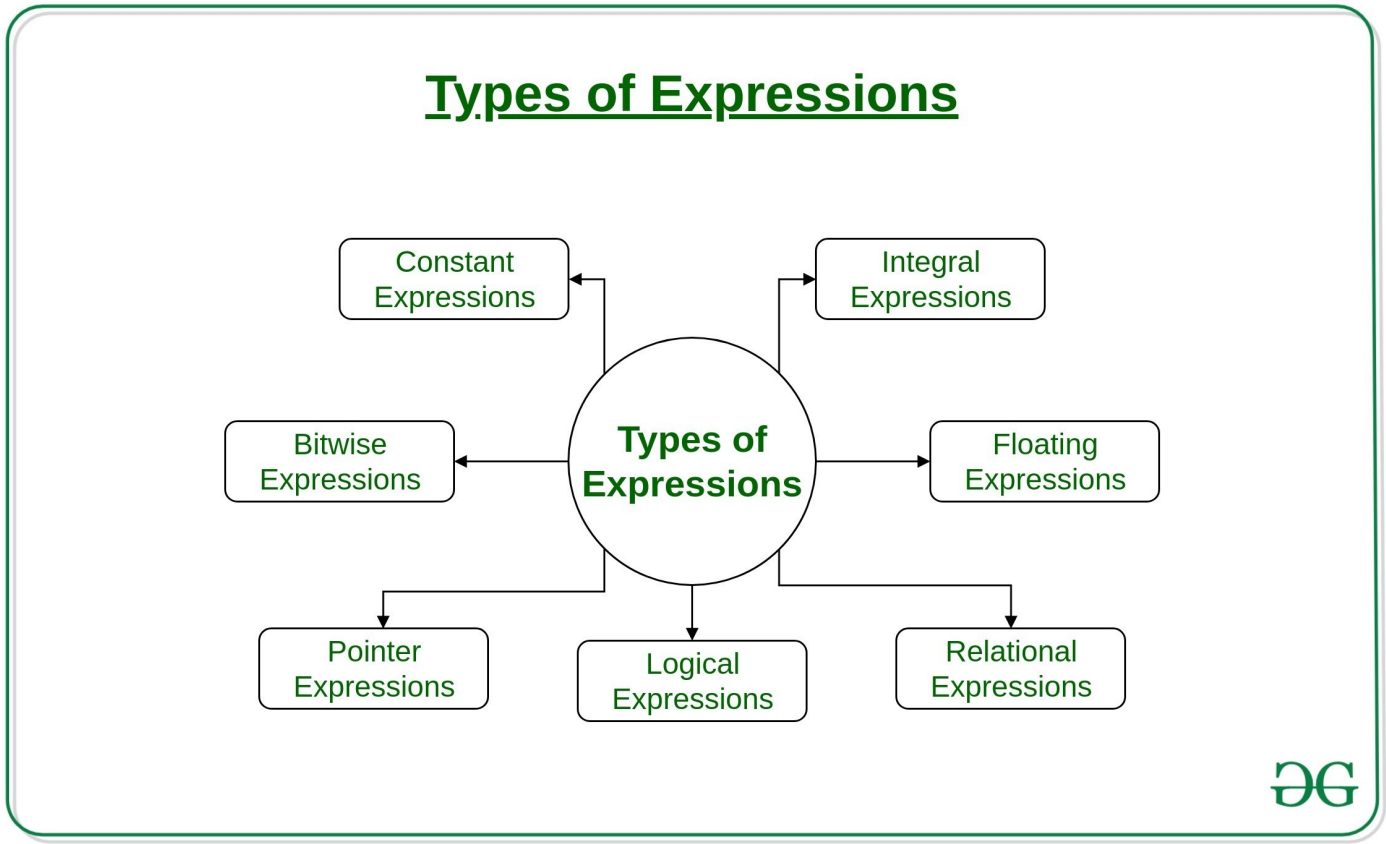
# Pause

Variabler

Statement

```
print("The answer is: " + str(round(x * 5, 1)) )
```

Expression

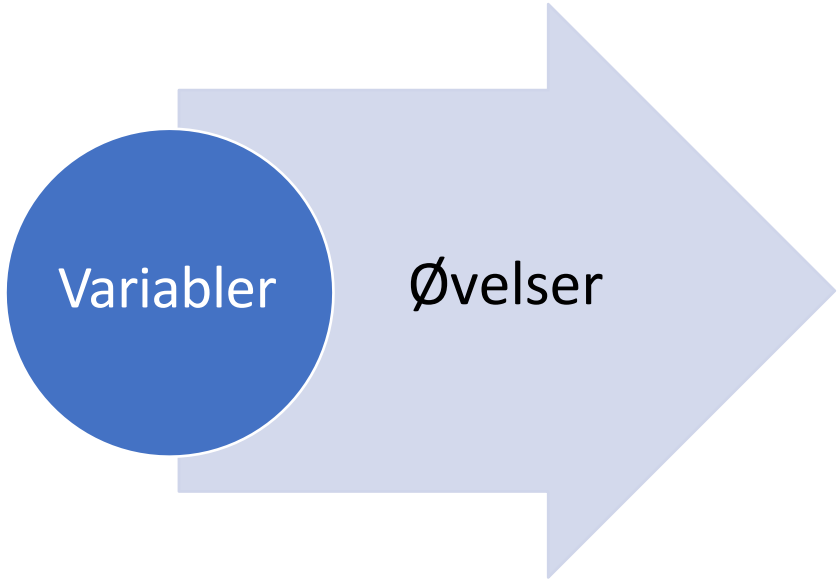


Variabler

Booleans


Operators

| Operators | Meaning | Example | Result |
|---|---|---|---|
| < | Less than | 5<2 | False |
| > | Greater than | 5>2 | True |
| <= | Less than or equal to | 5<=2 | False |
| >= | Greater than or equal to | 5>=2 | True |
| == | Equal to | 5==2 | False |
| != | Not equal to | 5!=2 | True |




- 5-5 – Alien colors

# Lister og conditions

**Booleans**

res=not(7<1) or (7 > 4) kan den blive til falsk vha parentes?

In [ ]:
```
1
```

# Conditions og biler

Lav en liste og put alle BMW'er i listen

Velkomst

kursets forløb



24/8

31/8

07/9

14/9

21/9

28/9

5/10

Her forlader vi bogen