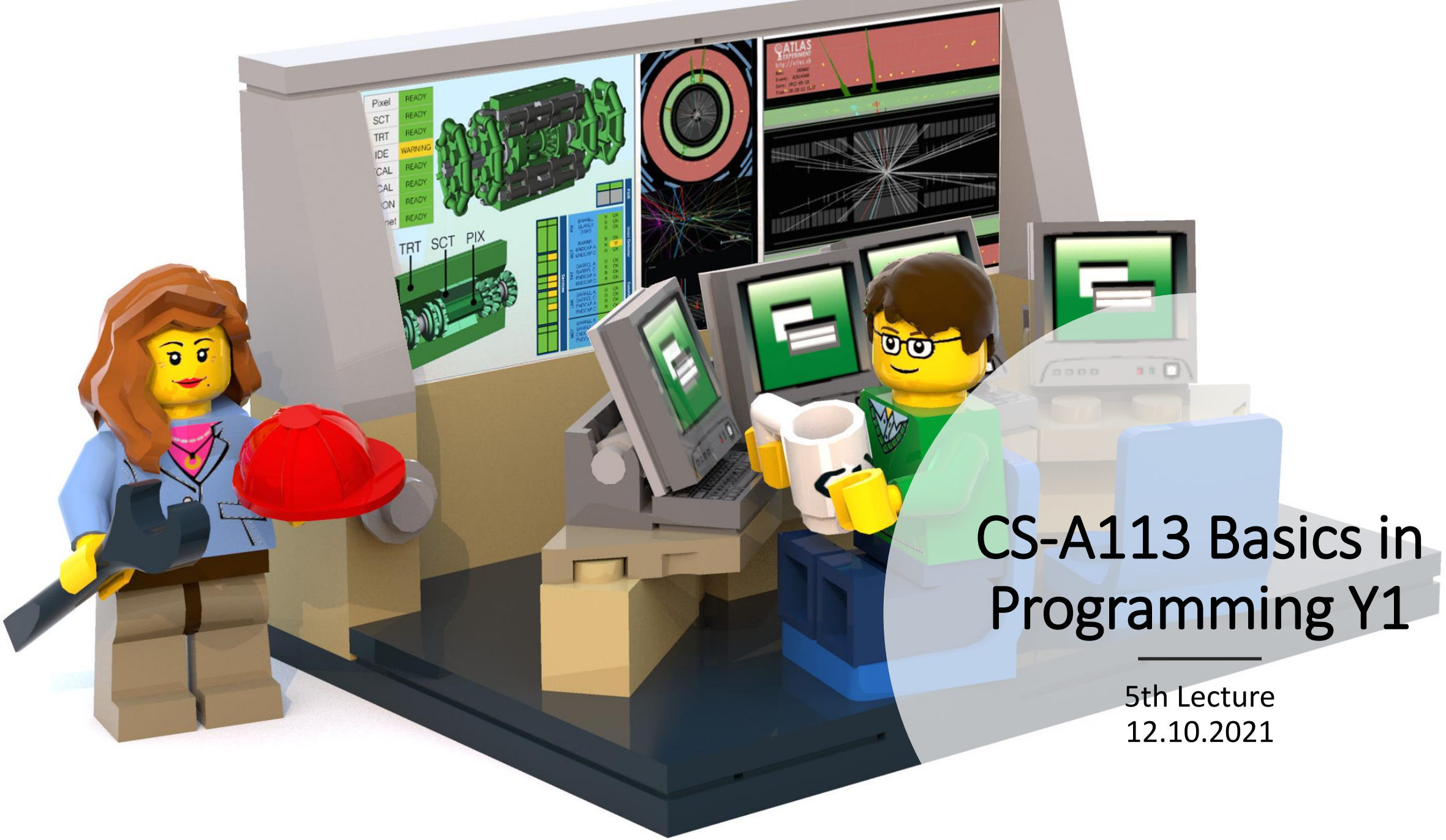


CS-A113 Basics in Programming Y1

5th Lecture
12.10.2021

The Lecture

- **Join with Video** – Makes my life nicer!
- Feel free to open your microphone and ask questions
- Feel free to write questions into the chat
- We will record the sessions and put it unlisted on youtube.

Aalto Code of Conduct and Plagiarism

Honesty is an academic core value

→ Write your own code!
(We do Plagiarism checks)

A+ Course Material is Mandatory!

Course Information

We provide substitute Exercises for missed submissions.

They will open on 12.11.2021 at 13:00

Substitute Exercise 1: compensate for missed rounds 1, 2 or 3.

Substitute Exercise 2: compensate for missed rounds 4, 5 or 6.

Substitute Exercise 3: Compensate for missed rounds 7 or 8.

You must always complete as many substitutive exercises as you have rounds to substitute: You can substitute at most 3!

You cannot increase your grade with substitute exercises and you cannot use points from failed rounds.

1 substitute exercise for round 9. Round 9 is voluntary, but you cannot get an exercise grade of more than 2 if you haven't gotten the minimum points from round 9.

Kahoot!

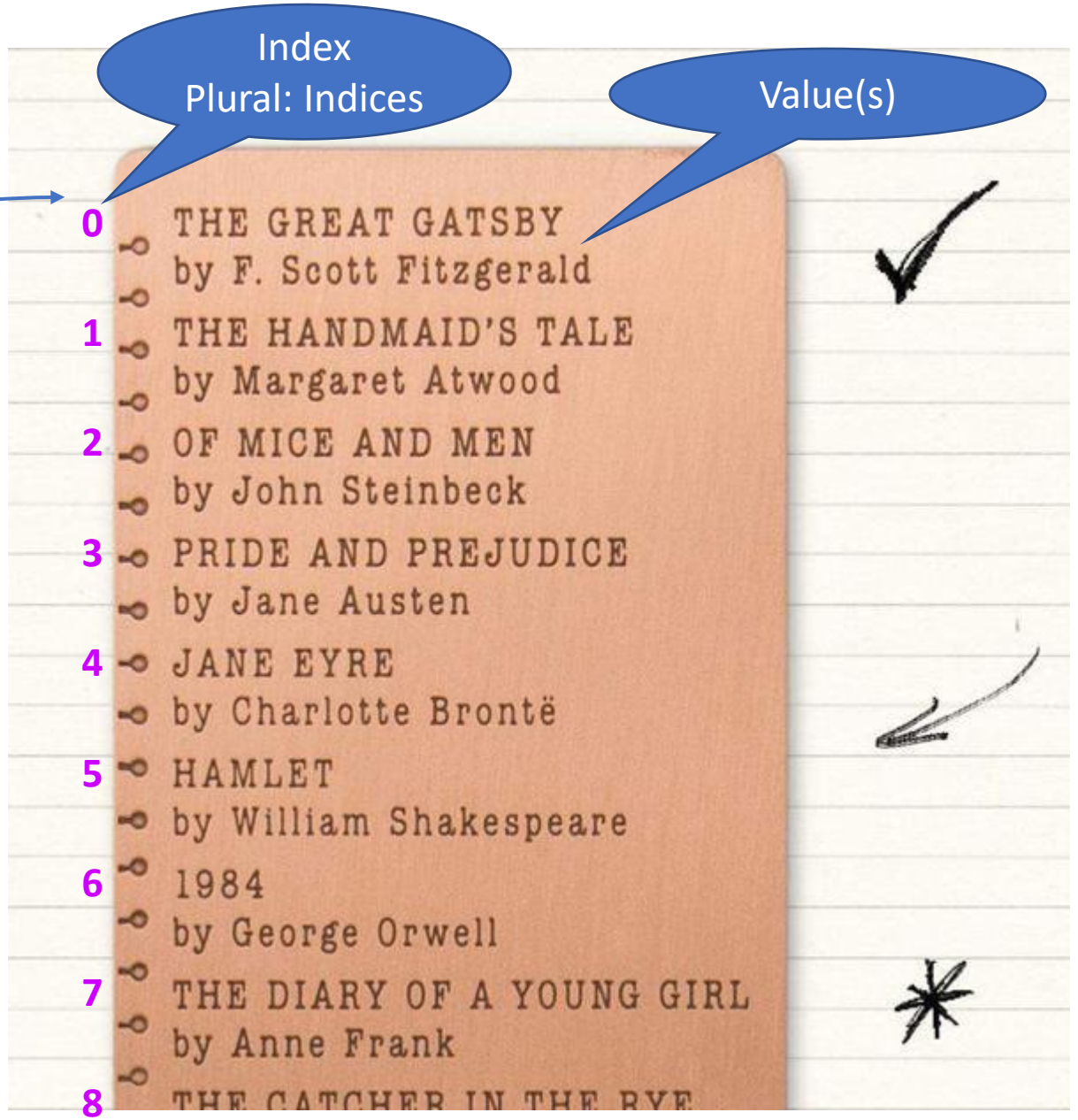
Interactions Today:

Go to:
http://presemo.aalto.fi/csa1113


Topic Today:
Lists

Finally!
We can conveniently store our stuff!

```
bookList

bookList[0] == ”THE GREAT GATSBY”
bookList[6] == ”1984”
```



myList

index	0	1	2	3	...	n
value	15	21	3	654	45	1

How to Start a List

```
myGroceries = []

myGroceries.append("apples")
myGroceries.append("bananas")
myGroceries.append("eggs")
```

Index	0	1	2
value	apples	bananas	eggs

```
myGroceries = ["apples","bananas","eggs"]
```

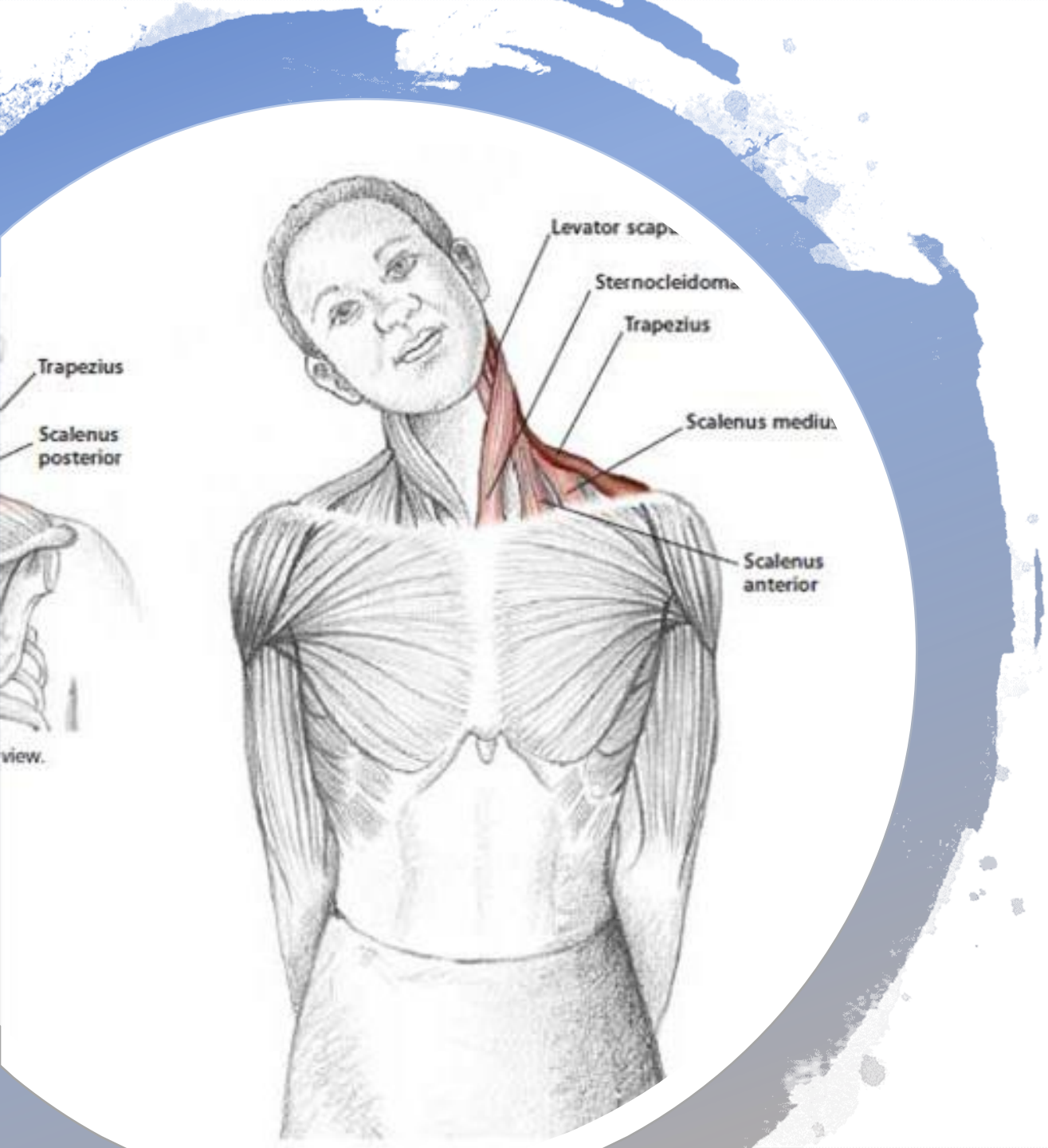
Index	0	1	2
value	apples	bananas	eggs

```
myGroceries = [""]*3

myGroceries [0] ="apples"
myGroceries [1] ="bananas"
myGroceries [2] ="eggs"
```

Index	0	1	2
value	""	""	""
Index	0	1	2
value	apples	""	""
Index	0	1	2
value	apples	bananas	""
Index	0	1	2
value	apples	bananas	eggs

How to Go through a List

```
myGroceries = [”apples”,”bananas”,”eggs”]

for myFood in myGroceries:
    print(myFood)


for i in range(len(myGroceries)):
    print(myGroceries[i])
    print(”is my”,i,”th item in the list)
```



Break:
Move your Neck!

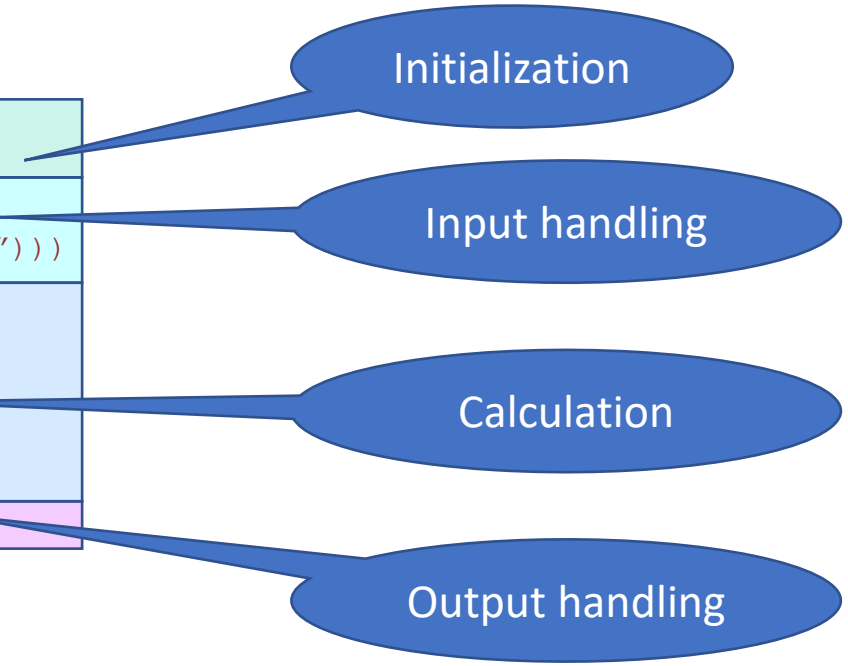
Coding Examples

```
def avgTemperature1():

    nofDays = 5
    total = 0

    for i in range(nofDays):
        temperature = int(input("Enter the temperature")
        total += temperature

    avgTemp = total/nofDays
    print("Your average temperature is", avgTemp)
```


```
def avgTemperature2():

    nofDays = 5
    temperatures = [ ]

    for i in range(nofDays):
        temperatures.append(int(input("Enter the temperature")))

    total = 0

    for myTemp in temperatures:
        total += myTemp

    avgTemp = total/nofDays
    print("Your average temperature is", avgTemp)
```

Coding Examples

```
def myProgram():
    nofDays = 5
    myList = [ ]

    for i in range(nofDays):
        myList.append(int(input("Enter the input")))

    total = 0

    for myElement in myList:
        total += myElement

    avg = total/nofDays

    print("Your average is", avgTemp)
```



Coding Examples

```
def avgTemperature1():
    nofDays = 5
    sum = 0

    for i in range(nofDays):
        temperature = int(input("Enter the t                    "))
        sum += temperature

    avgTemp = sum/nofDays
    print("Your average temperature is", avgTemp)
```

Initialization

Input handling

Calculation

Output handling

```
def avgTemperature2():
    nofDays = 5
    temperatures = [ ]

    for i in range(nofDays):
        temperatures.append(int(input("Enter the temperature")))

    sum = 0

    for myTemp in temperatures:
        sum += myTemp

    avgTemp = sum/nofDays
    print("Your average temperature is", avgTemp)
```

Initialization

Input handling

Calculation

Output handling

Coding Examples++
What if we want the average below Zero Temperature?

```
def avgTemperature():
    nofDays = 5
    sum = 0
    belowZeroSum = 0
    aboveZeroSum = 0

    for i in range(nofDays):
        temperature = int(input("Enter the temperature")
        sum += temperature
        if (temperature) < 0:
            belowZeroSum  += temperature
        else:
            aboveZeroSum += temperature

    avgTemp = sum/nofDays
    avgBelowZero = belowZeroSum/nofDays
    avgAboveZero = aboveZeroSum/nofDays

    print("Your average temperature is", avgTemp)
    print("Your average temperature is", avgBelowZero)
    print("Your average temperature is", avgAboveZero)
```

Initialization

Input handling

Calculation

Output handling

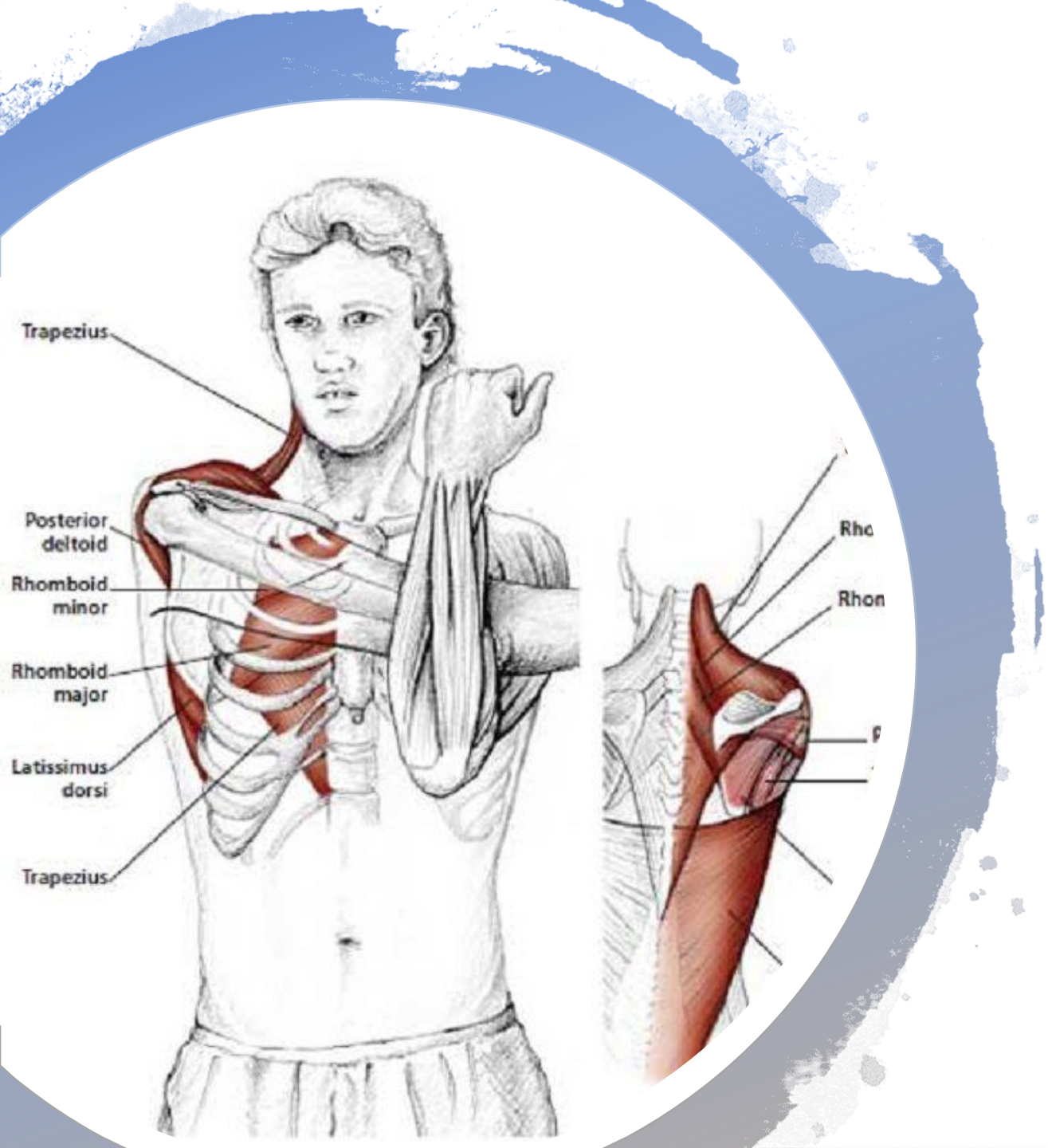
```
def avgTemperature():
    nofDays = 5
    temperatures = []

    for i in range(nofDays):
        temperatures.append(int(input("Enter the temperature"))

    sum = 0
    belowZeroSum = 0
    aboveZeroSum = 0

    for myTemp in temperatures:
        sum += myTemp
        if (temperature) < 0:
            belowZeroSum  += temperature
        else:
            aboveZeroSum += temperature

    avgTemps = [sum/nofDays, belowZeroSum/nofDays, aboveZero

    for myAvgTemp in avgTemps:
        print("Your average temperature is", myAvgTemp)
```

Initialization

Input handling

Calculation

Output handling



Break: Move your Shoulders

Go to:
http://presemo.aalto.fi/csa1113

Methods on Lists and where to find them

VERY IMPORTANT!

https://docs.python.org/3/tutorial/datastructures.html

myList = [”apples”,”bananas”,”eggs”]

1. len(myList) =
2. myList.index(”bananas”) =
3. myList.index(”toiletpaper”) =
4. myList.reverse()
5. myList.sort()
6. myList [3]

Methods on Lists and where to find them

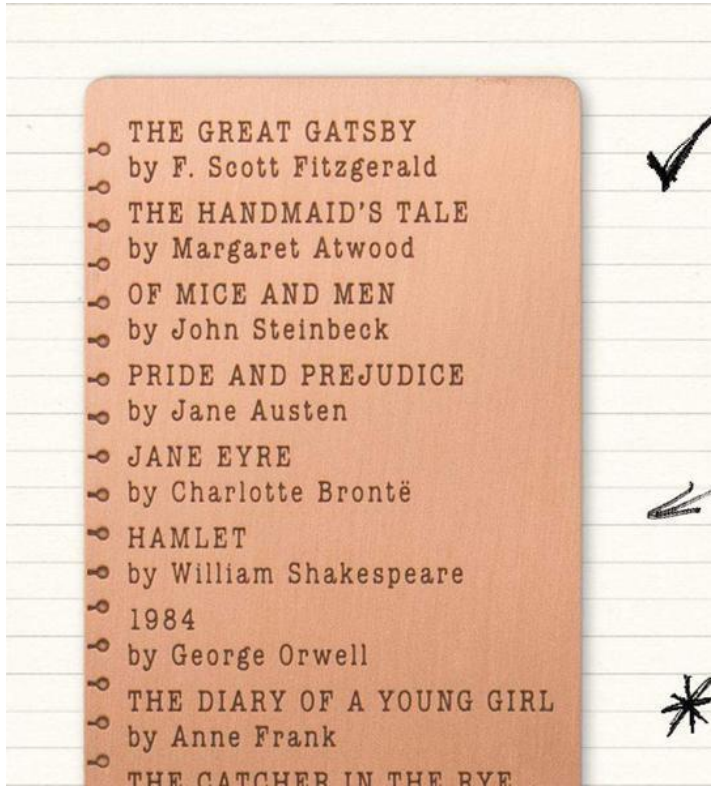
VERY IMPORTANT!

https://docs.python.org/3/tutorial/datastructures.html

myList = [”apples”,”bananas”,”eggs”]

1. len(myList) = 3
2. myList.index(”bananas”) = 1
3. myList.index(”toiletpaper”) = ValueError : ”toiletpaper” is not in list
4. myList.inverse() = [”eggs”,”bananas”, ”apples”]
5. myList.sort() = [”apples”,”bananas”,”eggs”]
6. myList [3] = indexError: list index out of range

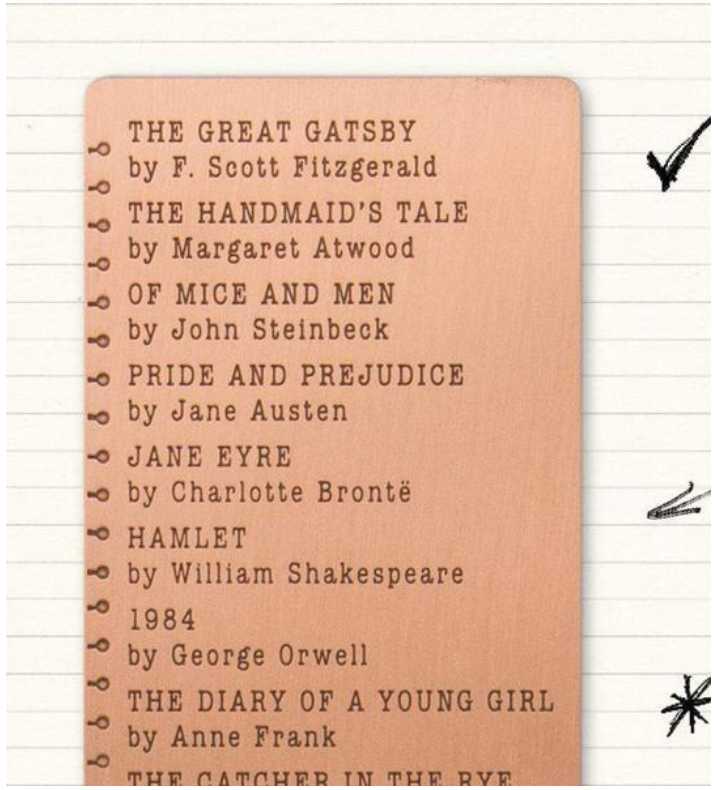
Lists



myList = [”apples”,”bananas”,”eggs”]

1. myList[2] = ”apples”
2. myList[myList.index(”bananas”)] = ”toiletpaper”
3. myList[myList.index(”eggs”)] = ”apples”

ts



myList = [”apples”,”bananas”,”eggs”]

1. myList[2] = ”apples”
   → myList = [”apples”,”bananas”,”apples”]
2. myList[myList.index(”bananas”)] = ”toiletpaper”
   → myList = [”apples”,”toiletpaper”,”apples”]
3. myList[myList.index(”eggs”)] = ”apples”
   → valueError

Things you can, but probably shouldn´t do

myList = [”apples”,”bananas”,”eggs”]

Why is this a bad idea?

1. myList.append(5)
2. myList.append(”5”)
3. myList = [”0”,”8”,”6”,”60”]
   myList.sort()
4. What happens here?
   myList = [”apples”,”bananas”,”Apples”,”a”,”A”]
   myList.sort()

Things you can, but probably shouldn´t do

myList = [”apples”,”bananas”,”eggs”]

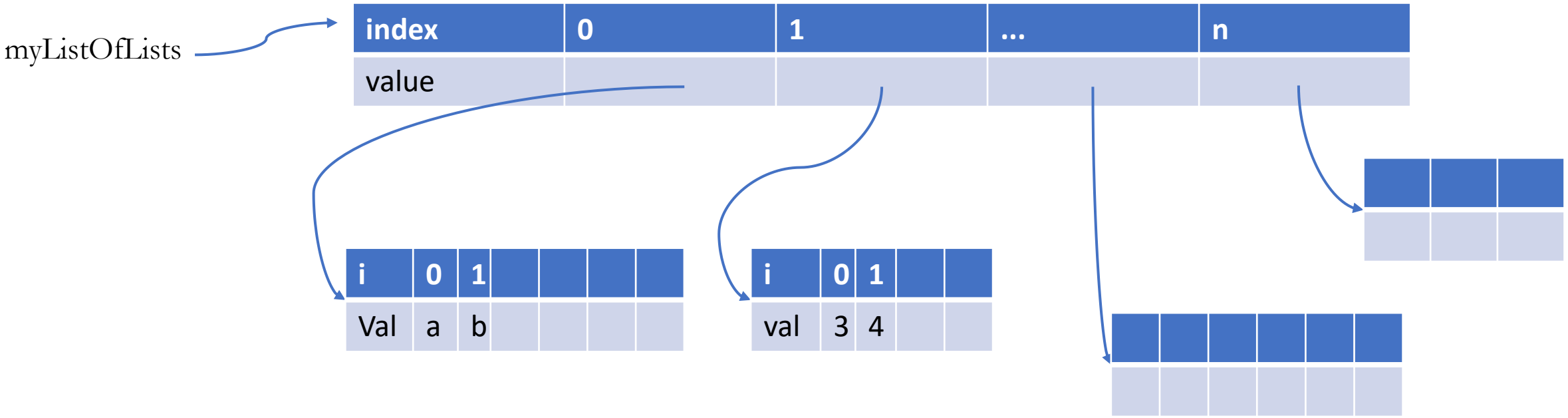
1. myList.append(5) → you have mixed types (e.g.,can not use the method sort)
2. myList.append(”5”)
   → sort returns [”5”,”apples”,”bananas”,”eggs”]
3. myList = [”0”,”8”,”6”,”60”]
   myList.sort() → returns [”0”,”6”,”60”,”8”]
4. What happens here?
   myList = [”apples”,”bananas”,”Apples”,”a”,”A”]
   myList.sort() → returns [”A”,”Apples”,”a”, ”apples”,”bananas”]

Lists of Lists: Cool Stuff, be Tedious!

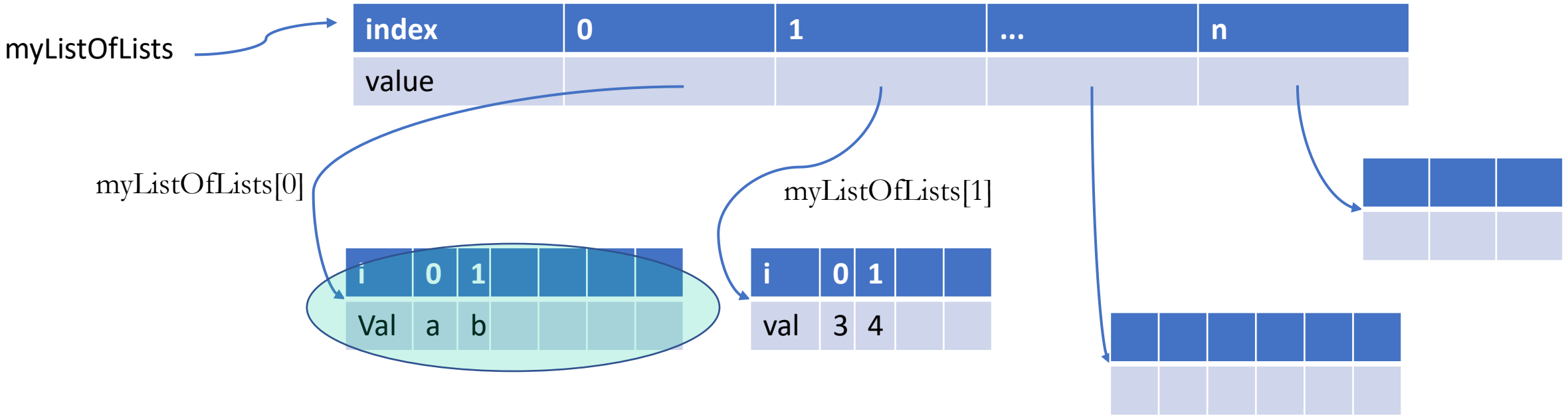
myListOfNumbers

index	0	1	…	n
value	56	47	41	54

Lists of Lists: Cool Stuff, be Tedious!

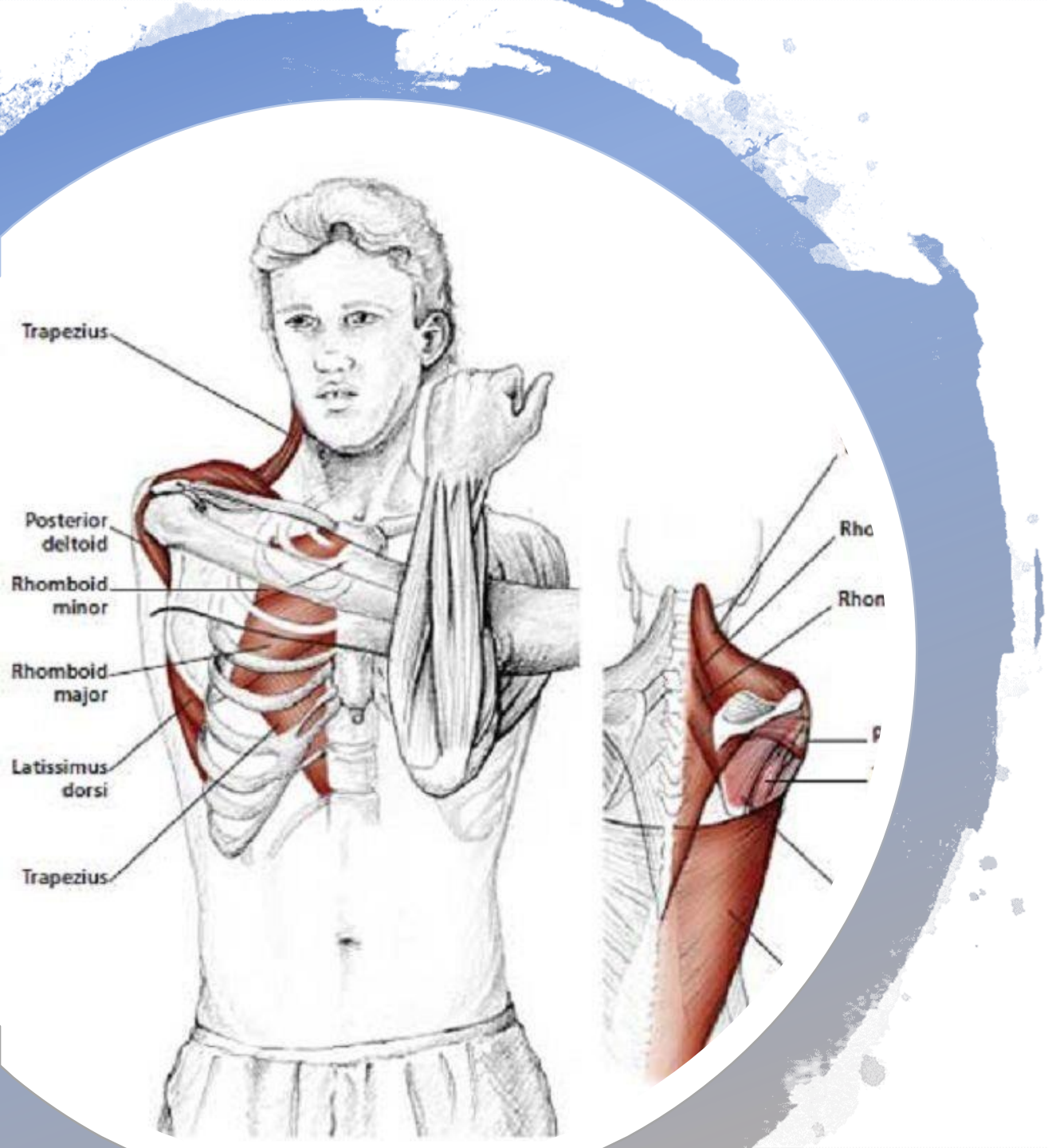


Lists of Lists: Cool Stuff, be Tedious!



myListOfLists [0] [1] = ”b”

myListOfLists [1] [0] = 3



Break: Move your Shoulders

What is indentation used for in Python?

Code Blocks

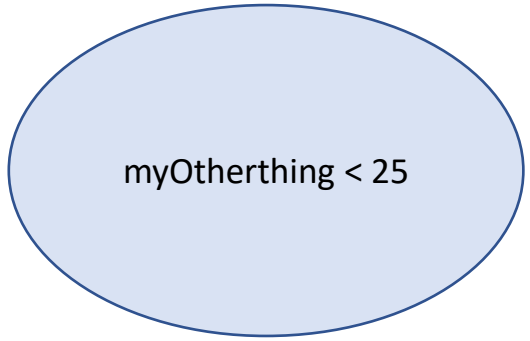
It is for readability and
MORE importantly:

It is the way the computer goes through the program

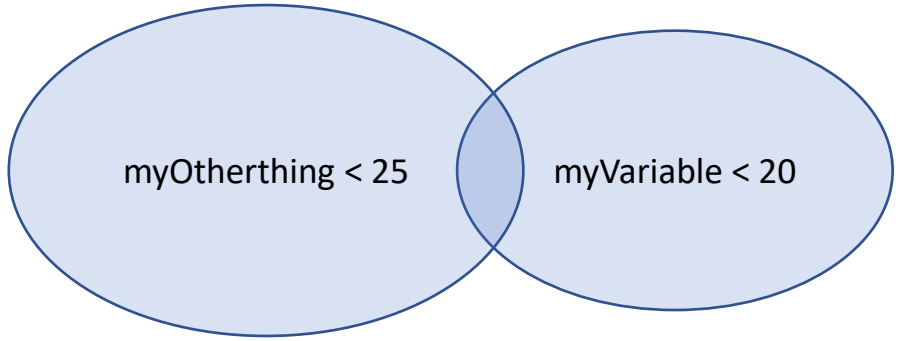
```
def goodFunction():
        myVariable = 10
        myOtherThing = 20

        for i in range(10):
                print(i)
                for k in range(5):
                        print(k)

        k = 0
        while k < 10:
                print(k)
                k += 1

        if (myOtherthing < 25 and myVariable < 20):
                print(myOtherthing)
                print(myVariable)
                print(”Bye”)
        elif (myOtherthing < 25):
                print(myOtherthing)
                print(”Bye”)
        else:
                print(”Bye”)

        print(”now the goodFunction is over”)

goodFunction()
```

```
def goodFunction():
        myVariable = 10
        myOtherThing = 20
        for i in range(10):
                print(i)
                for k in range(5):
                        print(k)
        k = 0
        while k < 10:
                print(k)
                k += 1
        if (myOtherthing < 25 and myVariable < 20):
                print(myOtherthing)
                print(myVariable)
                print(”Bye”)
        elif (myOtherthing < 25):
                print(myOtherthing)
                print(”Bye”)
        else:
                print(”Bye”)
        print(”now the goodFunction is over”)
goodFunction()
```

```
def goodFunction():
        myVariable = 10
        myOtherThing = 20
        for i in range(10):
                print(i)
                for k in range(5):
                        print(k)
        k = 0
        while k < 10:
                print(k)
                k += 1
        if (myOtherthing < 25 and myVariable < 20):
                print(myOtherthing)
                print(myVariable)
                print("Bye")
        elif (myOtherthing < 25):
                print(myOtherthing)
                print("Bye")
        else:
                print("Bye")
        print("now the goodFunction is over")
goodFunction()
```



```
def goodFunction():
        myVariable = 10
        myOtherThing = 20
        for i in range(10):
                print(i)
                for k in range(5):
                        print(k)
        k = 0
        while k < 10:
                print(k)
                k += 1
        if (myOtherthing < 25 and myVariable < 20):
                print(myOtherthing)
                print(myVariable)
                print("Bye")
        elif (myOtherthing < 25):
                print(myOtherthing)
                print("Bye")
        else:
                print("Bye")
        print("now the goodFunction is over")
goodFunction()
```



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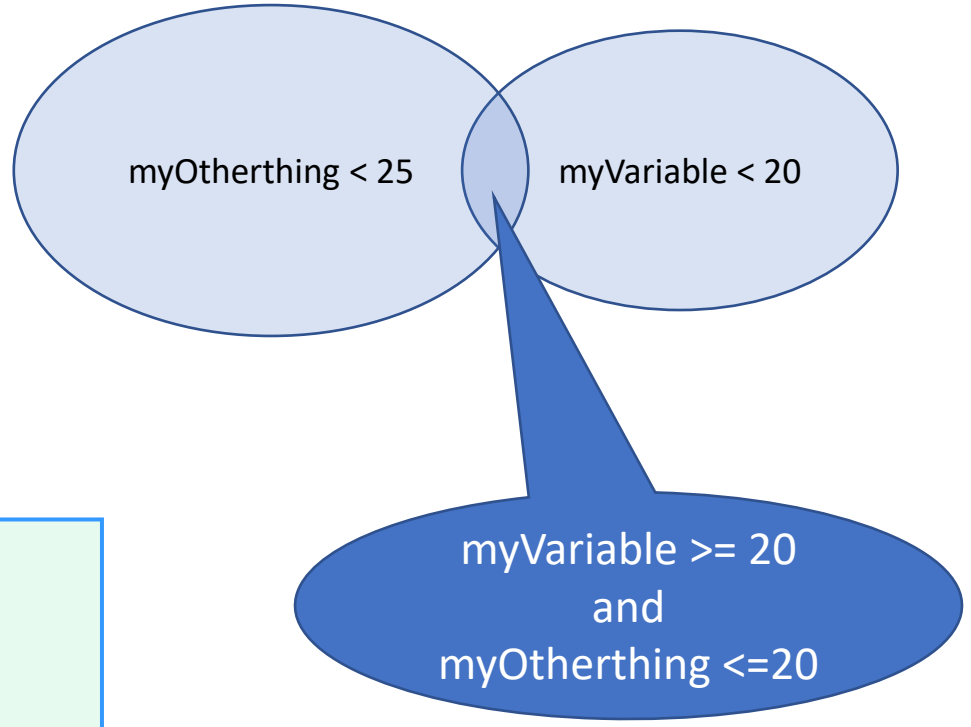
def goodFunction():
        myVariable = 10
        myOtherThing = 20
        for i in range(10):
                print(i)
                for k in range(5):
                        print(k)
        k = 0
        while k < 10:
                print(k)
                k += 1
        if (myOtherthing < 25 and myVariable < 20):
                print(myOtherthing)
                print(myVariable)
                print("Bye")
        elif (myOtherthing < 25):
                print(myOtherthing)
                print("Bye")
        else:
                print("Bye")
        print("now the goodFunction is over")
goodFunction()
```



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def goodFunction():
        myVariable = 10
        myOtherThing = 20
        for i in range(10):
                print(i)
                for k in range(5):
                        print(k)
        k = 0
        while k < 10:
                print(k)
                k += 1
        if (myOtherthing < 25 and myVariable < 20):
                print(myOtherthing)
                print(myVariable)
                print("Bye")
        elif (myOtherthing < 25):
                print(myOtherthing)
                print("Bye")
        else:
                print("Bye")
        print("now the goodFunction is over")
goodFunction()
```
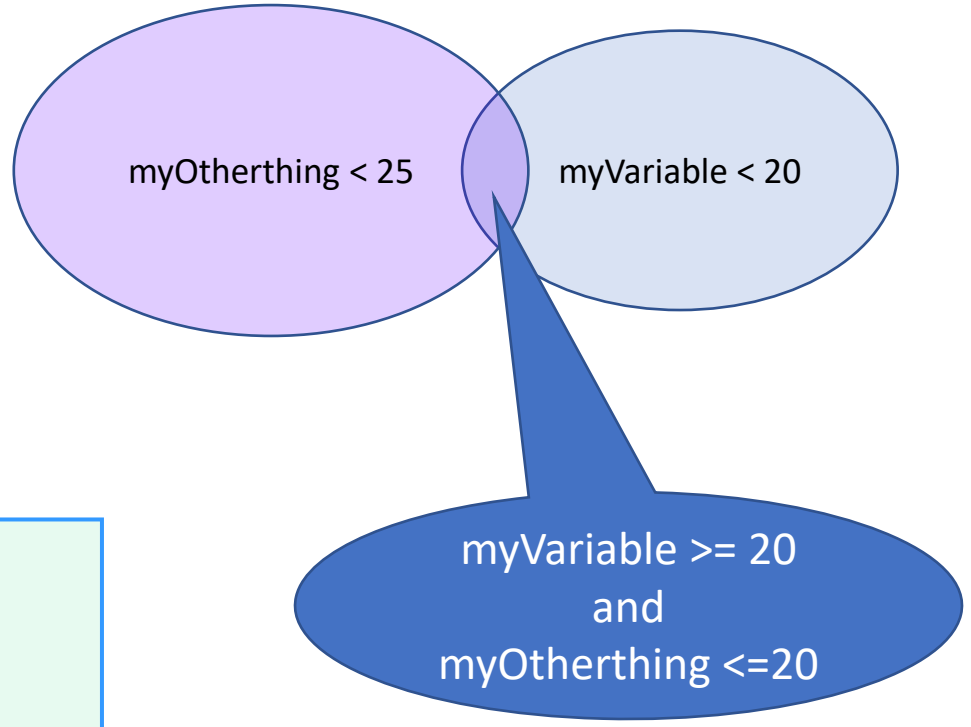
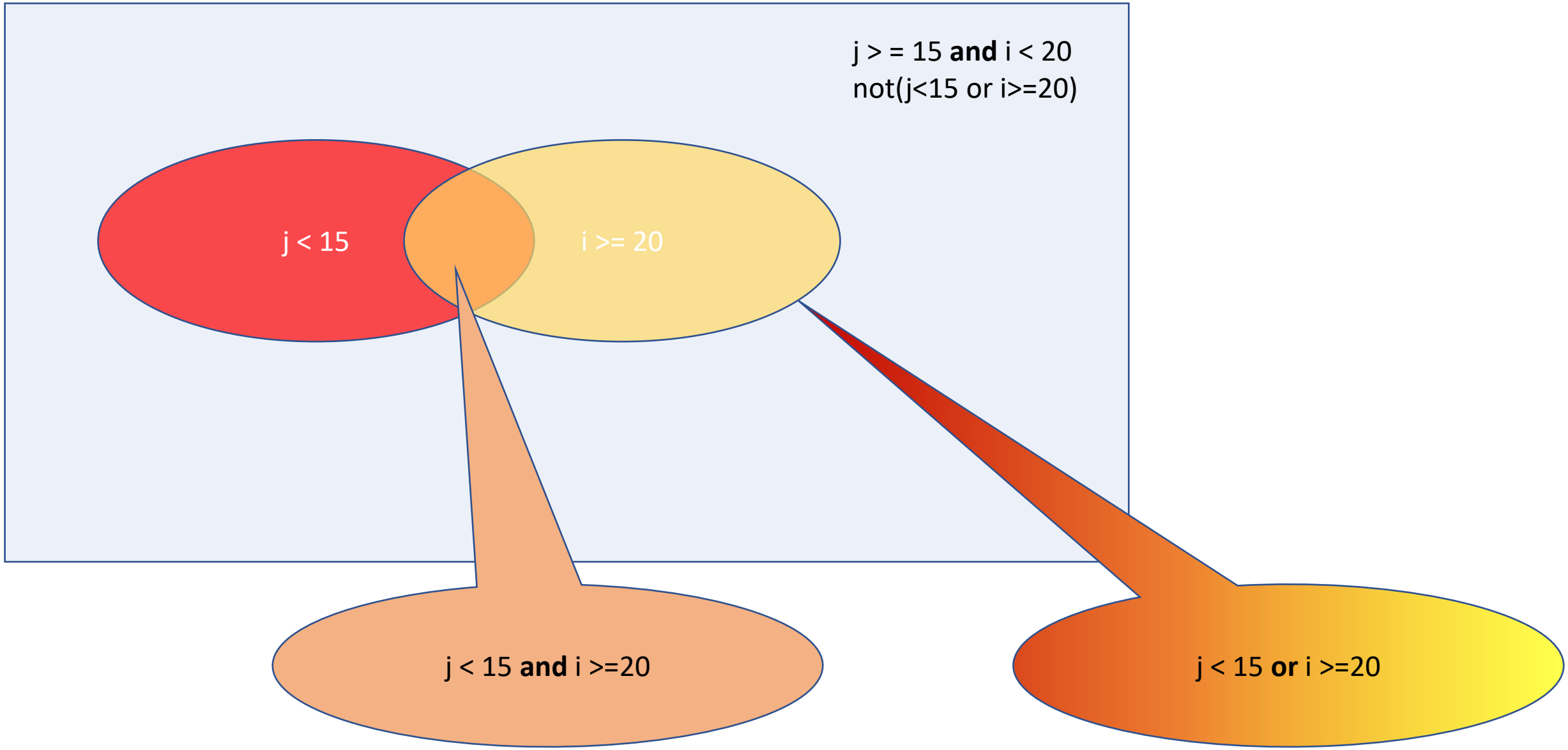
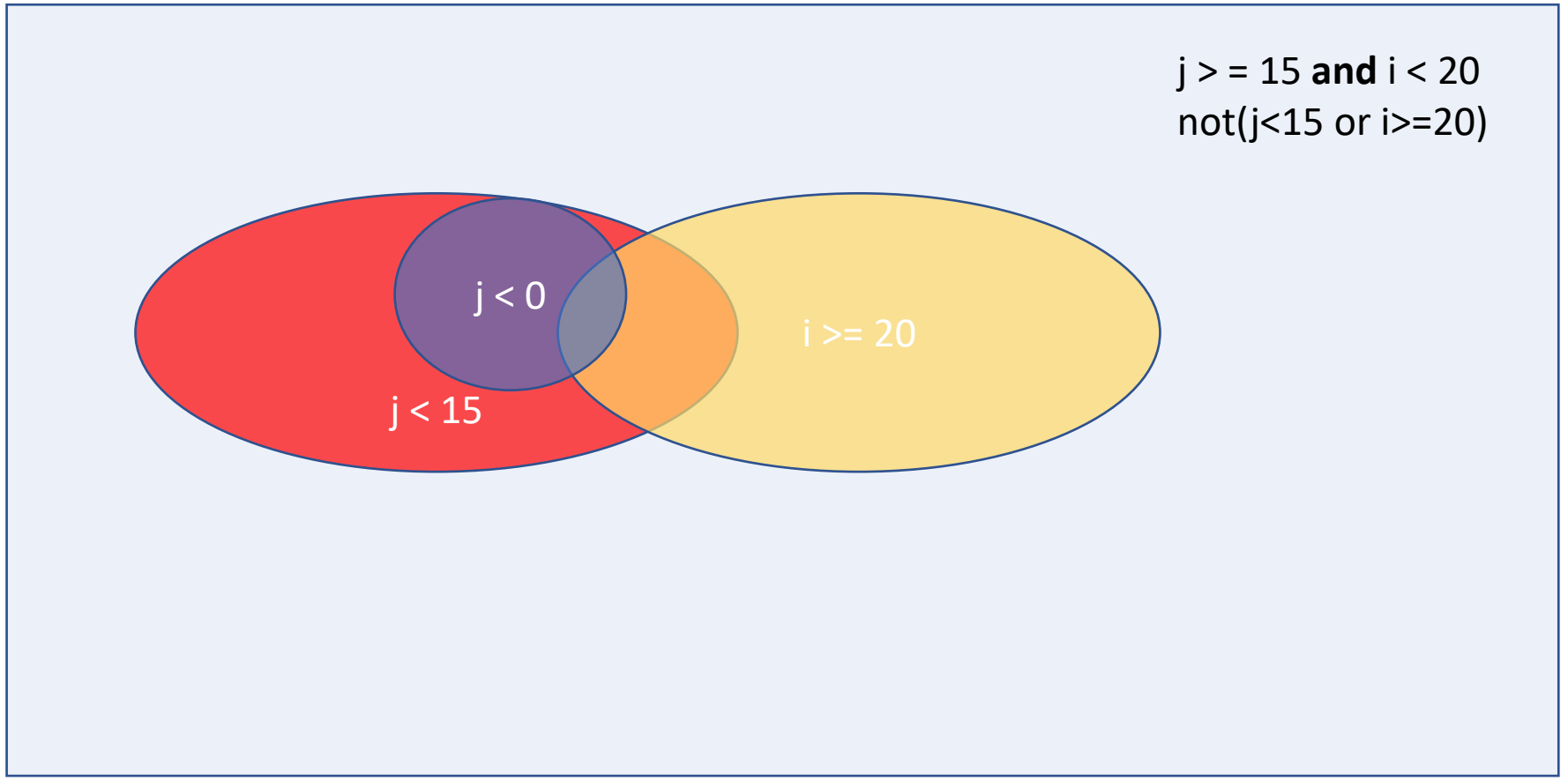




j > = 15 and i < 20
not(j<15 or i>=20)
j < 15
i >= 20
j < 15 and i >=20
j < 15 or i >=20




```
if ((j<0) and (j>=15 and i < 20)):
    print(”this will never be printed”)
```


"That's all Folks!"
Kahoot!