

made easy for user

Python

Python is high level, interpreted & general purpose, no compile time used in a lot of fields.

dynamic programming language which focus on

easy

Code || READABILITY

Who's using Python?

- * Software Engineers
- * Web Developers
- * Data Scientist
- * Network Engineers
- * Data Analysts
- * Mathematicians
- * Accountants

Kids

Why Python?

① Ease of Coding

Solve complex problems in less time
E with fewer lines of codes

```
str = "HelloWorld";
```

Java → str.substring(0, 3)

JS → str.substr(0, 3)

Python → str[0:3]

② General Purpose

① Data Science

⑤ AI / ML

⑨ Desktop App

② Data Processing

⑥ Automation

⑩ Testing

③ API Development

⑦ Web App

⑪ Video Games

④ Big Data

⑧ Mobile App

⑫ Data Visualization

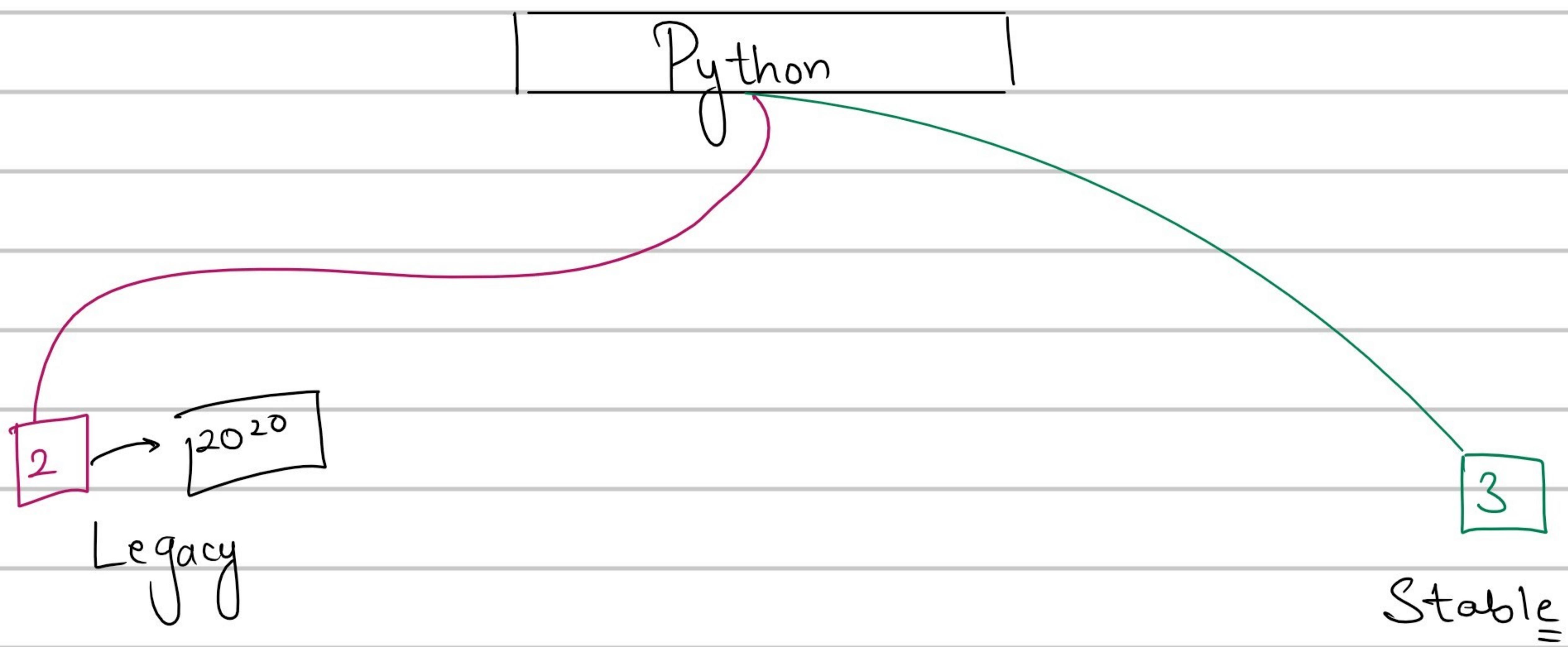
⑬ Statistics

⑬ High Level

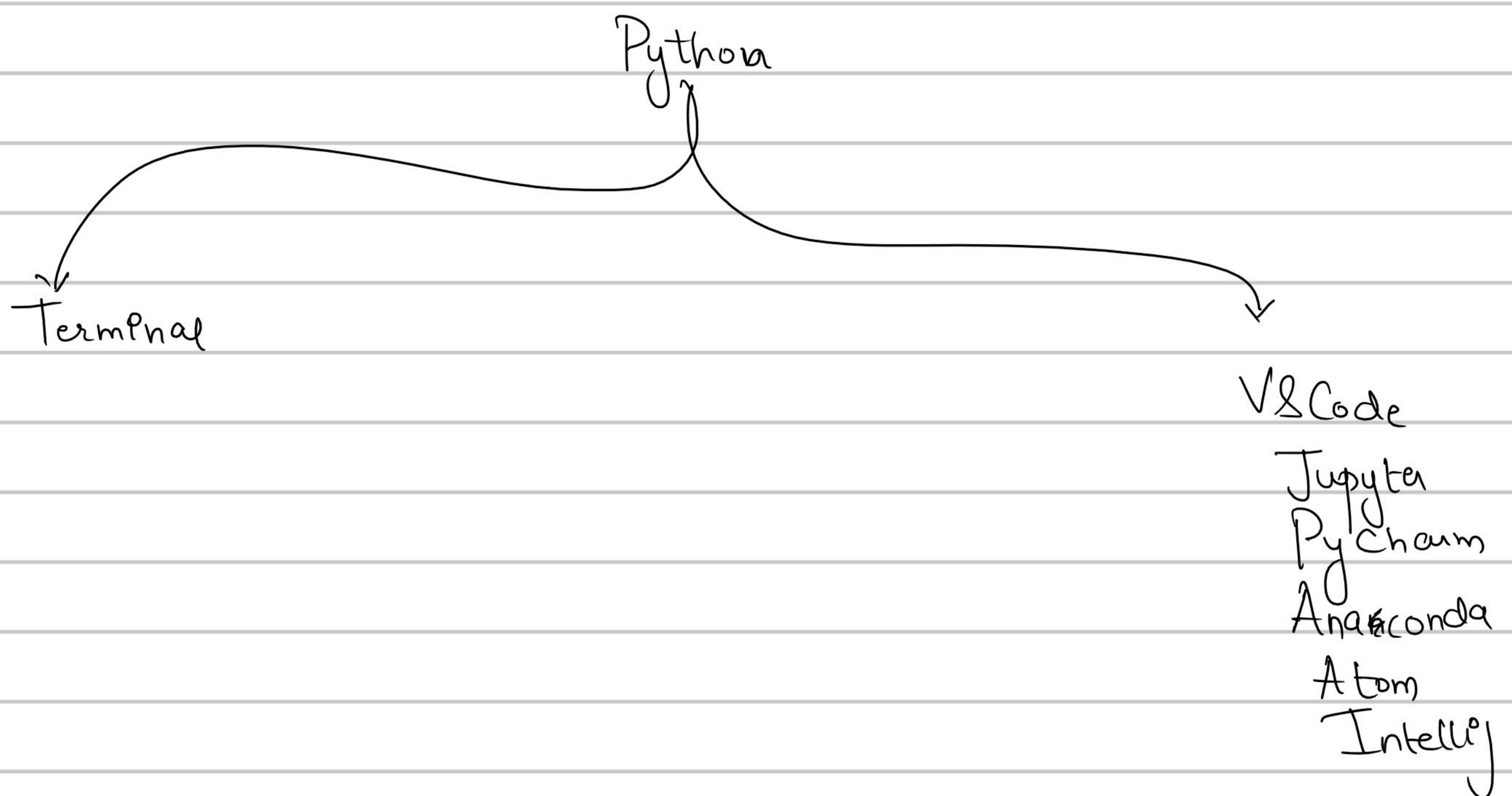
⑯ Huge Community Support

⑭ Cross Platform → no dependency on OS

⑮ Large Ecosystem → there are tons of libraries available
for python



Where can we execute Python



Data Types in Python

Type	Data Type
Text	str
Numeric	int, float, complex
Sequence	list, tuple, range
Map	dict
Set	set, frozenset
Boolean	bool
Binary	bytes, bytearray, memoryview

Keywords in Python

Keyword	Description
and	A logical operator
as	To create an alias
assert	For debugging
break	To break out of a loop
class	To define a class
continue	To continue to the next iteration of a loop
def	To define a function
del	To delete an object
elif	Used in conditional statements, same as else if
else	Used in conditional statements
except	Used with exceptions, what to do when an exception occurs

Keywords in Python

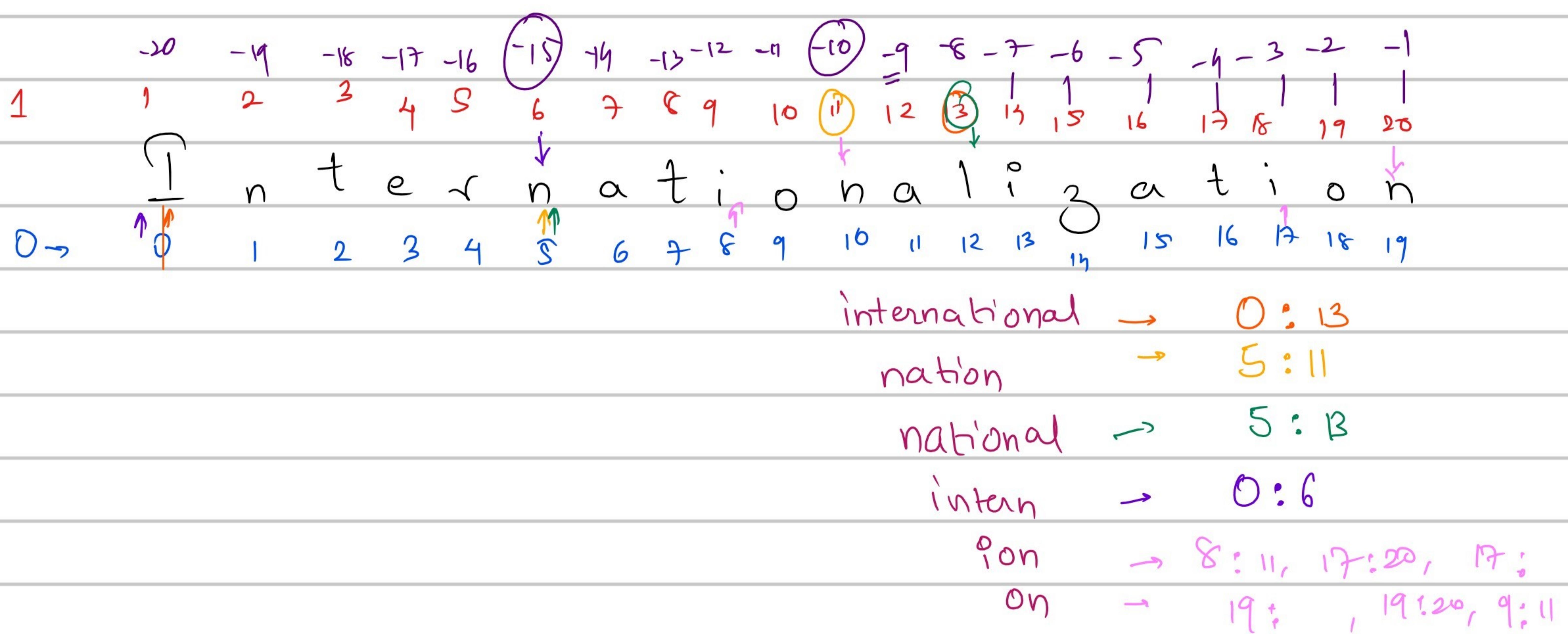
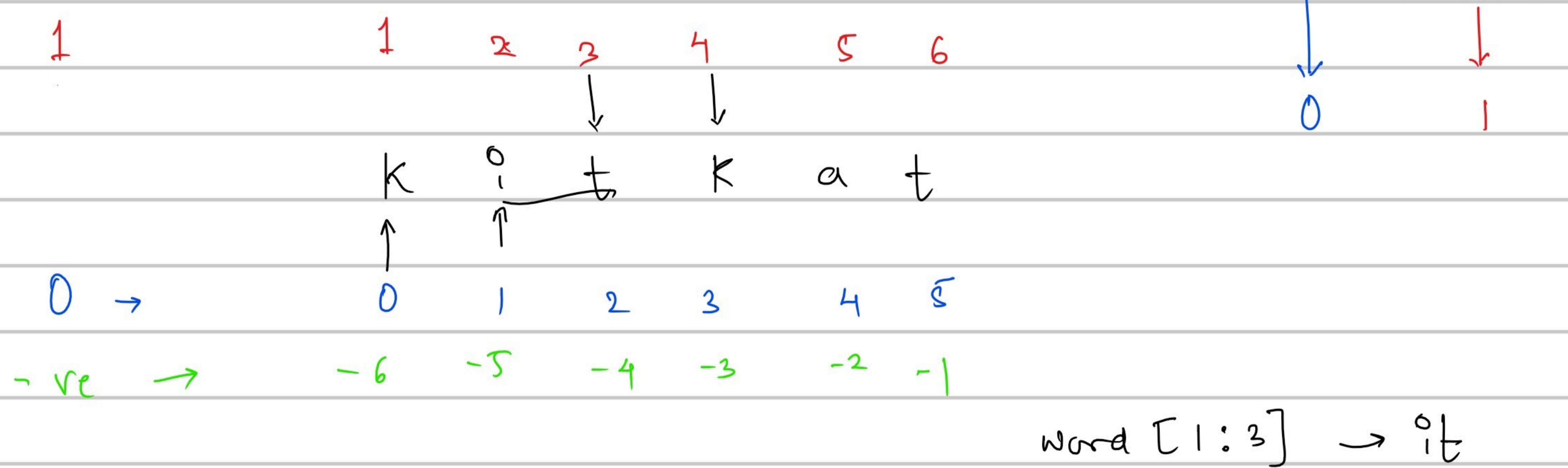
Keywords	Description
false	Boolean value, result of comparison operations
finally	Used with exceptions, a block of code that will be executed no matter if there is an exception or not
for	To create a for loop
from	To import specific parts of a module
global	To declare a global variable
if	To make a conditional statement
import	To import a module
in	To check if a value is present in a list, tuple, etc.
is	To test if two variables are equal
lambda	To create an anonymous function

Keywords in Python

Keyword	Description
None	Represents a null value
nonlocal	To declare a non-local variable
not	A logical operator
or	A logical operator
pass	A null statement, a statement that will do nothing
raise	To raise an exception
return	To exit a function and return a value
True	Boolean value, result of comparison operations
try	To make a try...except statement
while	To create a while loop
with	Used to simplify exception handling
yield	To end a function, returns a generator

range

[start : end]



Rules for the Variables in Python

- * must start with an alphabet or underscore (_)
- * cannot start with a number.
- * can only contain alpha-numeric & (-) (A-Z, a-z, 0-9, -)
- * are Case Sensitive, max, MAX & Max are three different variables.

→ space

Flow Control

→ Indentation

if condition :

 statements

else

 statements

String Interpolation in Python

a = 10

b = 20

message = f"Value of a is {a} and b is {b}"

}

When we write a string without breaking for including the variables

Functions

CODE ON
DEMAND

group of related statements
which performs a specific task

```
def function_name(parameters):  
    """ doc string """  
    statement(s)
```

- * keyword def marks the start of the function.
- * function name should uniquely identify a function.
- * Parameters are optional.
- * A colon (:) marks end of function.
- * An optional return statement is used for returning a value.

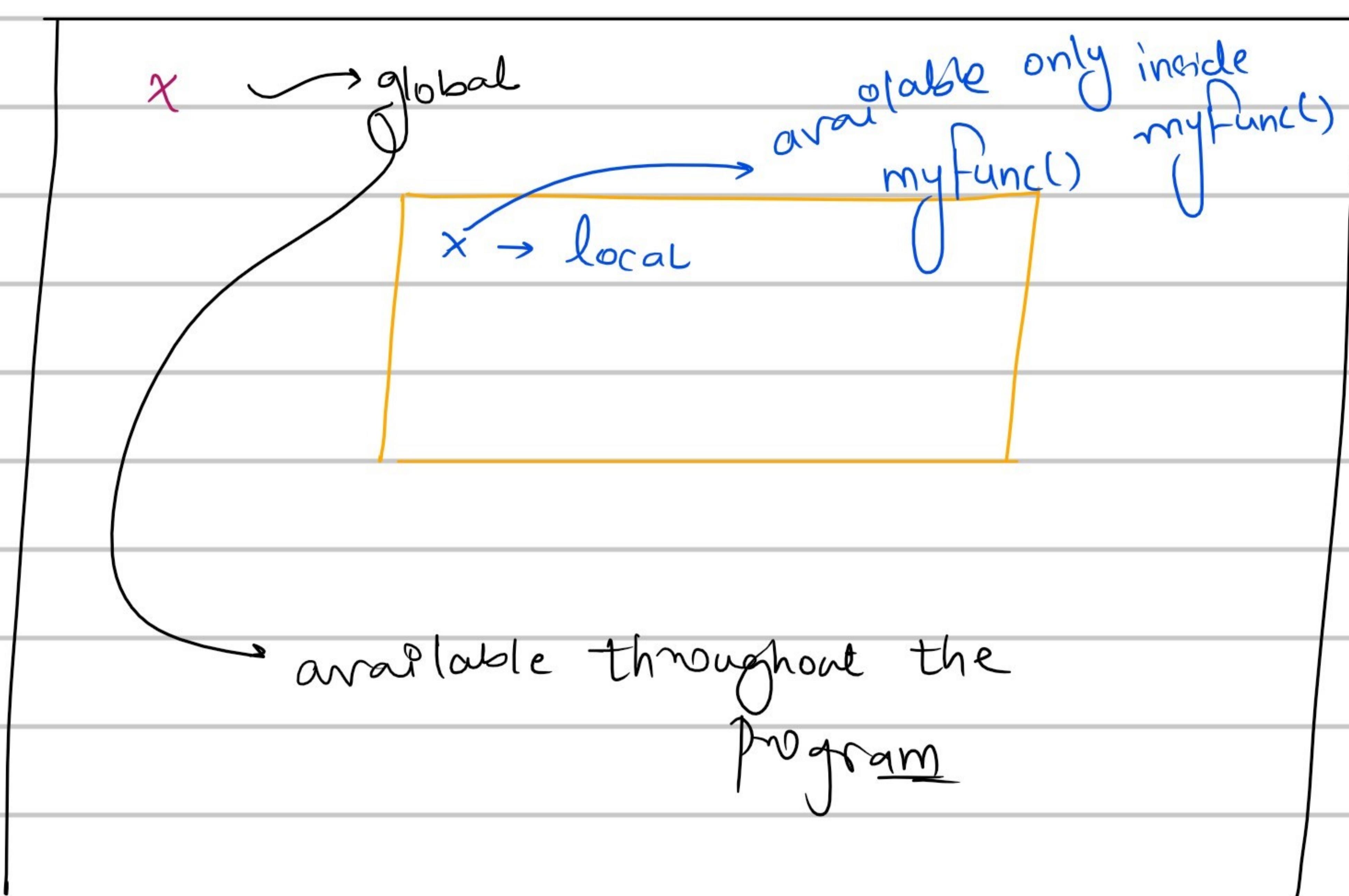
x()

it will be
invoked by the
Python when
it is triggered

$x() \equiv$ instant
execution

callable(x)

Scopes in Python



* Python does not support block scope
* min scope is function

Data Structures

list

tuple

set

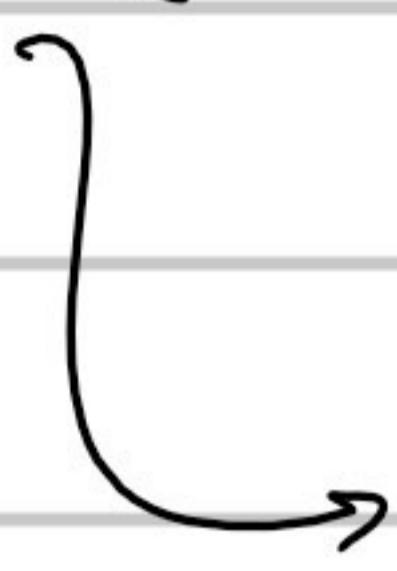
dict

[]

()

{ }

{ key: value }



individual elements

list inside a list

Lambda Functions



→ anonymous function → defined without a name

normal

def

anonymous

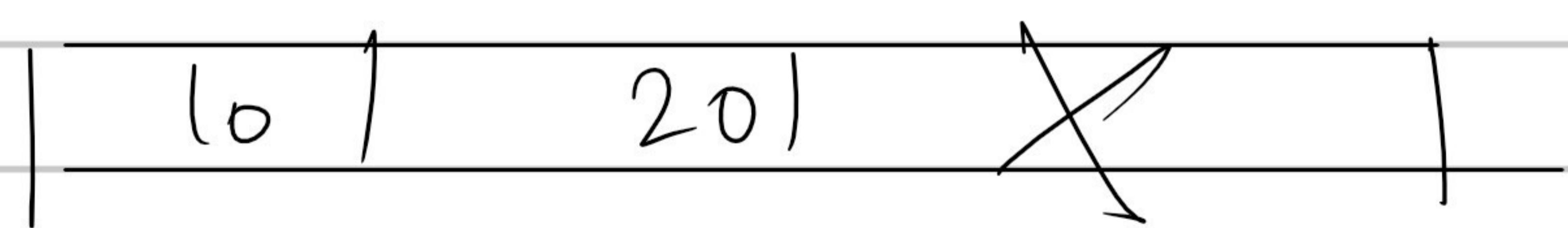
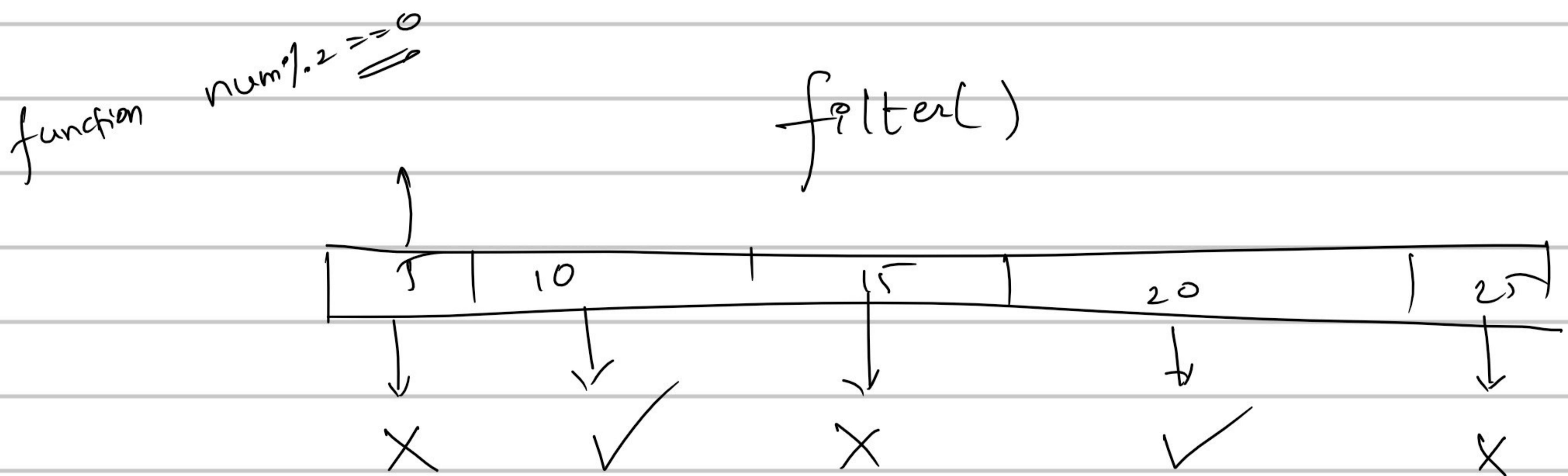
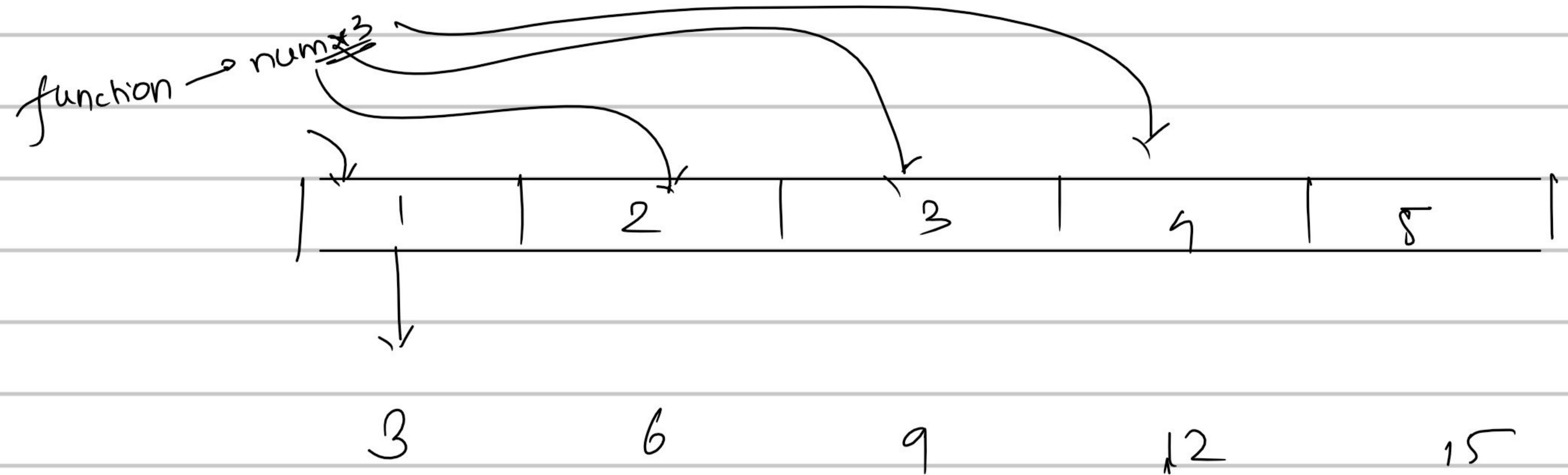
lambda

Structure of a lambda function

lambda parameters : expression

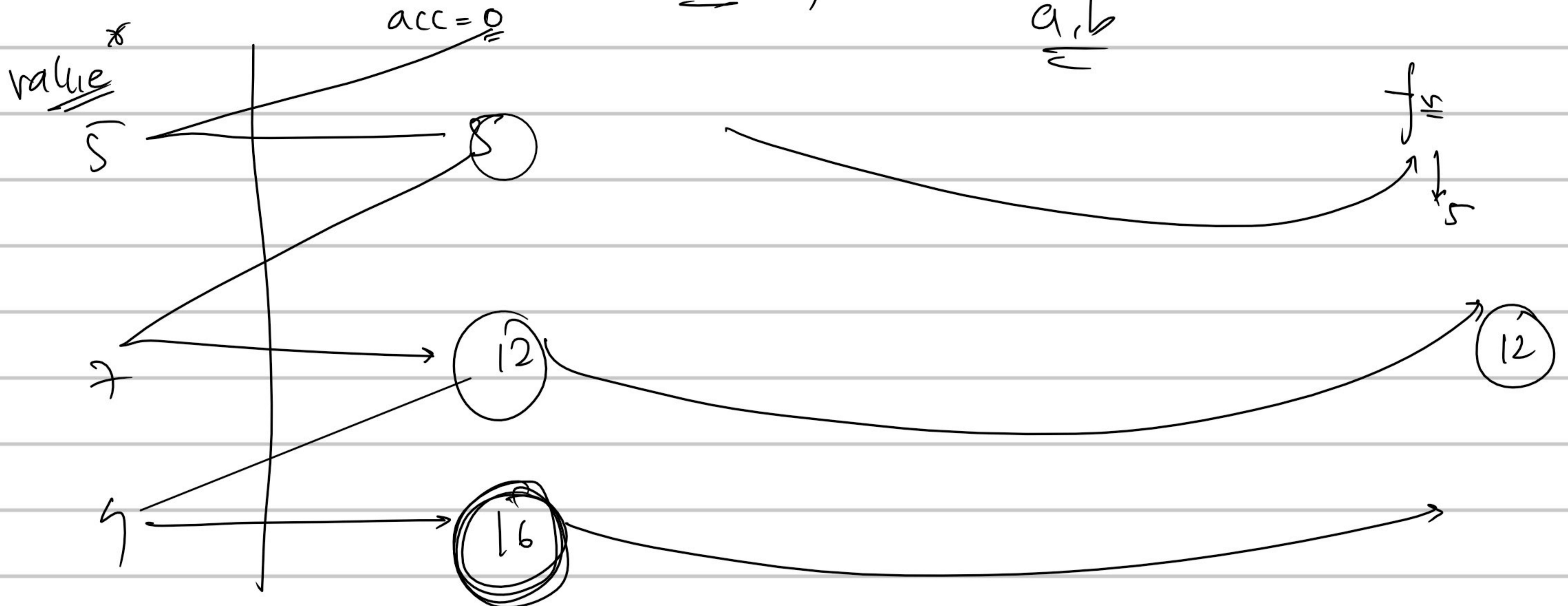
lambda items : items[1]

iterable
 map(function, iterable)
 on each element
 of this iterable
 this function
 will be applied



prices = [5, 7, 4]

reduce (lambda acc, value: acc + value)



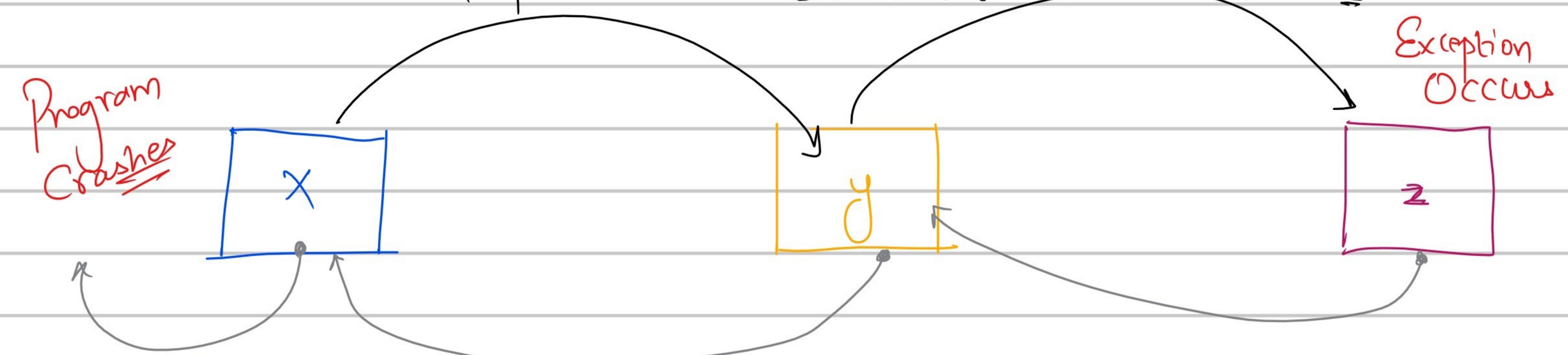
Exception

unexpected erroneous events occurring at runtime; breaking the normal flow of code

try:
statement(s)

except Err:

When exception occurs; Python stops the current process & passes the execution to calling process



Modules



helps to segregate &
files into manageable parts

Regex

Regular Expression.

pattern matching

✓ { zartab@codewithz.com
zartab@abc@something.com
zartab-n@xyz.com //

Regex

extended set

A basic set

Basic Set

Symbol	What it represents?
*	Zero or more occurrences of the character that precedes this asterisk
.	A wild card that represents any character
\s	Represents whitespace
[pqr]	A single character which can be either a 'p' , 'q' or an 'r'
[a-d]	A single character that falls in the range 'a-d'
[^pq]	A single character that is neither 'p' nor 'q'
^pattern	^ is an anchor tag that represents the beginning of line
pattern\$	\$ is an anchor tag that represents the end of line

*

1

Understand the Requirement: What needs to be included or excluded

2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

fooaaaabar

fooabar

foobar

fooaababar

fooxxxbar

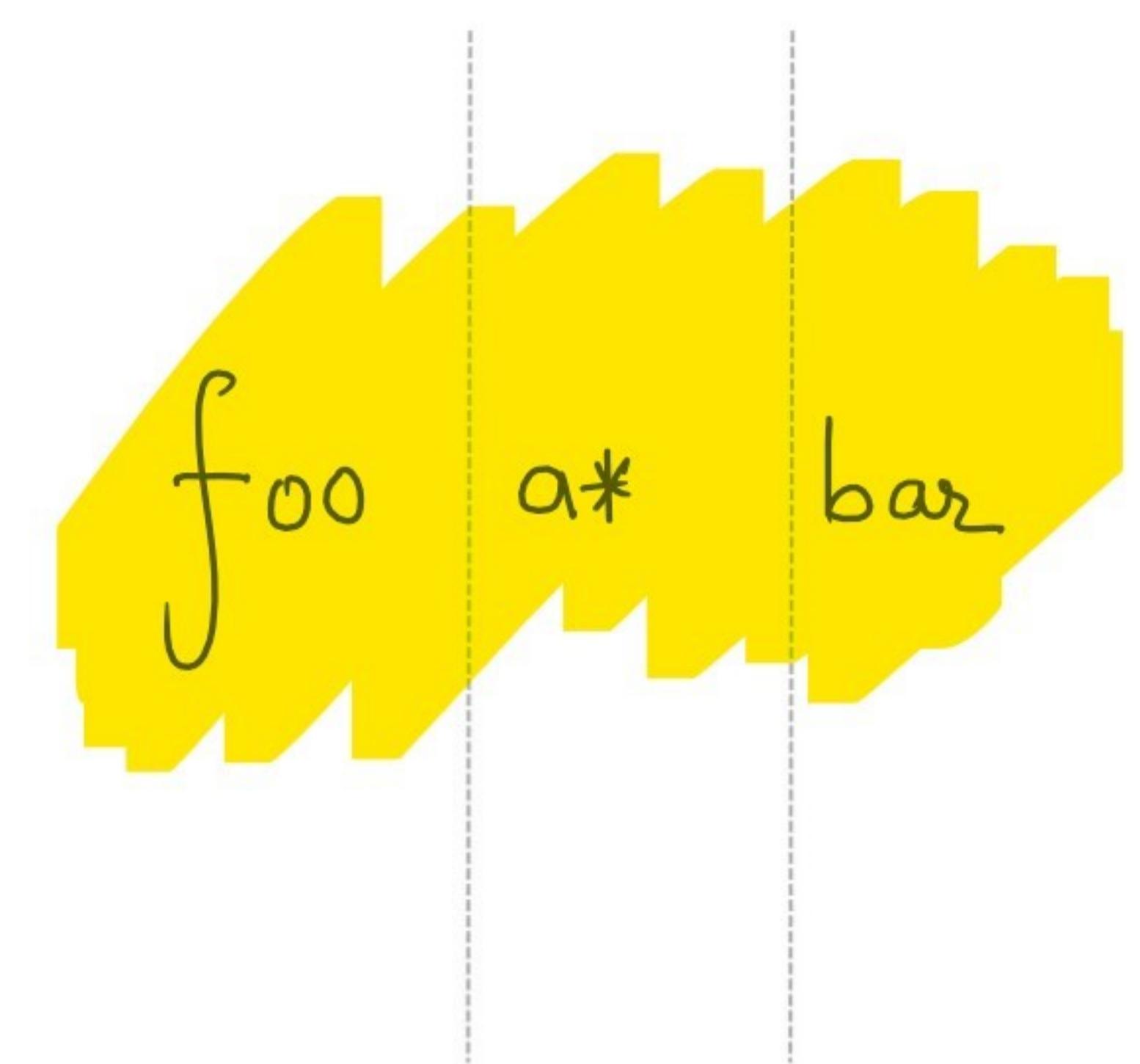
foxbar

foo aaaa bar

foo a bar

foo bar

foo aa bar



a* - Zero or more occurrences o 'a' (The character just preceding the asterisk)

1

Understand the Requirement: What needs to be included or excluded

2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

fooabar

fooxbar

baryfoo

foobar

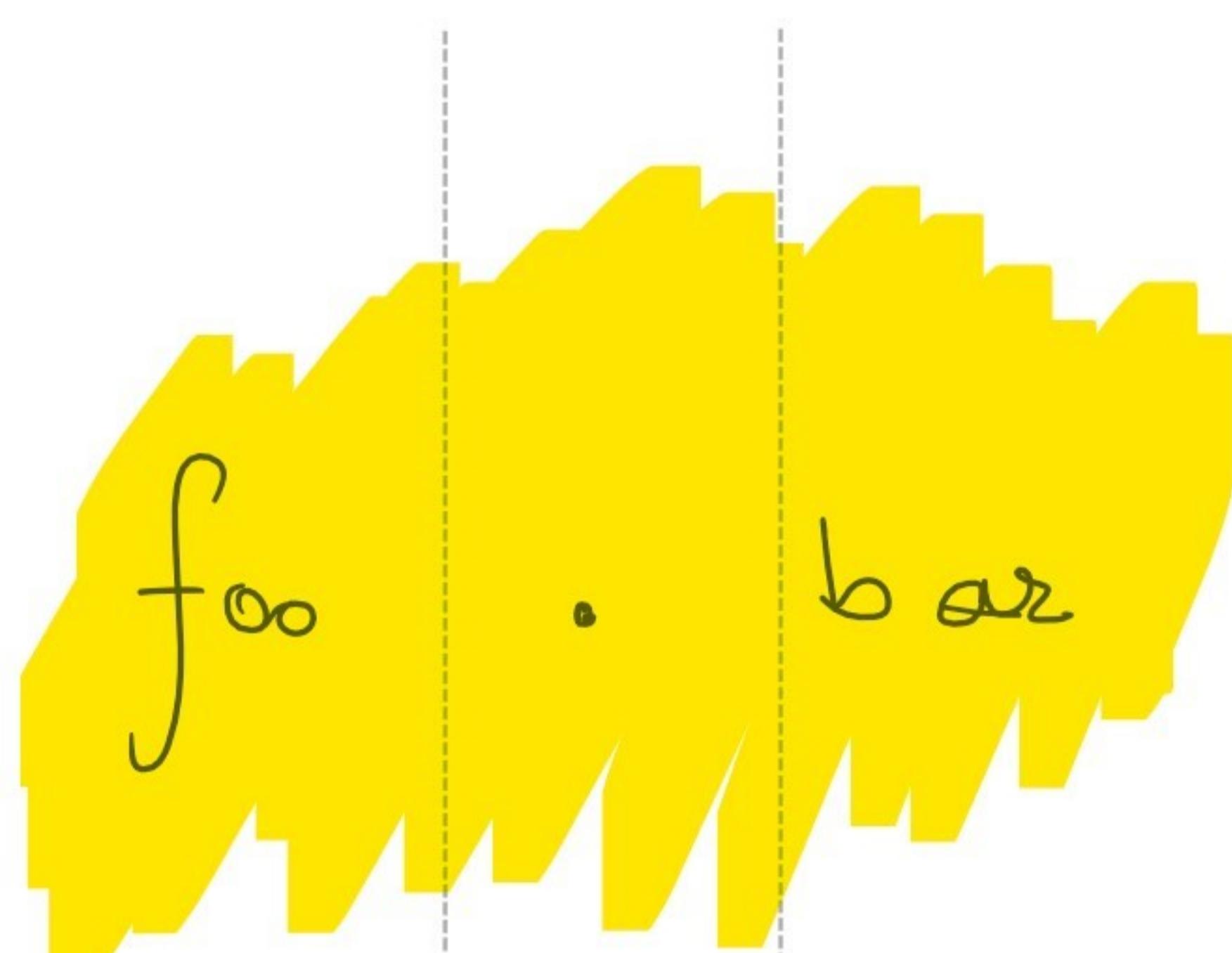
fooxybar

foocbar

foo (a) bar

foo (x) bar

foo (c) bar



. - Single wildcard . Can represent only ONE character [any] in single position

1

Understand the Requirement: What needs to be included or excluded

- foobar
- barfoo
- fooabcbar
- fooxcbar
- barcbyfoo
- foozbar
- barafoo
- barabfoo

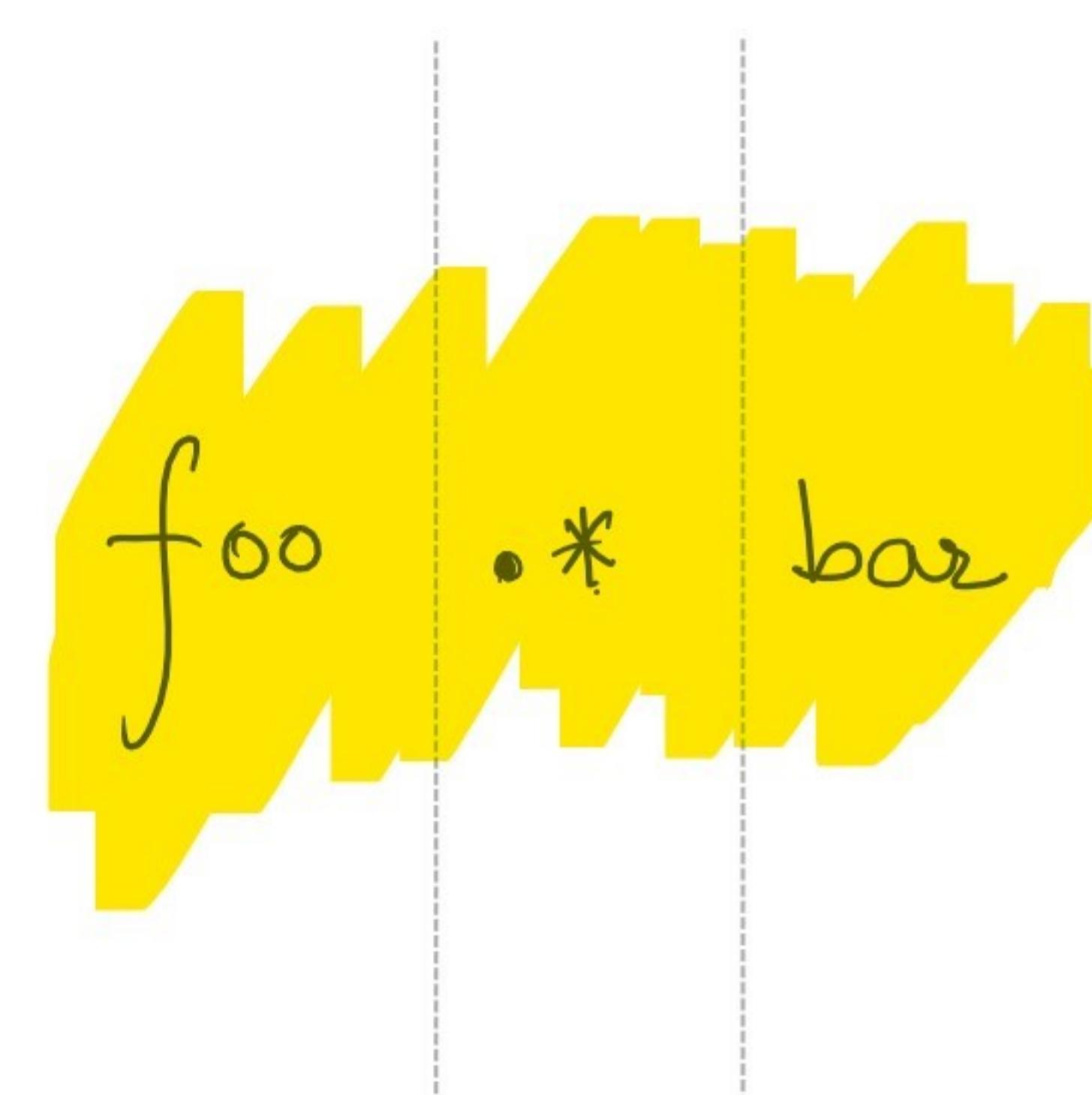
2

Identify the pattern in inclusion or exclusion list

<input checked="" type="checkbox"/> foo		bar
<input checked="" type="checkbox"/> foo	abc	bar
<input checked="" type="checkbox"/> foo	xc	bar
<input checked="" type="checkbox"/> foo	z	bar

3

Final Regular Expression



.* - Zero or more occurrences of wildcard, which means zero or more occurrences of any character

\s — space

1

Understand the Requirement: What needs to be included or excluded

- foxxxbar
- foo bar
- fooxbar
- fooxxbbar
- foo bar
- foo bar
- foobar
- fooyyybar

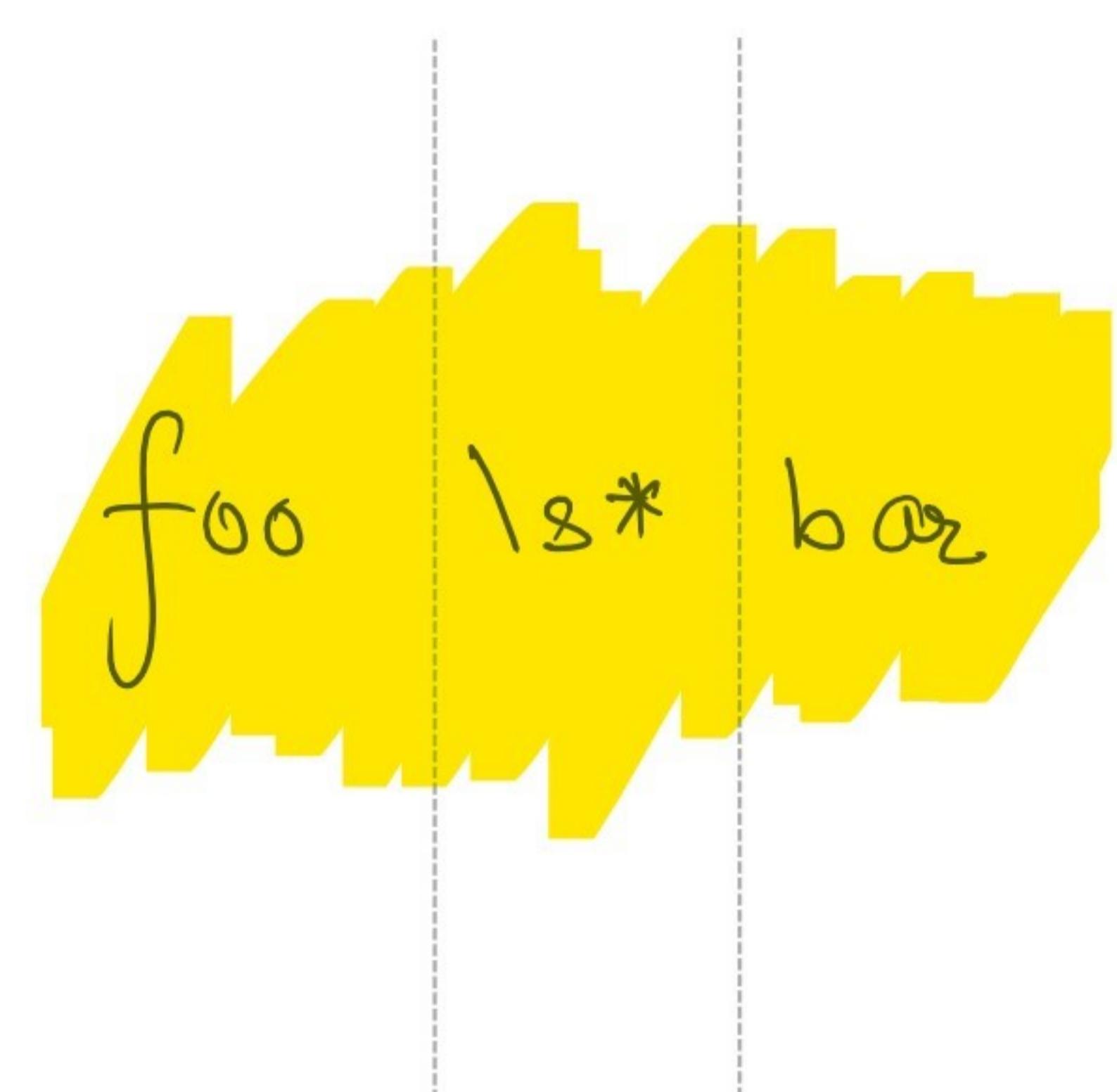
2

Identify the pattern in inclusion or exclusion list

<input checked="" type="checkbox"/> foo	<3 spaces>	bar
<input checked="" type="checkbox"/> foo	<1 spaces>	bar
<input checked="" type="checkbox"/> foo	<6 spaces>	bar
<input checked="" type="checkbox"/> foo	<0 spaces>	bar

3

Final Regular Expression



\s represents whitespace. \s* represents zero or more occurrence of whitespace

1

Understand the Requirement: What needs to be included or excluded

- foo
- moo
- coo
- doo
- poo
- loo
- boo
- hoo

2

Identify the pattern in inclusion or exclusion list

<input checked="" type="checkbox"/> f oo	
<input checked="" type="checkbox"/> c oo	
<input checked="" type="checkbox"/> l oo	

3

Final Regular Expression



1

Understand the Requirement: What needs to be included or excluded

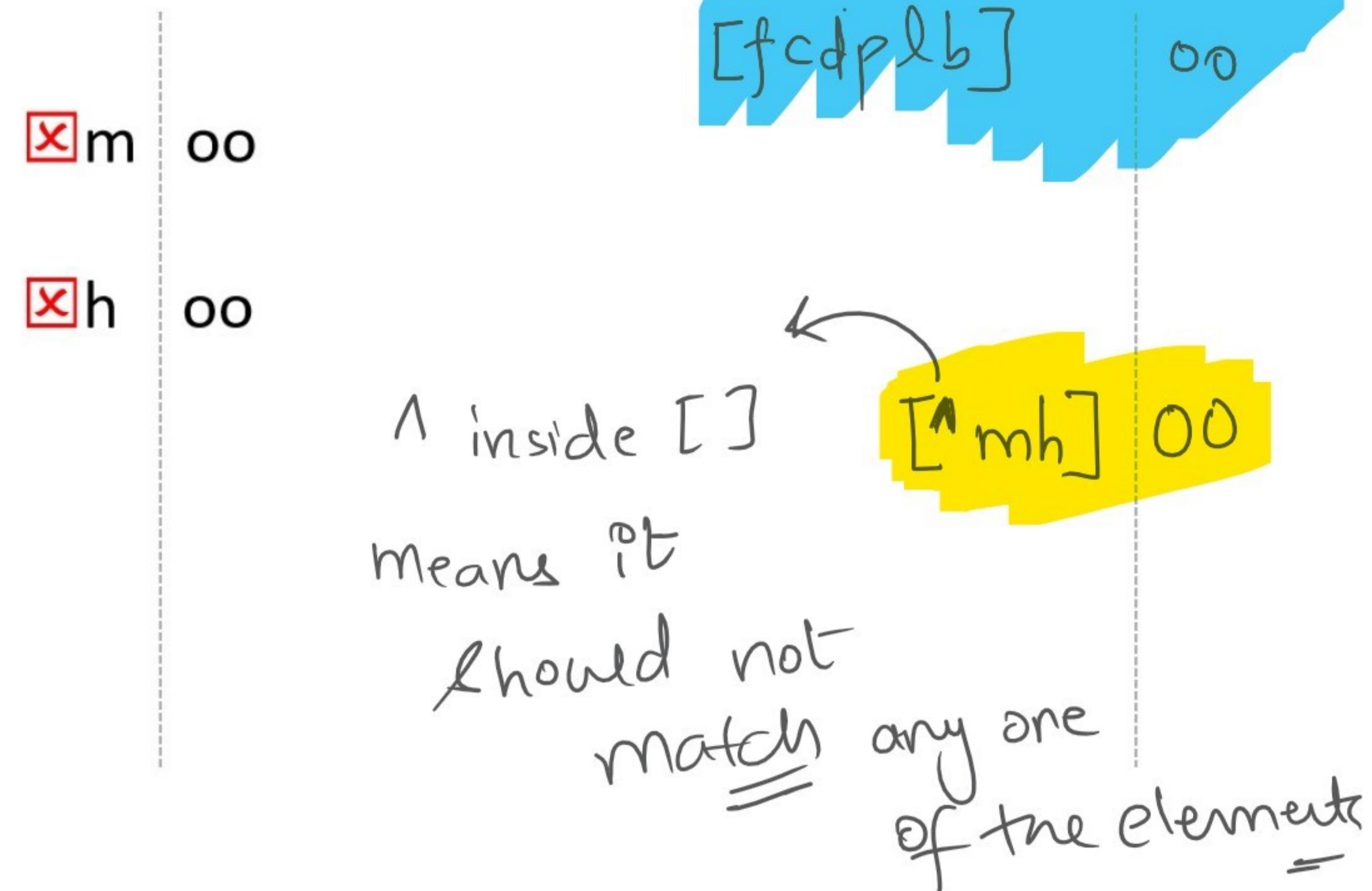
2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

- foo
- moo
- coo
- doo
- poo
- loo
- boo
- hoo



[^abc] - Any character EXCEPT any of the one inside the square brackets, in a single

1

Understand the Requirement: What needs to be included or excluded

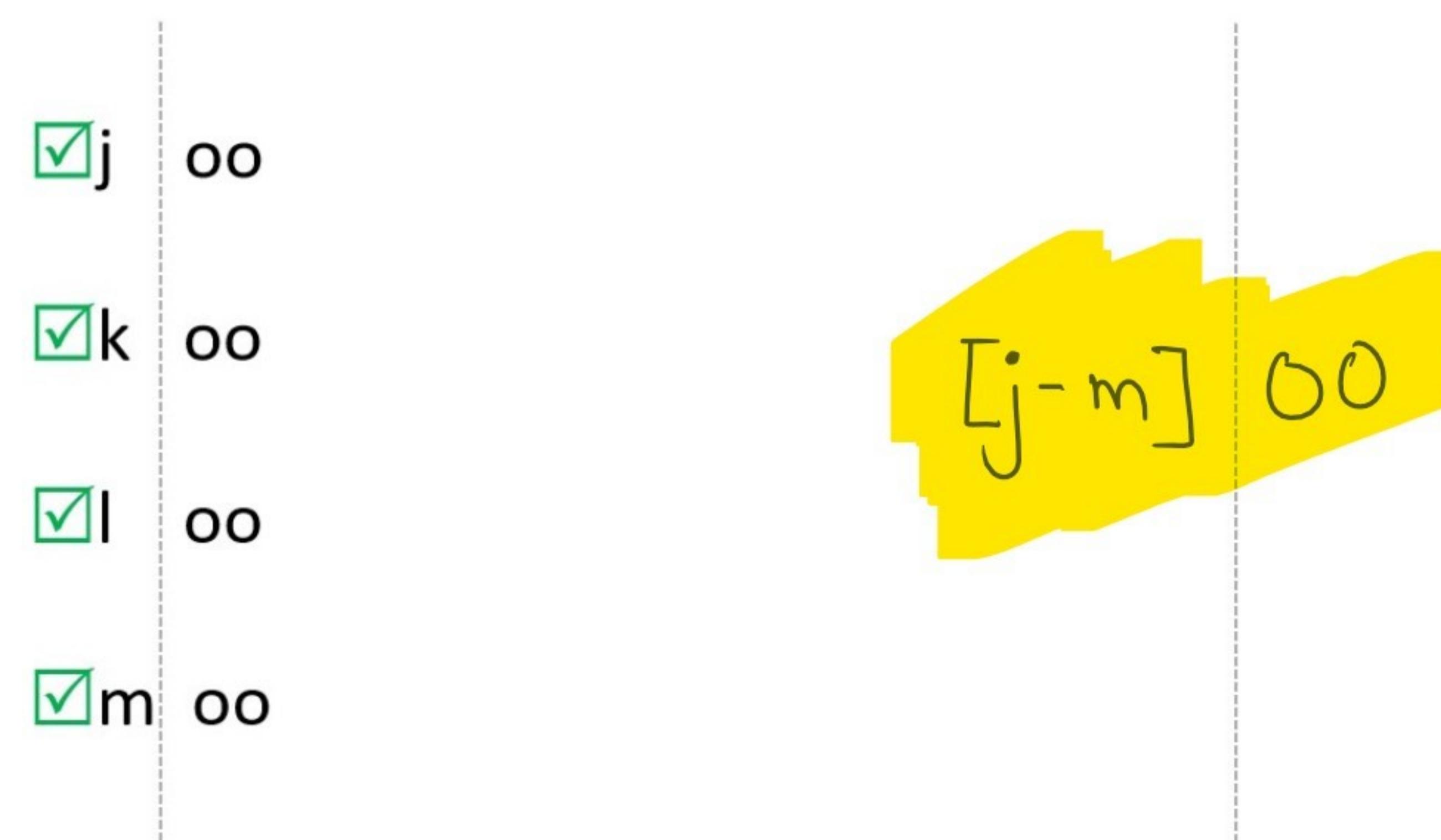
2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

- joo
- moo
- koo
- loo
- poo
- zoo
- moo
- hoo



[a-c] - One of the character falling in the range given in square brackets

1

Understand the Requirement: What needs to be included or excluded

2

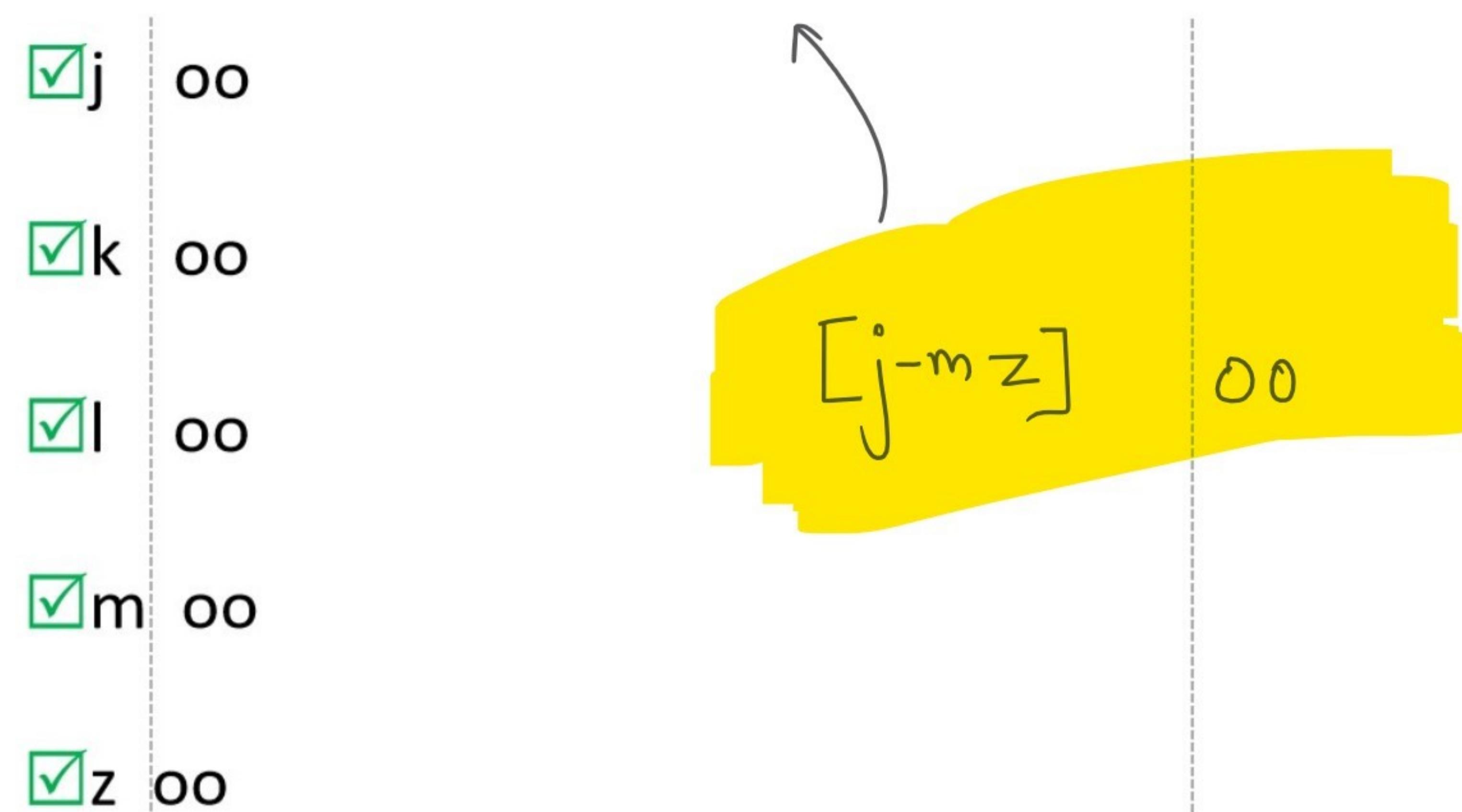
Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

$[j,k,l,m,z]$ → any one

- joo
- moo
- koo
- loo
- poo
- moo
- zoo
- hoo



[a-cx] - One of the character falling in the range given in square brackets OR any of the other choices given in square brackets - a,b, c,x

1

Understand the Requirement: What needs to be included or excluded

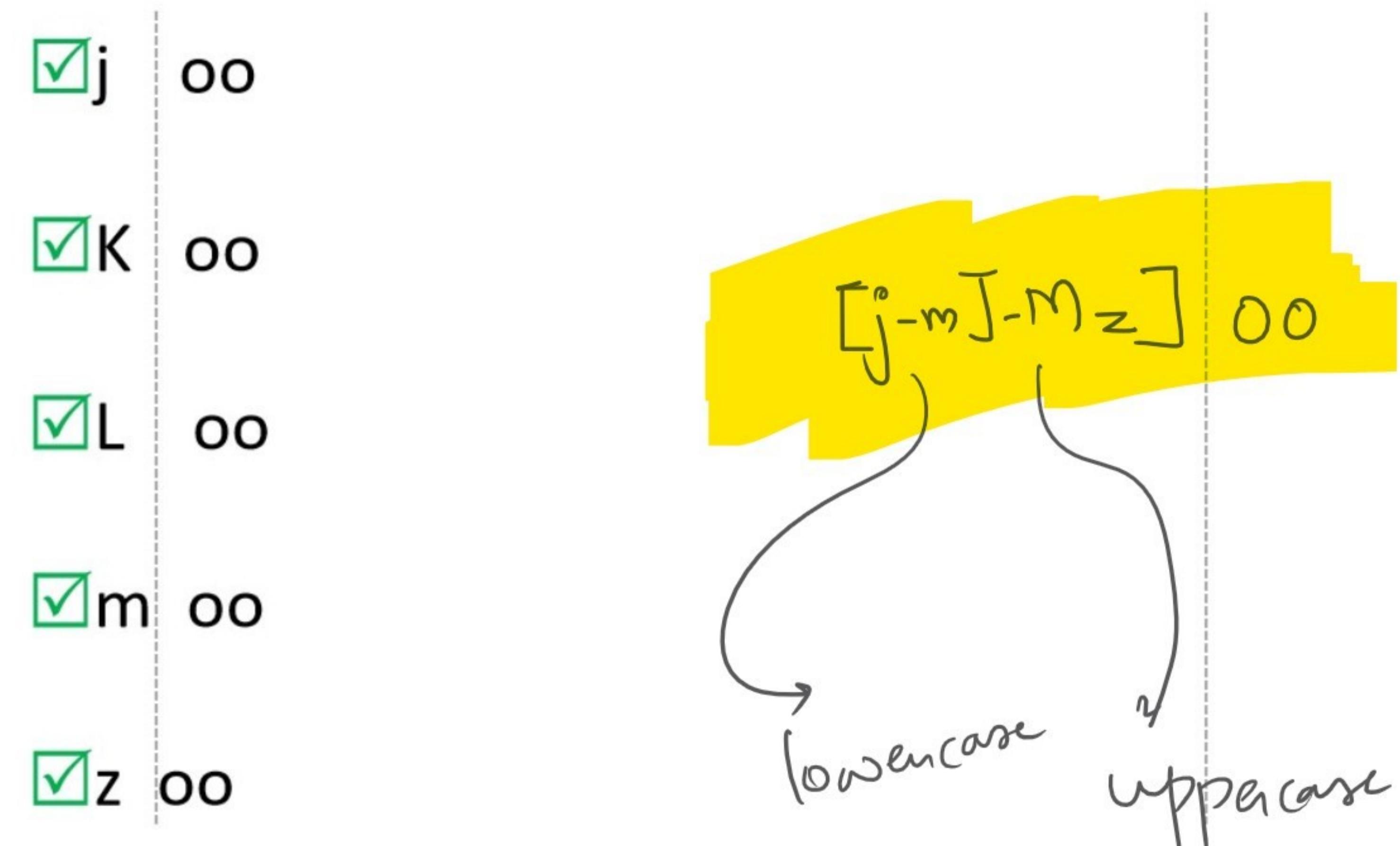
2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

- joo
- moo
- Koo
- Loo
- poo
- moo
- zoo
- hoo



[a-cACx] - One of the character falling in the range given in square brackets OR any of the other choices given in square brackets - a,b, c,A,B,C,x

1

Understand the Requirement: What needs to be included or excluded

- $x \text{xx} \cdot \text{yy}$
- $\text{xx} \cdot \text{yyyy}$
- $x \cdot \text{yy}$
- xy
- xxyy
- yx
- yxxx

2

Identify the pattern in inclusion or exclusion list

xx	\cdot	yy
xx	\cdot	yyyy
x	\cdot	yy

3

Final Regular Expression

don't use it as a wildcard
use it as $*$

$x^* \cdot y^*$

If a '.' is inside square brackets, it need not to be escaped

1

Understand the Requirement: What needs to be included or excluded

- $x\#y$
- $x;y$
- x,y
- $x&y$
- $x\%y$

2

Identify the pattern in inclusion or exclusion list

<input checked="" type="checkbox"/>	x	#	y
<input checked="" type="checkbox"/>	x	:	y
<input checked="" type="checkbox"/>	x	.	y

3

Final Regular Expression

$x [#:;.] y$

If a '.' is inside square brackets, it need not to be escaped

1

Understand the Requirement: What needs to be included or excluded

2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

x#y

x:y

x^y

x&y

x%y

x # y

x : y

x ^ y

x [#:|^] y

If a '^ - ' is inside square brackets, it need to be escaped with backslash

1

Understand the Requirement: What needs to be included or excluded

2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

x#y //

x\y //

x^y //

x&y

x%y

x # y

x \ y

x ^ y

x [#\\|^] y

If a '\ ' is inside square brackets, it need to be escaped with another backslash

1

Understand the Requirement: What needs to be included or excluded

2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

- foo bar baz
- bar foo baz
- baz foo bar
- bar baz foo
- foo baz bar
- baz bar foo

foo bar baz

foo baz bar

A yellow highlight box covers the text '^foo .*' which is the final regular expression. The '^' symbol is at the top left, 'foo' is in the middle, and the '*' symbol is at the bottom right.

^ is a placeholder that signifies beginning of line. Inside [] a ^ means negation, but outside brackets it acts as an anchor

1

Understand the Requirement: What needs to be included or excluded

2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

- foo bar baz
- bar foo baz
- baz foo bar
- bar baz foo
- foo baz bar
- baz bar foo

baz foo bar

foo baz bar

A yellow highlight box covers the text '.*bar\$'. The '.' character is at the top left, '*' is in the middle, and '\$' is at the bottom right.

\$ is a placeholder which signifies end of line

1

Understand the Requirement: What needs to be included or excluded

2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

- foo
- bar foo
- baz foo
- bar baz foo
- foo baz bar
- baz bar foo

foo

\wedge foo $\$$

\wedge signifies start of the line ; $\$$ is a placeholder which signifies end of line

Extended Set

Symbol	What it represents?
$+$	One or more occurrences of the character that precedes + symbol
$?$	Zero or one occurrence of the character that precedes ? symbol
$pat1 pat2$	Match either the pattern pat1 or pattern pat2
$()$	Divides the pattern into groups
$\{m\}$	Exactly 'm' occurrences of whatever precedes
$\{m,n\}$	At least m and at most n occurrences of whatever precedes

(3)

{2,3}

1

Understand the Requirement: What needs to be included or excluded

2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

- 834
- 519
- 4874
- 5
- 89
- 45687
- 25
- 645

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	[0-9][0-9][0-9]	\$
	<input checked="" type="checkbox"/>	[0-9][0-9][0-9]	\$
	<input checked="" type="checkbox"/>	[0-9][0-9][0-9]	\$

$\wedge [0-9]\{3\}\$$

a{m} represents exactly 'm' repetitions of whatever immediately precedes this

1

Understand the Requirement: What needs to be included or excluded

2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

- lion
- tiger
- leopard
- fox
- kangaroo
- cat
- mouse
- cuckoo
- deer

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	[a-z]{4}	\$
	<input checked="" type="checkbox"/>	[a-z]{5}	\$
	<input checked="" type="checkbox"/>	[a-z]{5}	\$
	<input checked="" type="checkbox"/>	[a-z]{6}	\$
	<input checked="" type="checkbox"/>	[a-z]{4}	\$

$\wedge [a-z]\{4,6\}\$$

a{m,n} represents atleast 'm' and atmost 'n' repetitions of whatever immediately precedes this

1

Understand the Requirement: What needs to be included or excluded

2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

ha → 5
 hahahahaha → 6
 hahaha → 3
 hahaha → 4
 haha → 2
 hahahahaha → 6
 hahahahahahaha → 8
 hahahahahahahaha → 9

- ha{5}
- ha{4}
- ha{6}
- ha{8}
- ha{9}

(ha){4}

paranthesis is used for grouping and treating as a single entity
 $\{m,\}$ represents atleast m repetitions of whatever precedes

1

Understand the Requirement: What needs to be included or excluded

2

Identify the pattern in inclusion or exclusion list

3

Final Regular Expression

$+ \rightarrow$ One or more occurrences

fooaaaabar
 fooabar
 foobar
 fooxxxbar
 fooxbar

<input checked="" type="checkbox"/> foo	aaaa	bar
<input checked="" type="checkbox"/> foo	a	bar
<input checked="" type="checkbox"/> foo	aa	bar

foo at bar

a+ One or more occurrences of 'a'

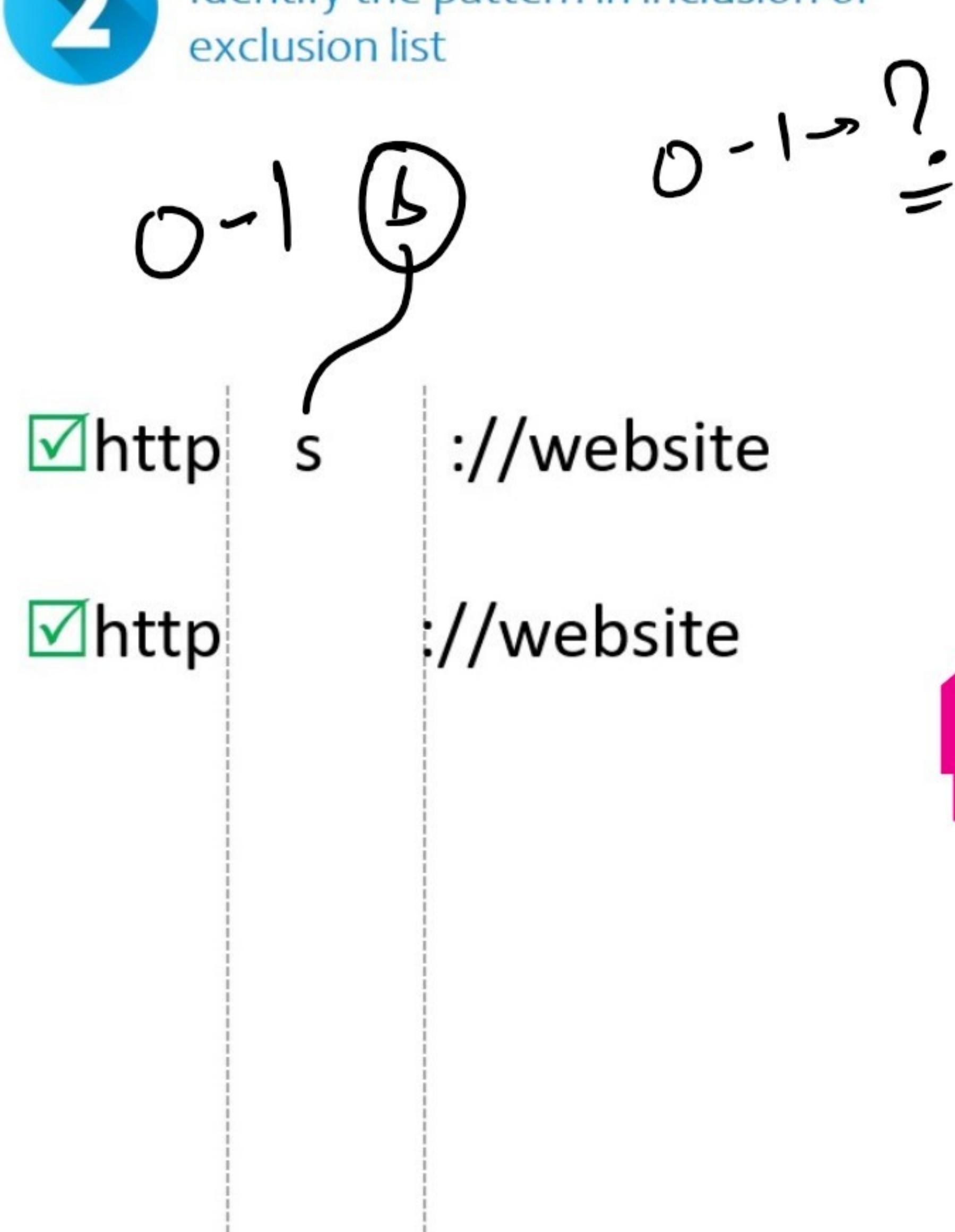
1

Understand the Requirement: What needs to be included or excluded

- https://website
- http://website
- httpss://website
- httpx://website
- httpxx://website

2

Identify the pattern in inclusion or exclusion list



3

Final Regular Expression

http s? ://website

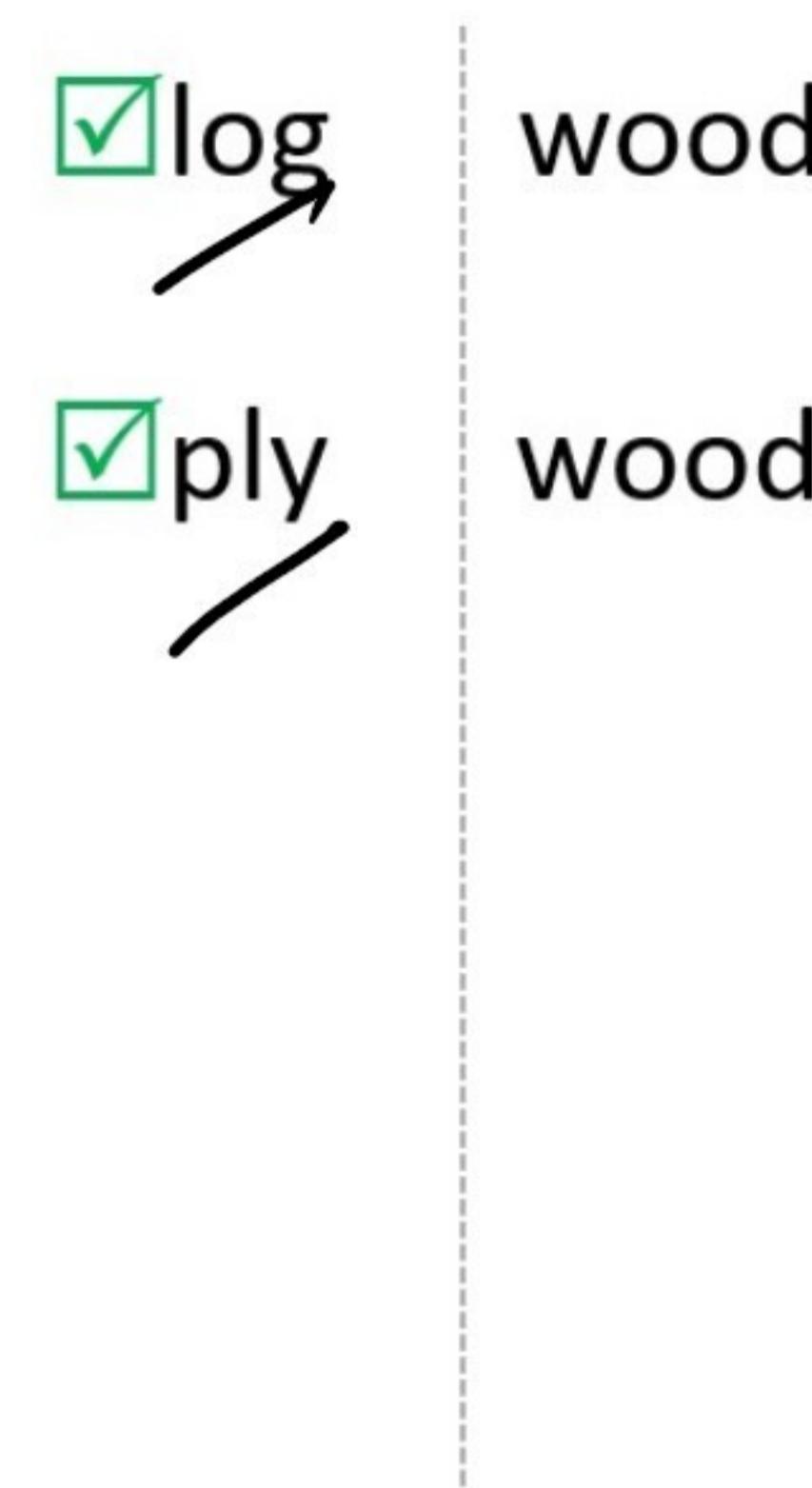
1

Understand the Requirement: What needs to be included or excluded

- redwood
- logwood
- sapwood
- rosewood
- plywood
- teakwood

2

Identify the pattern in inclusion or exclusion list



3

Final Regular Expression

(ply|log) wood

(a|b) represents either a or b, where a and b can be multi character strings

A-Z, a-z, ., -, 0-9

Email Pattern

↑

@

A-Z, a-z, ., -

↓

com

net

edu

org

[A-Za-z0-9.-] + @ [A-Za-z-]+ \.(com|edu|net|org)

1-h

✓ zartab@codewithz.com

✓ zartab.on@uni.edu

✗ zartab-n-122 @ my-company.net

7, 8, 9

X X X X X X X X X X

[7-9]{1}[0-9]{9}

phone
number
validation

Object Orientation

type(numbers)

0 1 2
numbers = [1, 2, 3, 4]
numbers[1]
numbers.append(4)

<class 'list'>

blueprint of what all things
a list can do is written
inside the class - list

point

• draw()

• move()

• get-distance()

shopping-cart

• add()

• remove()

• get-price(product)

Class → template or a blueprint which is used to
create new objects

Object → instance of class

{ Class → Human }

Object → John, Mary, Jason }

class Point:
 def draw(self):
 print('Something'):
 reference to the
 object of this
 class
 not a
 keyword
 p.draw(); p.draw();

It is compulsory to write a parameter which is self referencing.

Constructor

class Point:
 def __init__(self):
 representation of
 constructor in
 Python

Generator object

