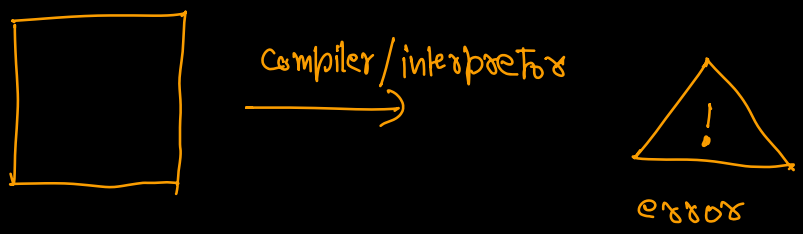
# Welcome all

## Types of error in python

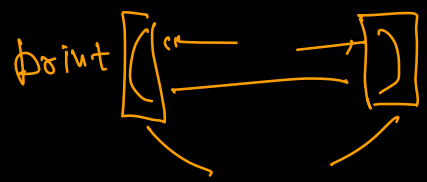
1. Syntax error
2. Runtime error




```
poin("hello world")
```

Syntax are rules of language which we should follow while writing are code

- → Misspelled word
- → Missing paranthesis
- → call something not defined
- → Ommitting our paranthesis while calling




print " " sep

# Runtime Error

These are the errors which we get during running of our program

As soon as python Interpretor, faces this it stops our program execution

```
num = 100
```

```
den = int(input())
```

```
 50
```

```
print( num/den)
```

```
2.0
```

```
den = int(input())
```

```
 0
```

```
print(num/den)
```

```
---------------------------------------------------------------------------
ZeroDivisionError                         Traceback (most recent call last)
Cell In[23], line 1
----> 1 print(num/den)

ZeroDivisionError: division by zero
```

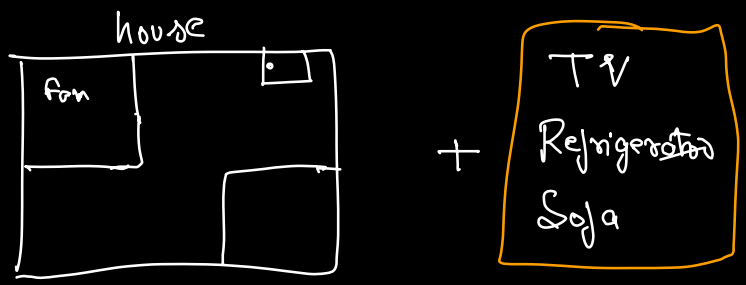
Runtime errors (Exception)

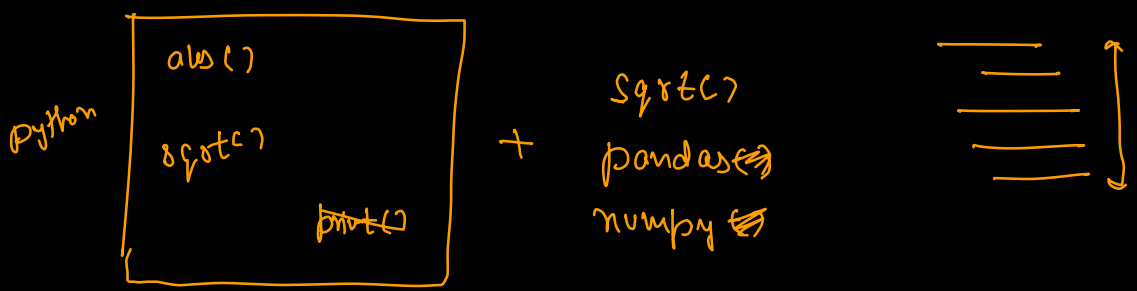
Exception handling.

# Function inside module

sum

sqrt




+ harry potter example

```
print ("hello")
```

```
hello
```

```
sqrt(25)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[9], line 1
----> 1 sqrt(25)

NameError: name 'sqrt' is not defined
```

```
import math
```

```
sqrt(25)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[11], line 1
----> 1 sqrt(25)

NameError: name 'sqrt' is not defined
```

```
math.sqrt(25)
```

```
5.0
```

```
import math as m
```

```
m.sqrt(25)
```

```
5.0
```


```
print ("hello")
```

```
hello
```

```
sqrt(25)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[9], line 1
----> 1 sqrt(25)

NameError: name 'sqrt' is not defined
```

```
import math
```

```
sqrt(25)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[11], line 1
----> 1 sqrt(25)

NameError: name 'sqrt' is not defined
```

```
math.sqrt(25)
```

```
5.0
```

```
import math as m
```

```
m.sqrt(25)
```

```
5.0
```

# Identifiers

⇒ Identifiers (Identity) is the name given to variables, functions, classes, library/module or any other object in python.

## Rules of Identifier

Identifier can be a combination of

| |
|---|
| lower case alphabets (a-z) |
| Upper case alphabet (A-Z) |
| numbers (0-9) |
| special character (_) |

## Rules :-

1. Cannot begin with number.

   0abc ✗ abc0 ✓

2. Cannot contain any other special char except _

   a@ ✗ @a ✗

   a_ ✓ _a ✓

3. Once started with (a-z), (A-Z) or '_'
it can contain (a-z)
(A-Z)
(0-9)
_
in some permissible limit.

4. They are case sensitive

$a \neq A$

---

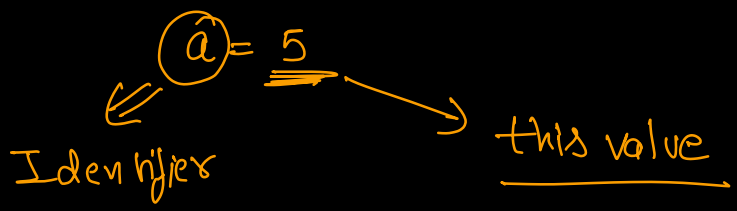
## Keywords

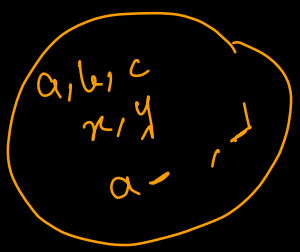
Continue if pass
break elif
(brake ✗)

# Data Types

Data type ⇒ type of data

identity of data present inside your (variable)




⇒ Variable ⇒ where data is stored

a = 5 b = 5.5

type ( _ )
↳ variable

O/P ⇒ What is the type of this variable

| We don't have any char type in Python |
|---|

Although, python doesn't expect programmer to define the type.

```
int a=5
float b=5.8
```

it internally still maintains a type.

14 data types ⟷ 6 categories

| Numeric | Boolean | Sequence | Set | Mapping | None |
|---|---|---|---|---|---|
| int | bool | str | set | dict | None Type |
| float | | list | frozen set | | |
| complex | | bytes | | | |
| | | bytearray | | | |
| | | tuple | | | |
| | | range | | | |

# Few properties of data type in Python

1. Data type in python are dynamic
   ↓
   Keep on changing

A variable can have different data type at diff. point of time.

C++/ Java vs Python

int a
char b

a

a = "mayank" ✗
c = 5 ✗

a = 5 ✓
a = "mayank" ✓

```
a = 5
```

```
type(a)
```

```
int
```

```
a = "mayank"
```

```
type(a)
```

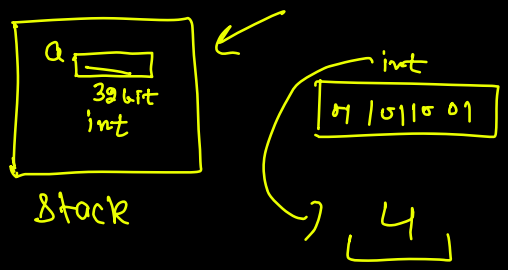
```
str
```

2. Size of datatype is also dynamic

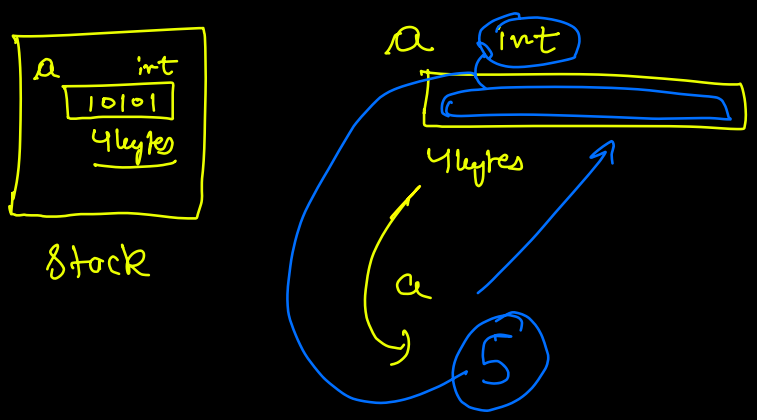
int a  4 bytes

a

1 bit
8 bit = 1 byte




a=5




Python dynamically changes the size based on value, type etc.

28 → 36 → 55
int  int  String

3. Data types are unbounded

int
long
double

int

$-2^7$ to $2^8$

```
intVar= 21474836475831562378657623985623956283214748364758315623786576239856239562835628562378
```

```
intVar
```

```
21474836475831562378657623985623956283214748364758315623786576239856239562835628562378214748364758315623786576239856239562835628562378
```

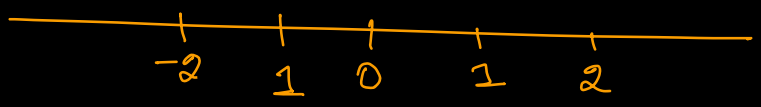
```
getsizeof(intVar)
```

```
88
```

# Numeric Data types

int  float  complex

## integer




natural no. $-1 - \infty$

whole 0, 1 ... $\infty$

integer $-\infty$ to $+\infty$

not fraction

or floating points

0.5 ✗  0.5 ✗

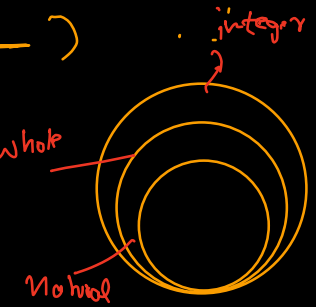
1 ✓  -5 ✓

5 ⇒ ~~natural~~ le, int

int ⇒ get type of ( — )

⇓

int




Unbounded

## Float

Like C++/Java, python also support floating points

2.15 3.14 2.78

The precision of floating point is 16

2.1234 (16)

## Complex number

3 + 5j

3 → real

5j → imaginary

$j = \sqrt{-1}$

$j = \sqrt{-1}$

Only j/I can be used

j can only be used as suffix