

Lecture 5, 21 August 2025

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Programming and Data Structures with Python

Data types

int

float

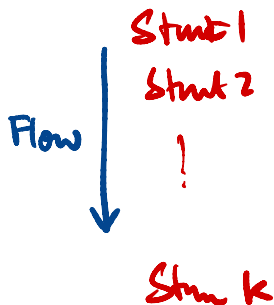
bool

- and
or
not

$$2 \leq x \leq 7$$

$$x \leq 7 \quad \text{and} \quad x \geq 2$$

Python code



Statements

Assignment : $v = 10$

Altering the control flow

Iteration : for

Loop : while

Conditional : if

if condition:

stmt1
stmt2

!

stmt k

if condition:

≡

else:

≡

$f(x) = |x|$

def abs(x):

if $x < 0$:

return $(-x)$

else:

return (x)

$$f(x) = |x|$$

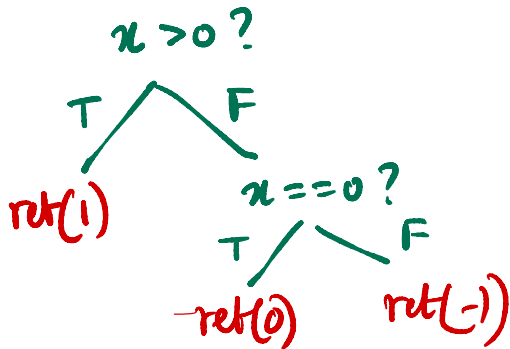
```
def abs(x):  
    if x < 0:  
        return (-x)  
    else:  
        return (x)
```

```
def isprime(x):
```

```
    for i in range(2, x):  
        if x % i == 0:  
            return (False)  
            ↓  
    return (True)
```

```
def abs(x):  
    if x < 0:  
        return(-x)  
    return(x)
```

$$\text{sign}(x) = \begin{cases} 1, & \text{if } x > 0 \\ 0, & \text{if } x = 0 \\ -1, & \text{if } x < 0 \end{cases}$$



```
def sign(x):
```

```
    if x > 0:
        return(1)
```

```
    else:
```

```
        if x == 0:
            return(0)
```

```
        else:
            return(-1)
```

$f(x) = \begin{cases} v_1 & \text{case 1} \\ v_2 & \text{case 2} \\ \vdots & \\ v_k & \text{case k} \end{cases}$

if _ :

else:

if _ :

else:

if _ :

else:

if _ :

else:



Python has elif:

if cond1 :

elif cond2 :

elif cond3 :

else :

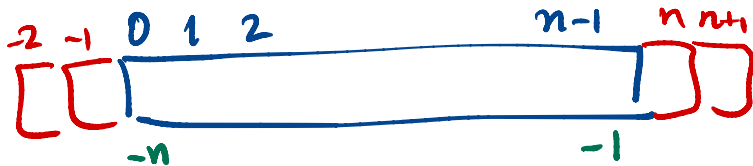
Lists Seq of values $[v_0, v_1, v_2, \dots, v_{n-1}]$
Positions $\begin{array}{cccc} | & | & | & | \\ 0 & 1 & 2 & n-1 \end{array}$

Values need not be of a uniform type

$[1, 2, \text{"ab"}, \text{False}]$

list l values are $l[0], \dots, l[n-1]$ $l[n] \dots$
"indexing" $\downarrow$
error

Query $l[i]$ - value of i may be out of bounds



List



Slice

$l[i:j]$ $[l[i], l[i+1], \dots, l[j-1]]$

positions of l in range (i, j)

Updating a hit-

$$L[j] = v$$

Each $L[i]$ is like a separate variable

"Collective" name

Update a slice

