

Mathematics

Example 1

The mathematical expression

$$\sum_{i=0}^6 3i,$$

can be expanded as,

$$\sum_{i=0}^6 3i = 3(0) + 3(1) + 3(2) + 3(3) + 3(4) + 3(5) + 3(6),$$

or can be written in tabular form:

$i$	0	1	2	3	4	5	6
$3i$	3(0)	3(1)	3(2)	3(3)	3(4)	3(5)	3(6)

where the bottom row is summed giving,

$$\sum_{i=0}^6 3i = 63.$$

Example 2

The mathematical expression

$$10 + \sum_{j=-3}^2 \left(2 + \frac{j}{2}\right),$$

can be expanded as,

$$10 + \sum_{j=-3}^2 \left(2 + \frac{j}{2}\right) = 10 + \left(2 + \frac{-2}{2}\right) + \left(2 + \frac{-1}{2}\right) + \left(2 + \frac{0}{2}\right) + \left(2 + \frac{1}{2}\right) + \left(2 + \frac{3}{2}\right),$$

or can be written in tabular form,

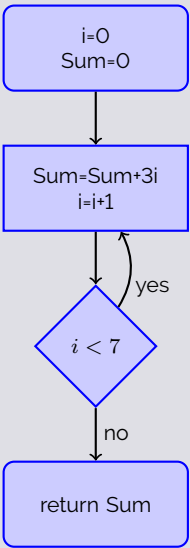
$j$	-3	-2	-1	0	1	2
$2j$	3(0)	3(1)	3(2)	3(3)	3(4)	3(5)
$2$	2	2	2	2	2	2

where the bottom two rows are add together and then added to 10 giving,

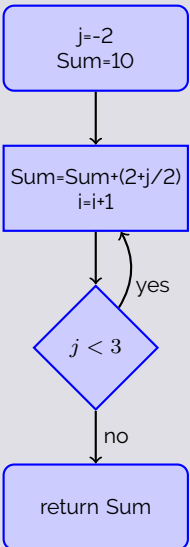
$$10 + \sum_{j=-3}^2 \left(2 + \frac{j}{2}\right) = 20.5.$$

Flowchart

Example 1



Example 2



Psuedocode

Example 1

Python Psuedocode

```
1 # Setting up the initial Sum value
2 Sum=0
3
4 # For loop from 0 to 6 with steps of 1
5 for i in range(0,7):
6     Sum=Sum+3*i
7
8
9 print(Sum)
```

The line by line output of the code for Example 1 is:

Loop count	i	Sum
0	0	0
1	1	3
2	2	9
3	3	18
4	4	30
5	5	45
6	6	63

Example 2

Python Psuedocode

```
1 # Setting up the initial Sum value as 10
2 Sum=10
3
4 # For loop from -3 to 2 with steps of 1
5 for j in range(-3,3):
6     Sum=Sum+(2+j/2)
7
8 return Sum
```

The line by line output of the code for Example 2 is:

Loop count	j	Sum
0	-3	10.3
1	-2	11.5
2	-1	13
3	0	15.0
4	1	17.5
5	2	20.5

<sup>1</sup>Course Website