

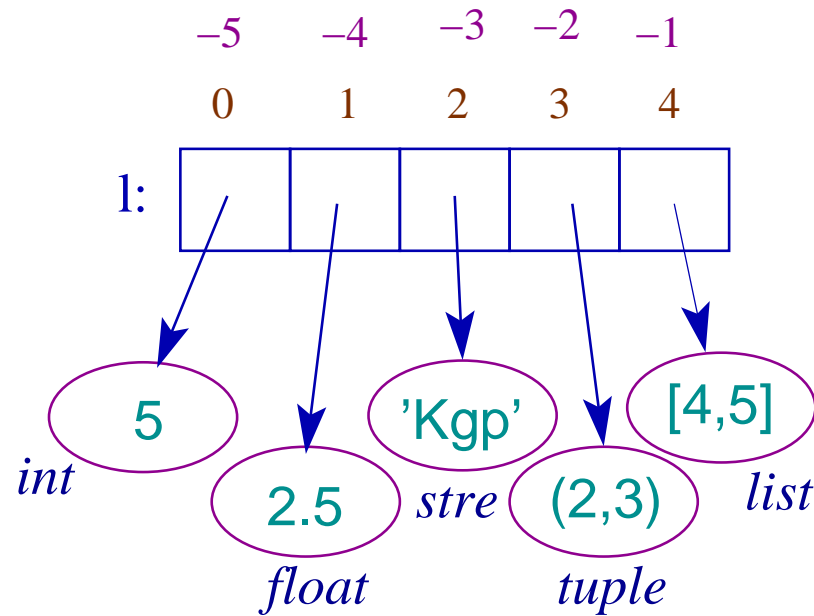
List

List

A **list** is a finite sequence of **object references**.
An element of a list can be of any type.

```
>>> l = [5, 2.5, "Kgp", (2,3), [4,5]]
>>> l
[5, 2.5, 'Kgp', (2, 3), [4, 5]]
>>> n = [] # empty list
>>> n
[]
```

Representation and Indices



Mutable Object

A **list** is a **mutable** object and its elements can be modified.

```
>>> l
[5, 2.5, 'Kgp', (2, 3), [4, 5]]
>>> l[0] = 7.5
>>> l
[7.5, 2.5, 'Kgp', (2, 3), [4, 5]]
>>> l[4][0] = "IIT"
>>> l
[7.5, 2.5, 'Kgp', (2, 3), ['IIT', 5]]
```

Slicing

Indexing and slicing of a *list* is similar to a *string*.

```
>>> l
[5, 2.5, 'Kgp', (2, 3), [4, 5]]
>>> l[2]
'Kgp'
>>> l[2][1]
'g'
>>> l[4][1]
5
>>> l[1:3]
[2.5, 'Kgp']
>>> l[-1:-3:-1]
[['IIT', 5], (2, 3)]
```

Operations

```
>>> l1 = [1,2,3]
>>> l2 = [2,3,4]
>>> l1+l2
[1, 2, 3, 2, 3, 4]
>>> 2*l1
[1, 2, 3, 1, 2, 3]
>>> len(l1)
3
>>> 2 in l1
True
```

Operations

```
>>> l1
[1, 2, 3]
>>> l1[len(l1):] = [5]      # l1.append(5)
>>> l1
[1, 2, 3, 5]
>>> l1.pop()
5
>>> l1
[1, 2, 3]
```

There are large number of operations available on list.

Note

If n is a positive integer, then `range(n)` is the list $[0, 1, \dots, n - 1]$.

```
>>> range(10)
```

```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
```

```
>>>
```

```
>>> range(0)
```

```
[]
```

```
>>> range(-5)
```

```
[]
```

```
>>> range(2.5)
```

```
__main__:1: DeprecationWarning:  
integer argument expected, got float  
[0, 1]
```


Note

If **s** is a string, then **s** can be split into list of strings on some character.

```
>>> s = "1 22 13 -14 50 6 7"
```

```
>>> s.split(' ')
```

```
['1', '22', '13', '-14', '50', '6', '7']
```

```
>>> s.split('1')
```

```
['', ' 22 ', '3 -', '4 50 6 7']
```

Example

```
# sumList.py : adds elements of an
#             integer list
l = input("Enter an integer list: ")
sum = 0
for n in l:
    sum = sum + n
print "sum(", l, ") = ", sum
```

Note

What happens if the list has data other than number e.g. `[12, "IIT", 7]`?

Note

```
$ python sumList.py
Enter an integer list: [2, "a", 3]
Traceback (most recent call last):
  File "sumList.py", line 5, in <module>
    sum = sum + n
TypeError: .....
```

Example

```
# sumListExc.py : adds elements
l = input("Enter an integer list: ")
sum = 0
try:
    for n in l:
        sum = sum + n
    print "sum(", l, ") = ", sum
except TypeError:
    print l, "contains non-number"
```

raw_input()

Reads a line from input and converts it to string (excluding the newline character) and returns it.

We may use a prompt with it which is written on the standard output.

```
>>> s = raw_input("Enter Data: ")
21 34 -7 22 56 7 -15
>>> s
'21 34 -7 22 56 7 -15'
>>> ls = s.split(' ')
>>> ls
['21', '34', '-7', '22', '56', '7', '-15']
```

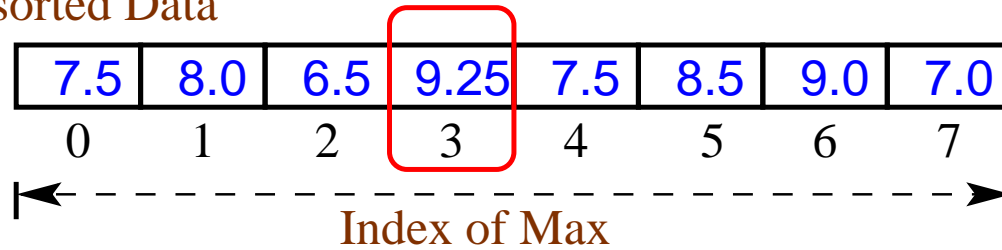
Selection Sort

The data is stored in a list and we sort them in **non-ascending** order. Let the length of the list be n .

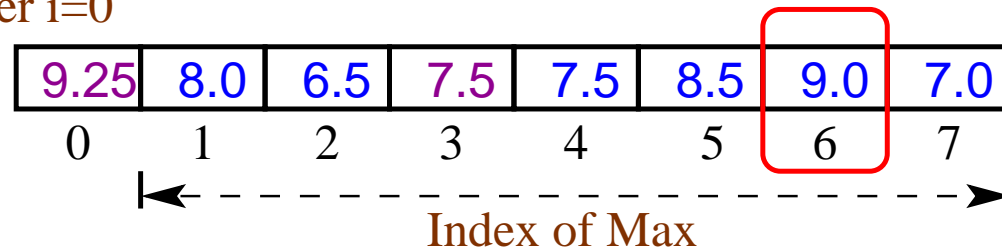
Selection Sort Algorithm

```
for i ← 0 to n - 2 do
  max ← a[i], maxIndex ← i
  for j ← i + 1 to n - 1 do
    if max < a[j] then
      max ← a[j], maxIndex ← j
    endIf
  endFor
  a[i] ↔ a[maxIndex]    # Exchange
endFor
```

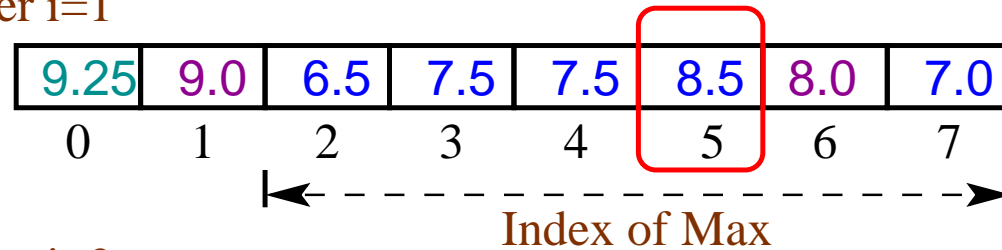

Unsorted Data



After i=0



After i=1



After i=2

