Lists

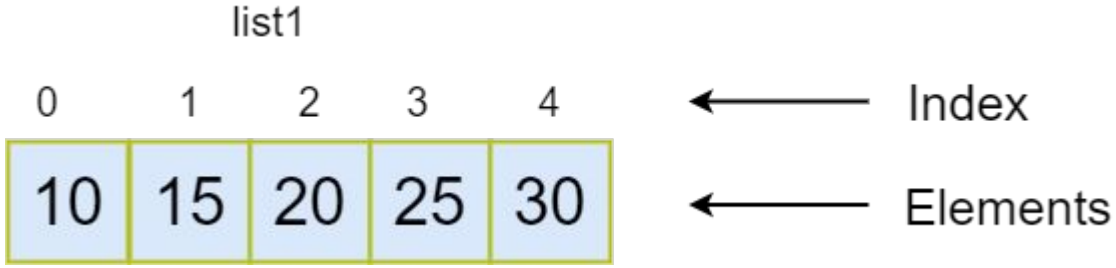
List is similar to an array, which is the ordered collection of the objects. The array is the most popular and commonly used collection in any other programming language.

Syntax:

```
var list1 = [10, 15, 20,25,25]
```

list is defined by storing all elements inside the square bracket ([]) and separated by commas (,).

Graphical Representation:



List1:

It is the list variable that refers to the list object.

Index:

Each element has its index number that tells the element position in the list. The index number is used to access the particular element from the list, such as list name[index]. The list indexing starts from 0 to length-1 where length denotes the numbers of the element present in the list.

For example:

The length of the above list is 5.

Elements:

The List elements refers to the actual value stored in the given list.

Dart

List Methods:

```
void main() {
  var lst = [1, 2, 3, 4, 5];
  var e1 = lst.first;
  var e2 = lst.last;
  var e3 = lst.elementAt(1);
  var len = lst.length;

  print('There are $len elements in the list');
  print('The first element is $e1');
  print('The last element is $e2');
  print('The second element is $e3');
}
```

Updating List

```
void main() {

    var myList = [0, 'one', 'two', 'three', 'four', 'five'];

    // replace the item at index '3'
    myList[3] = 3;
    print(myList);

    // replace the item at index '1'
    myList.replaceRange(1, 2, [1]);
    print(myList);
    // [0, 1, two, 3, four, five]


    // replace the items from index 2 to 4
    myList.replaceRange(2, 5, ['new 2', '3 and 4']);
    print(myList);

}
```

Sort Method

```
void main() {
var intList = [0, 5, 2, 3, 8, 17, 11];
intList.sort();
print(intList);

var tringList = ['vue', 'kotlin','dart', 'angular', 'flutter'];
tringList.sort();
print(tringList);

}
```

isEmpty & isNotEmpty Method

```
void main() {
  List vals = [];
  if (vals.isEmpty) {
    print('the list is empty');
  }

  vals.add(1);
  vals.add(2);
  vals.add(3);
  if (vals.isNotEmpty) {
    print('the list is not empty');
  }

  vals.clear();

  if (vals.isEmpty) {
    print('the list is empty');
  }
}
```

Reversed Method

```
void main() {
  var vals = [8, 4, 1, 2, 4, 5, 9];

  var reversed = List.of(vals.reversed);
  print(reversed);
}
```

Reversed List will be:
[9, 5, 4, 2, 1, 4, 8]

Add Methods

```
void main() {
  var vals = [1, 2, 3];

  vals.add(4);
  vals.addAll([5, 6, 7]);

  vals.insert(0, 0);
  vals.insertAll(4, [8, 9, 10]);

  print(vals);
}
```

Remove Methods

```
void main() {
  var vals = [1, 2, 3, 4, 5, 6];

  vals.remove(1);
  print(vals);

  vals.removeAt(vals.length - 1);
  print(vals);

  vals.removeLast();
  print(vals);

  vals.clear();
  print(vals);

}
```

Remove Methods

```
void main() {
   var vals2 = [-2, 1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10];

  vals2.removeWhere((e) => e < 0);
  print(vals2);

  vals2.removeRange(0, 5);
  print(vals2);

  vals2.retainWhere((e) => e > 7);
  print(vals2);

}
```

Map in Dart

A map is a collection of key/value pairs. The value is retrieved from a map with its associated key. Maps are also called dictionaries. A map literal consists of a pair of curly brackes, in which we specify the key/value pairs. The pairs are separated by comma. The key is separated from the value by colon.

Example

```
void main()
{
  var data = {'name': 'John Doe', 'occupation': 'gardener'};
  print(data);
  print(data.keys);
  print(data.values);

  var words = {1: 'sky', 2: 'falcon', 3: 'rock'};
  print(words);

}
```

Map Size

```
void main()
{
  var fruit = {1: 'Apple', 2: 'Orange'};

  print(fruit.length);
  print('There are ${fruit.length} elements in the map');
}
```

Result will be:

```
2
There are 2 elements in the map
```

isEmpty & isNotEmpty Method

```
void main() {
  var words = {
    1: 'sky',
    2: 'fly',
    3: 'ribbon',
    4: 'falcon',
    5: 'rock',
  };

  print(words.isEmpty);
  print(words.isNotEmpty);

  print('---------------');
  words.clear();

  print(words.isEmpty);
  print(words.isNotEmpty);
}
```

Add Method

```
void main() {
  var fruit = {1: 'Apple', 2: 'Orange'};

  fruit[3] = 'Banana';
  print(fruit);

  var val = fruit.putIfAbsent(3, () => 'Mango');
  print(fruit);
  print(val);

  var val2 = fruit.putIfAbsent(4, () => 'Cherry');
  print(fruit);
  print(val2);

}
```

Add Method

```
void main() {

   Map student = {'name':'Tom','age': 23};
   print('Map :${student}');

   student.addAll({'dept':'Civil','email':'tom@xyz.com'});
   print('Map after adding  key-values :${student}');

}
```

Remove Methods

```
void main() {
  var words = {
    1: 'sky',
    2: 'fly',
    3: 'ribbon',
    4: 'falcon',
    5: 'rock',
    6: 'ocean',
    7: 'cloud'
  };

  words.remove(1);
  print(words);

  words.removeWhere((key, value) => value.startsWith('f'));
  print(words);

  words.clear();
  print(words);
}
```

Merge Methods

```
void main() {
  var f1 = {1: 'Apple', 2: 'Orange'};
  var f2 = {3: 'Banana'};
  var f3 = {4: 'Mango'};

  var fruit = {}..addAll(f1)..addAll(f2)..addAll(f3);
  print(fruit);

  var fruit3 = {...f1, ...f2, ...f3};
  print(fruit3);

}
```

fromIterables Methods

```
void main() {
  var letters = ['I', 'II', 'V', 'X', 'L'];
  var numbers = [1, 2, 5, 10, 50];

  var data = Map.fromIterables(letters, numbers);
  print(data);
}
```

Result will be:

```
{I: 1, II: 2, V: 5, X: 10, L: 50}
```

containsKey & containsValue Methods

```
void main() {
  var myMap = {1: 'Apple', 2: 'Orange', 3: 'Banana'};
  print(myMap.containsKey(1));
  print(myMap.containsKey(3));

  print(myMap.containsValue('Apple'));
  print(myMap.containsValue('Cherry'));
}
```

Map Iteration Method

```
void main()
{
  var fruit = {1: 'Apple', 2: 'Banana', 3: 'Cherry', 4: 'Orange'};

  fruit.forEach((key, val) {
    print(' $key, $val');
  });

}
```

Loops in Dart

Dart Loop is used to run a block of code repetitively for a given number of times or until matches the specified condition. The main objective of the loop is to run the code multiple times. Dart supports the following type of loops:

1) Dart for loop

2) Dart for…in loop

3) Dart while loop

4) Dart do-while loop

For Loop

The for loop is used when we know how many times a block of code will execute.

```
void main()
{

   for(var num=1; num<=10; num++)       //for loop to print 1-10
                                           numbers
   {
      print(num);     //to print the number
   }
}
```

For in Loop

The for in loop is slightly different from the for loop. It only takes dart object or expression as an iterator and iterates the element one at a time. The loop will execute until no element left in the iterator.

```
void main()
{
   var list1 = [10,20,30,40,50];

   for(var i in list1)

  {
      print(i);
   }

}
```

While Loop

The while loop executes a block of code until the given expression is false. It is more beneficial when we don't know the number of execution.

```
void main()
{
   int i = 1;
   while (i < 5)
   {
      print( i);
      i++;
   }
}
```

Do While Loop

The do…while loop is similar to the while loop but only difference is that, it executes the loop statement and then check the given condition.

```
void main()
{
   var a = 1;
   do {
    print(a);
     a++;
   }while (a<10);
}
```

Functions

Functions are the building blocks of readable, maintainable, and reusable code. A function is a set of statements to perform a specific task. Functions organize the program into logical blocks of code. Once defined, functions may be called to access code.

```
String sayHelloWorld() {
    return "Hello, World!";
}
void main(){
sayHelloWorld();
}
```

Function with parameters

```
void main(){
  var sum = add(10,20);
  print("Sum Of Given No. Is : ${sum}");
}

int add(int n1, int n2){
    int result;
    result = n1+n2;
    return result;
}
```