Flutter 基礎 7 - Dart Lists (find, filter, collection if, sort, ...)

參考資料 + 翻轉教室輔助影片

Flutter 基礎與實作 7 - Dart Lists (find, filter, collection if, sort, ...)

APP 程式設計實務 (2021 Fall)

https://youtu.be/L1gQuM1BsPc

1. Dart/Flutter List Tutorial with Examples - BezKoder
2. List class - dart:core library - Dart API

課程設計

Find Elements

```
void main() {
  List<int> dat1 = [90, 97, 9, 54, 40, 7, 7, 13, 84, 99, 9];
  print("dat1 = $dat1");
  dynamic result = dat1.contains(9);
  print("dat1.contains(9) = $result");
  result = dat1.indexOf(9);
  print("dat1.indexOf(9) = $result");
  result = dat1.lastIndexOf(9);
  print("dat1.lastindexOf(9) = $result");
  result = dat1.indexWhere((x) => x < 8);
  print("dat1.indexWhere((x) => x<8) = $result");
  result = dat1.lastIndexWhere((x) => x < 8);
  print("dat1.lastindexWhere((x) => x<8) = $result");
}
```

Console

```
dat1 = [90, 97, 9, 54, 40, 7, 7, 13, 84, 99, 9]
dat1.contains(9) = true
dat1.indexOf(9) = 2
dat1.lastindexOf(9) = 10
dat1.indexWhere((x) => x<8) = 5
dat1.lastindexWhere((x) => x<8) = 6
```

Filter Elements

```
void main() {
  List<int> dat1 = [90, 97, 9, 54, 40, 7, 7, 13, 84, 99, 9];
  print("dat1 = $dat1");
  dynamic result = dat1.where((x) => x<=9).toList();
  print("dat1.where((x) => x<=9) = $result");
  result = dat1.firstWhere((x) => x>15);
  print("dat1.firstWhere((x) => x>15) = $result");
  result = dat1.lastWhere((x) => x>15);
  print("dat1.lastWhere((x) => x>15) = $result");
}
```

Console

```
dat1 = [90, 97, 9, 54, 40, 7, 7, 13, 84, 99, 9]
dat1.where((x) => x<=9) = [9, 7, 7, 9]
dat1.firstWhere((x) => x>15) = 90
dat1.lastWhere((x) => x>15) = 99
```

Filter - every(test)

```
import 'dart:math';

void main() {
  var rn = Random();
  var dat1 = List.generate(10, (n) => rn.nextInt(100));
  print("dat1 = $dat1");
  print("-" * 50);
  if (dat1.every((n) => n > 10)) {
    print('All numbers > 10');
  } else {
    print('Some number(s) <= 10');
  }
}
```

Console

```
dat1 = [99, 46, 96, 22, 26, 54, 47, 98, 27, 80]
--------------------------------------------------
All numbers > 10
```

Console

```
dat1 = [94, 28, 43, 63, 19, 62, 2, 59, 54, 74]
--------------------------------------------------
Some number(s) <= 10
```

Filter - any(test)

```
import 'dart:math';

void main() {
  var rn = Random();
  var dat1 = List.generate(10, (n) => rn.nextInt(100));
  print("dat1 = $dat1");
  print("-" * 50);
  if (dat1.any((n) => n > 80)) {
    print('Any number > 80');
  } else {
    print('All numbers <= 80');
  }
}
```

Console

```
dat1 = [69, 1, 26, 56, 83, 70, 68, 79, 96, 79]
--------------------------------------------------
Any number > 80
```

Console

```
dat1 = [23, 54, 77, 4, 13, 32, 62, 41, 74, 74]
--------------------------------------------------
All numbers <= 80
```

map(function)

```
import 'dart:math';

void main() {
  var rn = Random();
  var dat1 = List.generate(10, (n) => rn.nextInt(10));
  print("dat1 = $dat1");
  print("-" * 50);

  var pow2 = dat1.map((n) => n * n).toList();
  print("pow2 = $pow2");
```

Console

```
dat1 = [1, 1, 3, 5, 4, 6, 7, 9, 5, 5]
--------------------------------------------------
pow2 = [1, 1, 9, 25, 16, 36, 49, 81, 25, 25]
--------------------------------------------------
even = [2, 2, 4, 6, 4, 6, 8, 10, 6, 6]
```

```
  print("-" * 50);

  var even = dat1.map((n) => (n%2==0)? n : n + 1).toList();
  print("even = $even");
}
```

collection if

```
import 'dart:math';

void main() {
  var rn = Random();
  var student = rn.nextBool();
  var p1 = [
    'Joe',
    if (student) 'Student' else 'Teacher',
    if (student) rn.nextInt(50) + 50,
  ];
  var p2 = [
    'Mary',
    if (student) 'Student' else 'Teacher',
    if (student) rn.nextInt(50) + 50,
  ];

  print("student = $student");
  print("p1 = $p1");
  print("p2 = $p2");
  print("-" * 50);
}
```

Console

```
student = false
p1 = [Joe, Teacher]
p2 = [Mary, Teacher]
------------------------------
```

Console

```
student = true
p1 = [Joe, Student, 80]
p2 = [Mary, Student, 66]
------------------------------
```

collection for

```
void main() {
  List a = [for (var i = 0; i < 10; i++) i];
  List b = [for (var i = 1; i <= 10; i += 2) i];
  List c = [for (var i = 2; i <= 10; i += 2) i];
  List d = [
    for(var i=0; i<30; i++)
      if(i%2==0 && i%3==0) i
  ];

  print("a = $a");
  print("b = $b");
  print("c = $c");
  print("d = $d");
}
```

Console

```
a = [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
b = [1, 3, 5, 7, 9]
c = [2, 4, 6, 8, 10]
d = [0, 6, 12, 18, 24]
```

sort

```
import 'dart:math';

void main() {
  var rn = Random();
  var db = [for(var i=0; i<10; i++) rn.nextInt(100)];

  print("db = $db]\n");
  db.sort();
```

Console

```
db = [14, 28, 52, 84, 69, 3, 65, 46, 22, 94]]

db = [3, 14, 22, 28, 46, 52, 65, 69, 84, 94]]

db = [94, 84, 69, 65, 52, 46, 28, 22, 14, 3]]
```

```
  print("db = $db]\n");
  db.sort((a,b) => b.compareTo(a));
  print("db = $db]\n");
}
```

```
import 'dart:math';

void main() {
  var rn = Random();
  var db = [];
  db.add(['Kiven',rn.nextInt(100)]);
  db.add(['Shawn',rn.nextInt(100)]);
  db.add(['Potter',rn.nextInt(100)]);
  db.add(['Cindy',rn.nextInt(100)]);

  print("db = $db]\n");
  db.sort((a,b) => a[0].compareTo(b[0]));
  print("db = $db]\n");
  db.sort((a,b) => a[1].compareTo(b[1]));
  print("db = $db");
}
```

Console

```
db = [[Kiven, 70], [Shawn, 90], [Potter, 1], [Cindy, 61]]]

db = [[Cindy, 61], [Kiven, 70], [Potter, 1], [Shawn, 90]]]

db = [[Potter, 1], [Cindy, 61], [Kiven, 70], [Shawn, 90]]
```

List of list

Console

```
c = [[2, 0], [0, 5], [4, 0], [4, 1, 5], [1, 2, 3], [2, 3, 3]]

d = [2, 0, 0, 5, 4, 0, 4, 1, 5, 1, 2, 3, 2, 3, 3]
```

```
import 'dart:math';

void main() {
  var rn = Random();
  var a = List.generate(3, (n) => [rn.nextInt(6), rn.nextInt(6)]);
  var b = List.generate(3, (n) => [rn.nextInt(6), rn.nextInt(6), rn.nextInt(6)]);
  var c = a + b;

  print("c = $c\n");
  var d = [];
  for (var x in c) {
    for (var y in x) {
      d.add(y);
    }
  }
  print("d = $d");
}
```

更詳細的操作說明，請參閱『翻轉教室輔助影片』...


該休息了...