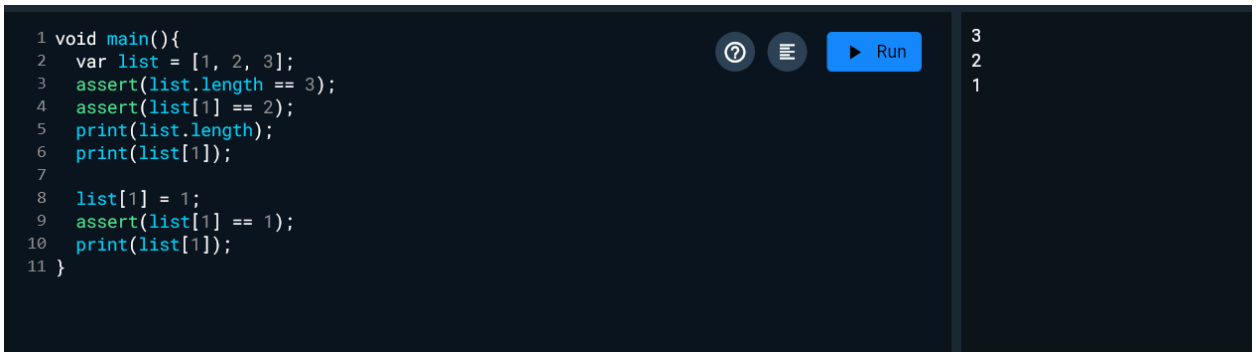
Nama: Ricky Putra Pratama Tedjo
Kelas : TI-3C / 22
NIM : 2241720204

Praktikum 1

Langkah 1

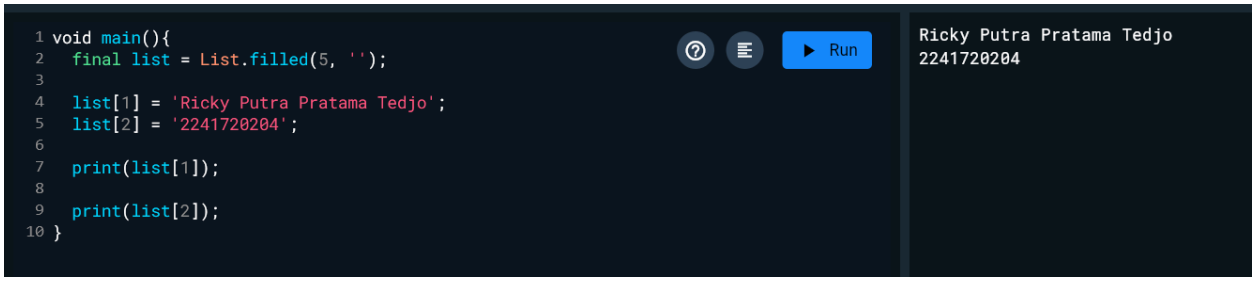


Langkah 2

Panjang array dicetak, setelah itu nilai indeks 1 array dicetak. Kemudian nilai indeks 1 diganti dengan 1 dan dicetak

Langkah 3

Nama dan nim tidak bisa dimasukkan ke dalam variabel yang bertipe null
Diganti menjadi



Praktikum 2

Langkah 1

```
void main(){
  var halogens = {'fluorine', 'chlorine', 'bromine', 'iodine', 'astatine'};
  print(halogens);
}
```

```
{fluorine, chlorine, bromine, iodine, astatine}
```

Langkah 2

Dalam dart, Isi array dapat dicetak langsung tanpa memerlukan looping

Langkah 3

```
void main(){
  var halogens = {'fluorine', 'chlorine', 'bromine', 'iodine', 'astatine'};
  print(halogens);

  var names1 = <String>{};
  Set<String> names2 = {}; // This works, too.
  var names3 = {}; // Creates a map, not a set.

  print(names1);
  print(names2);
  print(names3);
}
```

```
{fluorine, chlorine, bromine, iodine, astatine}
{}
{}
{}
```

Ditambah dengan add dan addall

```
void main(){
  var halogens = {'fluorine', 'chlorine', 'bromine', 'iodine', 'astatine'};
  print(halogens);

  var names1 = <String>{};
  Set<String> names2 = {}; // This works, too.
  var names3 = {}; // Creates a map, not a set.

  names1.addAll(['Ricky putra pratama tedjo','2241720204']);
  names2.add('Ricky Putra Pratama Tedjo');
  names2.add('2241720204');

  print(names1);
  print(names2);
  print(names3);
}
```

```
{fluorine, chlorine, bromine, iodine, astatine}
{Ricky putra pratama tedjo, 2241720204}
{Ricky Putra Pratama Tedjo, 2241720204}
{}
```

Praktikum 3

Langkah 1

Langkah 2

Sama seperti untuk array, dart juga mencetak nilai dan key dari map

Langkah 3

```
  var mhs1 = Map<String, String>();
  gifts['first'] = 'partridge';
  gifts['second'] = 'turtledoves';
  gifts['fifth'] = 'golden rings';
  gifts['nim'] = '2241720204';
  gifts['nama'] = 'Ricky Putra Pratama Tedjo';
  mhs1['nim'] = '2241720204';
  mhs1['nama'] = 'Ricky Putra Pratama Tedjo';

  var mhs2 = Map<int, String>();
  nobleGases[2] = 'helium';
  nobleGases[10] = 'neon';
  nobleGases[18] = 'argon';
  nobleGases[22] ='2241720204';
  nobleGases[23] = 'Ricky Putra Pratama Tedjo';
  mhs2[1] = '2241720204';
  mhs2[2] = 'Ricky Putra Pratama Tedjo';

  print(mhs1);
  print(mhs2);
}
```

Output

```
{first: partridge, second: turtledoves, fifth: 1}
{2: helium, 10: neon, 18: 2}
{nim: 2241720204, nama: Ricky Putra Pratama Tedjo}
{1: 2241720204, 2: Ricky Putra Pratama Tedjo}
```

Praktikum 4

Langkah 1

```
1 void main(){
2   var list = [1, 2, 3];
3   var list2 = [0, ...list];
4   print(list1);
5   print(list2);
6   print(list2.length);
7 }
```

Run

```
compileDDC
main.dart:4:9: Error: Undefined name 'list1'.
  print(list1);
        ^^^^^
```

Langkah 2

List1 belum ada

```
1 void main(){
2   var list = [1, 2, 3];
3   var list2 = [0, ...list];
4   print(list);
5   print(list2);
6   print(list2.length);
7 }
```

Run

```
[1, 2, 3]
[0, 1, 2, 3]
4
```

Langkah 3

```
1 void main(){
2   var list = [1, 2, 3];
3   var list2 = [0, ...list];
4   print(list);
5   print(list2);
6   print(list2.length);
7
8   list1 = [1, 2, null];
9   print(list1);
10  var list3 = [0, ...?list1];
11  print(list3.length);
12 }
```

Run

```
compileDDC
main.dart:8:3: Error: Setter not found: 'list1'.
  list1 = [1, 2, null];
  ^^^^^
main.dart:9:9: Error: Undefined name 'list1'.
  print(list1);
        ^^^^^
main.dart:10:23: Error: Undefined name 'list1'.
  var list3 = [0, ...?list1];
                      ^^^^^
main.dart:10:23: Error: Unexpected type 'invalid-type' of a spread.  Expected
'dynamic' or an Iterable.
  var list3 = [0, ...?list1];
                      ^
```

Deklarasi list1 tidak benar

```
1 void main(){
2   var list = [1, 2, 3];
3   var list2 = [0, ...list];
4   print(list);
5   print(list2);
6   print(list2.length);
7
8   var list1 = [1, 2, null];
9   print(list1);
10  var list3 = [0, ...?list1];
11  print(list3.length);
12 }
```

Run

The receiver can't be null, so the null-aware operator '...?' is unnecessary.

```
[1, 2, 3]
[0, 1, 2, 3]
4
[1, 2, null]
4
```

Setelah ditambahkan nim

```dart
void main(){
  var list = [1, 2, 3];
  var list2 = [0, ...list];
  print(list);
  print(list2);
  print(list2.length);

  var list1 = [1, 2, null];
  print(list1);
  list1.add(2241720204);
  var list3 = [0, ...?list1];
  print(list3.length);
}
```

Run

```
[1, 2, 3]
[0, 1, 2, 3]
4
[1, 2, null]
5
```

Langkah 4

```dart
void main(){
  var list = [1, 2, 3];
  var list2 = [0, ...list];
  print(list);
  print(list2);
  print(list2.length);

  var list1 = [1, 2, null];
  print(list1);
  list1.add(2241720204);
  var list3 = [0, ...?list1];
  print(list3.length);

  var nav = ['Home', 'Furniture', 'Plants', if (promoActive) 'Outlet'];
  print(nav);
}
```

Run

```
compileDDC
main.dart:14:49: Error: Undefined name 'promoActive'.
  var nav = ['Home', 'Furniture', 'Plants', if (promoActive) 'Outlet'];
                                                ^^^^^^^^^^^
```

promoActive belum memiliki nilai

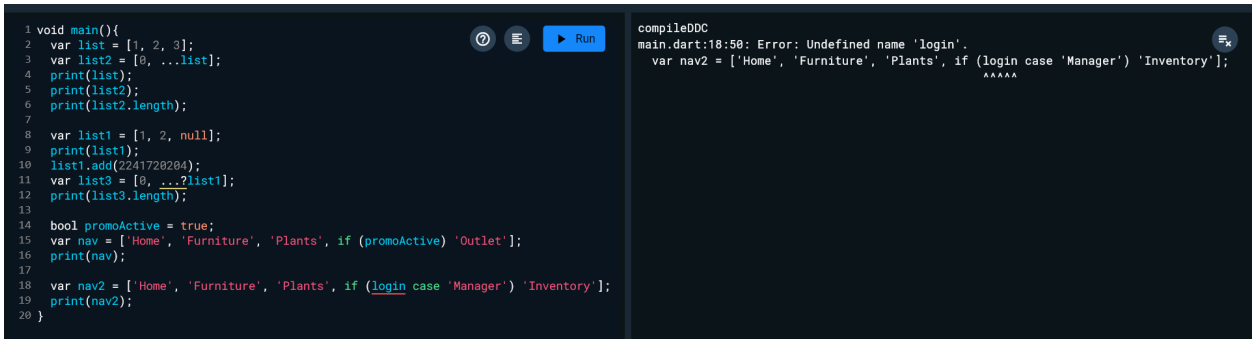
```dart
void main(){
  var list = [1, 2, 3];
  var list2 = [0, ...list];
  print(list);
  print(list2);
  print(list2.length);

  var list1 = [1, 2, null];
  print(list1);
  list1.add(2241720204);
  var list3 = [0, ...?list1];
  print(list3.length);

  bool promoActive = true;
  var nav = ['Home', 'Furniture', 'Plants', if (promoActive) 'Outlet'];
  print(nav);
}
```

Run

```
[1, 2, 3]
[0, 1, 2, 3]
4
[1, 2, null]
5
[Home, Furniture, Plants, Outlet]
```

Jika promoactive bernilai true, maka outlet ikut tercetak

Langkah 5



```
void main(){
  var list = [1, 2, 3];
  var list2 = [0, ...list];
  print(list);
  print(list2);
  print(list2.length);

  var list1 = [1, 2, null];
  print(list1);
  list1.add(224172020 4);
  var list3 = [0, ...?list1];
  print(list3.length);

  bool promoActive = true;
  var nav = ['Home', 'Furniture', 'Plants', if (promoActive) 'Outlet'];
  print(nav);

  var nav2 = ['Home', 'Furniture', 'Plants', if (login case 'Manager') 'Inventory'];
  print(nav2);
}
```

```
compileDDC
main.dart:18:50: Error: Undefined name 'login'.
  var nav2 = ['Home', 'Furniture', 'Plants', if (login case 'Manager') 'Inventory'];
                                                 ^^^^^
```

Login belum memiliki nilai

```
void main(){
  var list = [1, 2, 3];
  var list2 = [0, ...list];
  print(list);
  print(list2);
  print(list2.length);

  var list1 = [1, 2, null];
  print(list1);
  list1.add(2241720204);
  var list3 = [0, ...?list1];
  print(list3.length);

  bool promoActive = true;
  var nav = ['Home', 'Furniture', 'Plants', if (promoActive) 'Outlet'];
  print(nav);

  String login = 'Manager';
  var nav2 = ['Home', 'Furniture', 'Plants', if (login case 'Manager') 'Inventory'];
  print(nav2);
}
```

```
[1, 2, 3]
[0, 1, 2, 3]
4
[1, 2, null]
5
[Home, Furniture, Plants, Outlet]
[Home, Furniture, Plants, Inventory]
```

Jika login bernilai manager, inventory tercetak

Langkah 6

```
void main(){
  var list = [1, 2, 3];
  var list2 = [0, ...list];
  print(list);
  print(list2);
  print(list2.length);

  var list1 = [1, 2, null];
  print(list1);
  list1.add(2241720204);
  var list3 = [0, ...?list1];
  print(list3.length);

  bool promoActive = true;
  var nav = ['Home', 'Furniture', 'Plants', if (promoActive) 'Outlet'];
  print(nav);

  String login = 'Manager';
  var nav2 = ['Home', 'Furniture', 'Plants', if (login case 'Manager') 'Inventory'];
  print(nav2);

  var listOfInts = [1, 2, 3];
  var listOfStrings = ['#0', for (var i in listOfInts) '#$i'];
  assert(listOfStrings[1] == '#1');
  print(listOfStrings);
}
```

```
[1, 2, 3]
[0, 1, 2, 3]
4
[1, 2, null]
5
[Home, Furniture, Plants, Outlet]
[Home, Furniture, Plants, Inventory]
[#0, #1, #2, #3]
```

Collection for digunakan untuk membuat perulangan dalam sebuah collection

Praktikum 5

Langkah 1

```
1 void main(){
2   var record = ('first', a: 2, b: true, 'last');
3   print(record)
4 }
5
```

Run

```
compileDDC
main.dart:3:15: Error: Expected ';' after this.
  print(record)
              ^
```

Langkah 2

Line ke 3 tidak diakhiri semicolon

```
1 void main(){
2   var record = ('first', a: 2, b: true, 'last');
3   print(record);
4 }
5
```

Run

```
(first, last, a: 2, b: true)
```

Langkah 3

```
1 (int, int) tukar((int, int) record) {
2   var (a, b) = record;
3   return (b, a);
4   }
5
6 void main(){
7   var record = ('first', a: 2, b: true, 'last');
8   print(record);
9
10 }
11
```

Run

```
(first, last, a: 2, b: true)
```

Fungsi tidak digunakan didalam main

```
1 (bool, int) tukar((int, bool) record) {
2   var (a, b) = record;
3   return (b, a);
4   }
5
6 void main(){
7   var record = ('first', a: 2, b: true, 'last');
8   print(record);
9   tukar((record.a, record.b));
10
11
12 }
13
```

Run

```
(first, last, a: 2, b: true)
```

Langkah 4

```
(bool, int) tukar((int, bool) record) {
  var (a, b) = record;
  return (b, a);
  }

void main(){
  var record = ('first', a: 2, b: true, 'last');
  print(record);
  tukar((record.a, record.b));

  (String, int) mahasiswa;
  print(mahasiswa);
}
```

```
compileDDC
main.dart:12:9: Error: Non-nullable variable 'mahasiswa' must be assigned before i
can be used.
  print(mahasiswa);
        ^^^^^^^^^
```

Mahasiswa belum memiliki nilai

```
(bool, int) tukar((int, bool) record) {
  var (a, b) = record;
  return (b, a);
  }

void main(){
  var record = ('first', a: 2, b: true, 'last');
  print(record);
  tukar((record.a, record.b));

  (String, int) mahasiswa = ('Ricky Putra Pratama Tedjo',2241720204);
  print(mahasiswa);
}
```

```
(first, last, a: 2, b: true)
(Ricky Putra Pratama Tedjo, 2241720204)
```

Langkah 5

```
(bool, int) tukar((int, bool) record) {
  var (a, b) = record;
  return (b, a);
  }

void main(){
  var record = ('first', a: 2, b: true, 'last');
  print(record);
  tukar((record.a, record.b));

  (String, int) mahasiswa = ('Ricky Putra Pratama Tedjo',2241720204);
  print(mahasiswa);

  var mahasiswa2 = ('first', a: 2, b: true, 'last');

  print(mahasiswa2.$1); // Prints 'first'
  print(mahasiswa2.a); // Prints 2
  print(mahasiswa2.b); // Prints true
  print(mahasiswa2.$2); // Prints 'last'
}
```

```
(first, last, a: 2, b: true)
(Ricky Putra Pratama Tedjo, 2241720204)
first
2
true
last
```

Tugas Praktikum

2. Sebuah potongan kode yang menjalankan sebuah task tertentu
3.

```dart
// positional parameters
void greet(String name, int age) {}

// Named Parameters
void enableFlags({bool? bold, bool? hidden}) {}
```

Positional : parameter yang harus diisi dengan posisi argumen yang benar
Named : parameter yang diberikan dengan nama, bukan posisi

4.
Function dipanggil sebagai parameter untuk function lain

```dart
void printElement(int element) {
  print(element);
}



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

  list.forEach(printElement);
}
```

5.
Function yang tidak memiliki nama

```dart
var multiply = (int a, int b) {
  return a * b;
};


void main(){
  print(multiply(3, 4)); // Output: 12
}
```

6.

Lexical scope adalah aturan tentang bagaimana variabel di dalam sebuah program bisa diakses berdasarkan lokasi atau konteks di mana variabel tersebut dideklarasikan.

```
void outerFunction() {
  var outerVar = 'I am outside';

  void innerFunction() {
    var innerVar = 'I am inside';
    print(outerVar); // Bisa mengakses outerVar
    print(innerVar); // Bisa mengakses innerVar
  }

  innerFunction();
  // print(innerVar); // Error, tidak bisa mengakses innerVar dari luar
}
```

Closures adalah fungsi yang mengingat lingkungan tempat fungsi tersebut didefinisikan, meskipun fungsi tersebut dipanggil di luar lingkup awalnya.

```
Function outerFunction() {
  var message = 'Hello, Dart!';

  // Mengembalikan fungsi anonimus (closure)
  return () {
    print(message);
  };
}

void main() {
  var myClosure = outerFunction();
  myClosure(); // Output: Hello, Dart!
}
```

7.

```
1 (String, int) foo(){
2   return ('ABC',4);
3 }
4 void main() {
5   print(foo());
6 }
```

Run

```
(ABC, 4)
```