Using Map in Dart (Normal & JSON Parsing)

📌 Using `Map` in Dart (Normal & JSON Parsing)

A `Map` in Dart is a collection of key-value pairs, similar to a dictionary in Python or an object in JavaScript. It allows efficient lookups, insertions, and deletions, typically in **O(1) time complexity**.

1️⃣ Creating and Using a Normal `Map` in Dart

```
dart
CopyEdit
void main() {
  // Define a Map
  Map<String, int> studentScores = {
    'Alice': 85,
    'Bob': 92,
    'Charlie': 78
  };

  // Access a value by key
  print(studentScores['Bob']); // Output: 92

  // Add a new key-value pair
  studentScores['David'] = 88;

  // Update a value
  studentScores['Alice'] = 90;

  // Remove a key-value pair
  studentScores.remove('Charlie');

  // Iterate over the Map
  studentScores.forEach((key, value) {
    print('$key scored $value');
  });

  // Check if a key exists
  print(studentScores.containsKey('Alice')); // Output: true

  // Get all keys and values
  print(studentScores.keys);   // Output: (Alice, Bob, David)
  print(studentScores.values); // Output: (90, 92, 88)
}
```

2️⃣ Converting a `Map` to JSON in Dart

Dart provides the `dart:convert` library to **convert a Map into a JSON string**.

```
dart
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import 'dart:convert';

void main() {
  Map<String, dynamic> student = {
    'name': 'Alice',
    'age': 20,
    'scores': {'math': 85, 'science': 90}
  };

  // Convert Map to JSON string
  String jsonString = jsonEncode(student);
  print(jsonString);
  // Output: {"name":"Alice","age":20,"scores":{"math":85,"science":90}}
}
```

3️⃣ Fetching Data from JSON (Parsing JSON into a Map)

```
dart
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import 'dart:convert';

void main() {
  // Sample JSON String
  String jsonData = '{"name": "Alice", "age": 20, "city": "New York"}';

  // Convert JSON String to Map
  Map<String, dynamic> user = jsonDecode(jsonData);

  // Access values
  print(user['name']); // Output: Alice
  print(user['age']);  // Output: 20
}
```

4️⃣ Fetching JSON with a List of Objects

If your JSON contains a **list of objects**, parse it into a `List<Map<String, dynamic>>`.

```
dart
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import 'dart:convert';

void main() {
```

```
  String jsonData = '''
  [
    {"id": 1, "name": "Alice"},
    {"id": 2, "name": "Bob"}
  ]
  ''';

  // Convert JSON String to List of Maps
  List<dynamic> users = jsonDecode(jsonData);

  // Iterate through the List
  for (var user in users) {
    print('${user['id']} - ${user['name']}');
  }
}
```

Output:

```
CopyEdit
1 - Alice
2 - Bob
```

5️⃣ Converting JSON to a Dart Model Class

Instead of using a raw `Map`, you can **convert JSON into a Dart object**.

Step 1: Create a Dart Model Class

```
dart
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class User {
  String name;
  int age;

  // Constructor
  User({required this.name, required this.age});

  // Factory constructor to convert JSON to User object
  factory User.fromJson(Map<String, dynamic> json) {
    return User(
      name: json['name'],
      age: json['age'],
    );
  }

  // Convert User object to JSON
  Map<String, dynamic> toJson() {
    return {
      'name': name,
      'age': age,
```

```
    };
  }
}
```

Step 2: Convert JSON to Dart Object

```
dart
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import 'dart:convert';

void main() {
  String jsonData = '{"name": "Alice", "age": 20}';

  // Convert JSON to Dart Object
  Map<String, dynamic> userMap = jsonDecode(jsonData);
  User user = User.fromJson(userMap);

  print(user.name); // Output: Alice
  print(user.age);  // Output: 20

  // Convert Dart Object to JSON
  String jsonString = jsonEncode(user.toJson());
  print(jsonString); // Output: {"name":"Alice","age":20}
}
```

6️⃣ Fetch JSON from API in Flutter (Using `http` Package)

To fetch JSON data from an **API**, use the `http` package.

📌 **Install the `http` package:** Run this in the terminal:

```
csharp
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flutter pub add http
```

📌 Fetch JSON from API Example:

```
dart
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import 'dart:convert';
import 'package:http/http.dart' as http;

void fetchUserData() async {
  final response = await http.get(Uri.parse('https://jsonplaceholder.typicode.com/users/1'));

  if (response.statusCode == 200) {
    Map<String, dynamic> userData = jsonDecode(response.body);
    print('User Name: ${userData['name']}');
  } else {
    print('Failed to load data');
```

```
  }
}

void main() {
  fetchUserData();
}
```

📌 Summary

Task	Code Example
Create and use a normal Map	✅ `Map<String, int> myMap = {...};`
Convert Map to JSON	✅ `jsonEncode(myMap);`
Parse JSON into a Dart Map	✅ `jsonDecode(jsonString);`
Handle List of JSON objects	✅ `List<dynamic> data = jsonDecode(jsonList);`
Use Dart Model for JSON conversion	✅ `User.fromJson(jsonMap);`
Fetch JSON from an API	✅ `http.get(Uri.parse(url));`