Problem Statement: JSON Structure Verification

Your task is to implement a robust JSON structure verification function in Dart. The goal is to ensure that a given JSON data adheres to a predefined structure. The structure is defined using a template that specifies the expected properties, their types, and other constraints.

Template Structure

The template is a nested map where each key represents a property in the JSON data. The corresponding value is another map that includes the following information:

- required: a boolean indicating whether the property is required.
- value: the expected type or structure of the property.

Verification Rules

Property Existence: If a property is marked as required in the template but is missing in the JSON data, raise a JSONVerificationError with error code 1001 and message "$key is required, but missing.".
Type Mismatch: If a property exists in the JSON data but its type does not match the expected type in the template, raise a JSONVerificationError with error code 1002 and message "$key should be of type ${expectedProperty['value'].runtimeType}.".
Nested Structure Verification: If a property's expected value is a nested structure (map), recursively apply the verification function to that property.
Array Verification:

- If the property's expected value is an array, check if the corresponding property in the JSON data is also an array. If not, raise a JSONVerificationError with error code 1002 and message "$key should be an array.".
- Check the length of the array against the specified max and min values (if provided in the template).
- For each element in the array, recursively apply the verification function to ensure its structure matches the expected structure.

Error Codes and Messages

- 1001: Missing Property Error
  - Message: "$key is required, but missing."
  - Description: Indicates that a required property specified in the template is missing in the JSON data.
- 1002: Invalid Property Type Error
  - Message: "$key should be of type …."
  - Description: Indicates that a property exists in the JSON data, but its type does not match the expected type specified in the template.
- 1003: Invalid Property Structure Error
  - Message: "$key is invalid. ${error.message}"

        - Description: Indicates that a property's value is expected to have a specific structure (nested map), but the structure verification fails.
- 1004: Invalid Array Max Length Error
    - Message: "$key should have at most ${expectedProperty['max']} elements."
    - Description: Indicates that an array property in the JSON data has more elements than the specified maximum allowed in the template.
- 1005: Invalid Array Min Length Error
    - Message: "$key should have at least ${expectedProperty['min']} elements."
    - Description: Indicates that an array property in the JSON data has fewer elements than the specified minimum allowed in the template.
- 1006: Invalid Array Element Error
    - Message: "$key[$i] contains invalid elements. ${error.message}"
    - Description: Indicates that an element within an array property in the JSON data does not match the expected structure.

Example Usage

```
const expectedStructure = {
  'course': {
    'required': true,
    'value': {
      'name': {'required': true, 'value': ''},
      'instructor': {'required': true, 'value': ''},
      'duration': {'required': true, 'value': 0},
      'students': {
        'required': true,
        'min': 5,
        'value': [
          {'name': {'required': true, 'value': ''}, 'age': {'required': true, 'value': 0}}
        ],
      },
      'lessons': {
        'required': true,
        'min': 5,
        'value': [
          {'title': {'required': true, 'value': ''}, 'duration': {'required': true, 'value': 0}}
        ],
      },
      'isPremium': {'required': true, 'value': false}
    },
  },
  'category': {'required': true, 'value': ''},
```

```
  'language': {'required': true, 'value': ''},
};

const jsonData =
  {
    "course": {
      "name": "Introduction to JavaScript",
      "instructor": "John Doe",
      "duration":30,
      "students": [
        {
          "name": "Alice",
          "age": 25
        },
        {
          "name": "Bob",
          "age": 28
        }
      ],
      "lessons": [
        {
          "title": "Getting Started",
          "duration": 10
        },
        {
          "title": "Variables and Data Types",
          "duration": 15
        },
        {
          "title": "Functions",
          "duration": 20
        }
      ],
      "isPremium": true
    },
    "category": "Programming",
    "language": "English"
  };
```

Starter Code

```
class JSONVerificationError implements Exception {
  final int errorCode;
  final String errorType;
  final String message;
```

```
  JSONVerificationError(this.errorCode, this.errorType, this.message);
}

void verifyJson(String jsonData, Map<String, dynamic> expectedStructure) {
//Your code goes here
}


//Code Testing
void main() {
  const jsonData = '''
    {
      "course": {
        "name": "Introduction to JavaScript",
        "instructor": "John Doe",
        "duration":30,
        "students": [
          {
            "name": "Alice",
            "age": 25
          },
          {
            "name": "Bob",
            "age": 28
          }
        ],
        "lessons": [
          {
            "title": "Getting Started",
            "duration": 10
          },
          {
            "title": "Variables and Data Types",
            "duration": 15
          },
          {
            "title": "Functions",
            "duration": 20
          }
        ],
        "isPremium": true
      },
      "category": "Programming",
```

```
    "language": "English"
  }
}
''';

const expectedStructure = {
  'course': {
    'required': true,
    'value': {
      'name': {'required': true, 'value': ''},
      'instructor': {'required': true, 'value': ''},
      'duration': {'required': true, 'value': 0},
      'students': {
        'required': true,
        'min': 5,
        'value': [
          {'name': {'required': true, 'value': ''}, 'age': {'required': true, 'value': 0}}
        ],
      },
      'lessons': {
        'required': true,
        'min': 5,
        'value': [
          {'title': {'required': true, 'value': ''}, 'duration': {'required': true, 'value': 0}}
        ],
      },
      'isPremium': {'required': true, 'value': false}
    },
  },
  'category': {'required': true, 'value': ''},
  'language': {'required': true, 'value': ''},
};

try {
  verifyJson(jsonData, expectedStructure);
  print('Valid');
} catch (e) {
  print((e as JSONVerificationError).message);
}
}
```