Dungeons & Dragons Game State Manager

Coding Standards

Developed for Retro Rabbit by Optimize Prime

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Introduction

This is a document that enumerates and explains the various coding standards followed by the team Optimize Prime. These standards ensure for readable and consistent code that is essential for group programming. For our project we chose a new emerging technology to develop our app with: Flutter. Flutter uses a new OOP language developed by Google for their internal projects - Dart.

1. Detailed System Design

2. Coding Conventions

Flutters framework works with a very modular ‘plug-and-build’ approach in the form of Widgets. Widgets are at the core of the Flutter framework and everything that is built or displayed is a Widget. Widgets all perform different operations and influence the Widgets that are nested within them. Using this top-down tree like approach where Widgets plug into and hold each other we can achieve any and all operations and UI designs that would be possible on either android or iOS.

Using these Widgets has a variety of benefits for performance. This is because only Widgets that have changed visually are redrawn if they are still visible on the screen. We have the design option between either a Stateless Widget or a Stateful Widget. The later being able to update itself on request, with the Stateless having to be redrawn. By using these two types intelligently and correctly we are able to streamline the efficiency of our app with regards to rendering and drawing it on the screen.

Naming Conventions:

- In Dart there is a standardized naming convention, and we intend to follow it to prevent ambiguity or going against the general feel of the langage.
- Variables use lowerCamelCase while methods and functions use UpperCamelCase.
- Encapsulation and class-object variable and method scoping is built into the naming of the variables or methods. For instance if you want a field to be private, it needs to start with an underscore: ‘_exampleVar’ .

Layout Rules:

- In Dart and specifically Flutter, your code can quickly become longer horizontally than your screen or workspace due to the amount of tabbing that arises from the use of embedding Widgets inside each other. Meaning it often leads to unstructured-looking or unfriendly code. As such we take steps to ensure our code still adheres to the Flutter and Dart structures while remaining easy to read and understand.

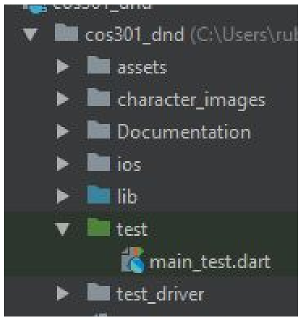
- When code has grown too far horizontally we extract it as a new Widget Object and simply plug that into the code to reduce the clutter.
- Stateful Widgets are essentially a Stateless Widget that manages States, making it Stateful, the states are net strictly encapsulated and as such must always be kept together in code to prevent confusion or misunderstanding.
- We have a Singleton AppData class that we use to transfer data around our app without losing it or having to re-fetch it on every new screen. This class has a strict Static only policy and it has been made a singleton to enforce zero duplication as this could have disastrous results.
- Apart from these rules we make use of general coding standards as explained below for spacing etc.

Commenting Practices:

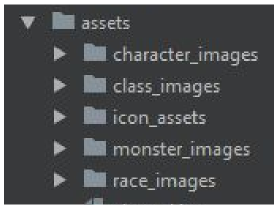
- Whenever a new Widget is created, its purpose should be briefly commented.
- Whenever a member has implemented a new feature or a new way of doing something, as we are learning all the time due this being a new framework using a new language, we expect them to briefly comment how it works and why they did it.
- When a member feels what they have done might not be intuitive to read and understand it should be briefly explained in comments.
- Each file should have a comment header at the top explaining what should be in the file, to ensure we encapsulated our code correctly and for good practice.
- In regards to commenting we follow good practices as described below.

3. File Structure

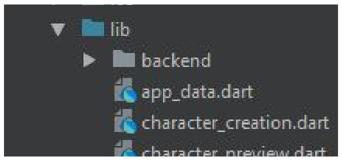
Front end:



The file structure of the front end is shown on the left.
Assets is the resources that the application requires. It mostly consists of images and is shown on the right.
Documentation is where artifacts relating to the documentation of the product is stored.

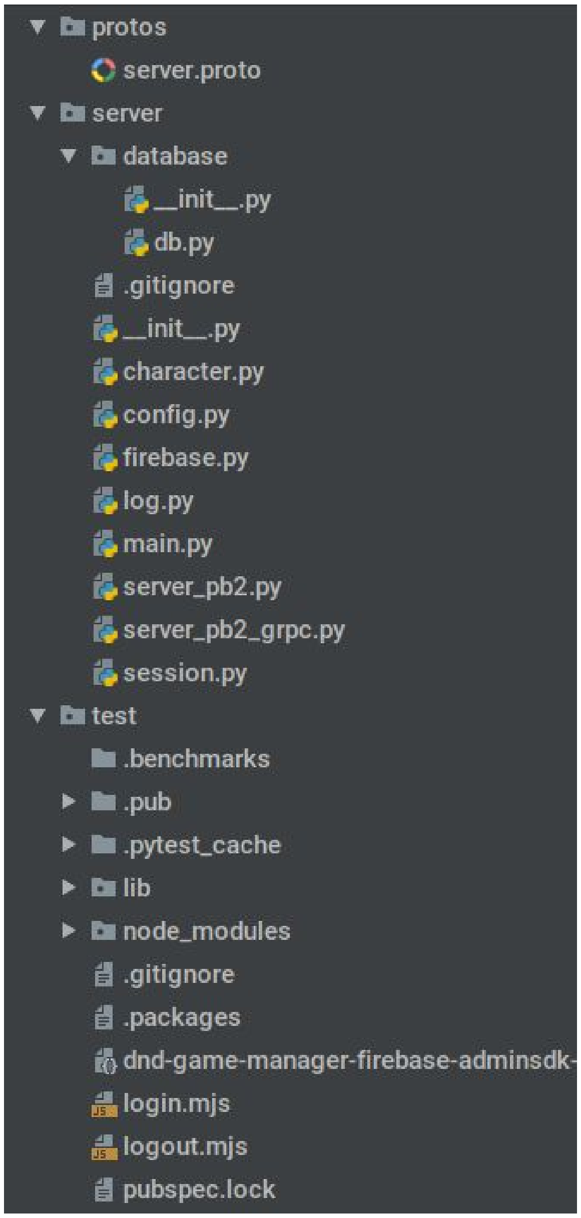


Lib (shown right) is where the source code of the product is stored. Lib is has a folder called backend that contains code that integrates



with the backend of the product. App_data.dart contains global information about the instance of the app.

Back end:



```
▼ protos
      server.proto
▼ server
   ▼ database
         __init__.py
         db.py
      .gitignore
      __init__.py
      character.py
      config.py
      firebase.py
      log.py
      main.py
      server_pb2.py
      server_pb2_grpc.py
      session.py
▼ test
      .benchmarks
   ▶ .pub
   ▶ .pytest_cache
   ▶ lib
   ▶ node_modules
      .gitignore
      .packages
      dnd-game-manager-firebase-adminsdk-
      login.mjs
      logout.mjs
      pubspec.lock
```

The back end file structure is shown above. The main application is inside the server directory. The database directory contains the database ORM functions and objects. The test directory contains all the testing code. The lib directory inside the test directory contains the back end library for the Android app to communicate with the server.

4. Code Review Process

General Coding Standards

Spacing and blank lines

Blank lines should be used to separate code in the same way as it is used in an essay to separate paragraphs. Statements that contribute to the same concept should be seen as a paragraph.

When a control statement like an “if” or “for” is followed by braces, there must be a space between the statement and the braces. These statements should also be preceded and followed by a blank line.

Function and class declarations and implementations should be preceded and followed by a blank line.

A space should follow each comma when parameters that are comma separated.

Variable declarations should be grouped together in the same paragraph.

Indentation

Lines are always indented when an open brace takes place. The lines stay indented until the closing brace is reached or another open brace takes place in which case the line is indented again.

Conditional Branching

An else statement is placed underneath the closing brace of an if statement. If the else is followed by an if, the if should take place on the same line with a space separating the if and the else.

Example:

```
if () {
}
```

```
else if () {
}
```

Braces

Open braces are placed next to the declaration and closing braces are placed underneath the declaration.

.

Example:

```
if () {
}

for (int i = 0; i < num; i++) {
}
```

Comments

Class, method and function declarations must be preceded by a description that will assist fellow developers in understanding the declaration. In the case of a method or function declaration, the description should explain the purposes of all parameters, what the function does and what it returns if it has a return statement.

Inline comments should be used where applicable. Usually above a group of statements that perform tasks that contribute to the same concept.

Variable declarations should be preceded by comments.

“//” is used for all comments.

Variable Declarations

Variables are declared in the Camel Case style and the name should explain what the variable is meant for. The names should not be too long.

Example:

```
int myNumber;
```

Classes and Methods

Classes are declared in the Pascal Case style while methods are declared in the Camel Case style and their names should explain what they are meant for.

Example:
```
class  BigDog {
      void barkLoud() {
      }
};
```

Line Length

Lines should not exceed the standard width of an A4 page. If a call to a function for example would violate this rule, parameters should be placed on separate lines and braces follow the rules of braces mentioned above.

Example:
```
veryLongFunctionCall(
      Parameter1,
      Parameter2
);
```

Efficiency vs Readability

It is more important that collaborators can understand each others code rather than it being efficient.

Object-Oriented vs Procedural

We follow the principles of Object-Oriented programming.

High Cohesion

We keep classes and functions that contribute to the same thing together in the same file.