

# **CS6.401 Software Engineering Spring 2024**

## **Project- 1 Report (Bonus Task)**

### **Team 23**

#### **Team Members:**

<b>Name</b>	<b>Roll Number</b>
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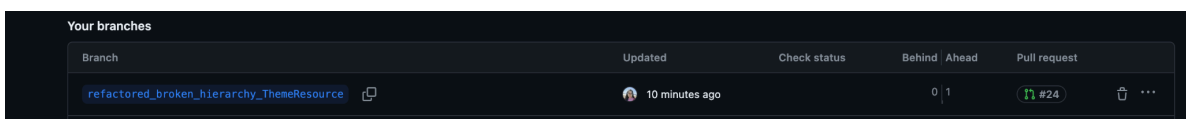
# Bonus Task: Automated Refactoring Pipeline

## Note:

- The task is implemented for a specific file instead of the entire repository considering the limitations of API usage (for GPT-3.50) imposed by openAI.
- Bonus task Python file path: [branch] bonus -> bonus\_task -> bonus.ipynb

## Procedure

- **Step 1: New branch creation in github**



- **Step 2: Automated Design Smell Detection and Refactoring**

- Using the OpenAI API, detected the design smells by giving specific prompts to the LLM.
- The code was refactored by utilizing the LLM, by providing prompts to do so.
- Input File content provided to LLM:

```
20 @Path("/theme")
21 public class ThemeResource extends BaseResource {
22     /**
23      * Returns the list of all themes.
24      *
25      * @return Response
26      * @throws JSONException
27      */
28     @GET
29     @Produces(MediaType.APPLICATION_JSON)
30     public Response list() throws JSONException {
31         ThemeDao themeDao = new ThemeDao();
32         List<String> themeList = themeDao.findAll();
33         JSONObject response = new JSONObject();
34         List<JSONObject> items = new ArrayList<>();
35         for (String theme : themeList) {
36             JSONObject item = new JSONObject();
37             item.put("id", theme);
38             items.add(item);
39         }
40         response.put("themes", items);
41         return Response.ok().entity(response).build();
42     }
43 }
```

- ```
In [5]: 1 t1 = detect_broken_hierarchy(code_sample)

In [6]: 1 print(t1)

ChatCompletion(id='chatcmpl-8vRjTQ8jKV0fCWxRjDbkukNVf8a9n', choices=[Choice(finish_reason='stop', index=0, logprobs=None, message=ChatCompletionMessage(content='In the given code, the ThemeResource class extends BaseResource but does not use any of its methods. This indicates a broken hierarchy smell.\n\nTo refactor the code and remove the broken hierarchy smell, we can remove the inheritance from BaseResource if it is not needed. If there are common methods that need to be shared between ThemeResource and other resources, those methods can be extracted into a separate class and used as a composition instead of inheritance.\n\nRefactored code:\n```java\npackage com.sismics.books.rest.resources;\n\nimport com.sismics.books.core.dao.file.ThemeDao;\nimport org.codehaus.jettison.json.JSONException;\nimport org.codehaus.jettison.json.JSONObject;\nimport javax.ws.rs.GET;\nimport javax.ws.rs.Path;\nimport javax.ws.rs.Produces;\nimport javax.ws.rs.core.MediaType;\nimport javax.ws.rs.core.Response;\nimport java.util.ArrayList;\nimport java.util.List;\n\n/**\n * Theme REST resources.\n */\n * @author jtremaux\n */\n@Path("/theme")\npublic class ThemeResource {\n\n    /**\n     * Returns the list of all themes.\n     */\n    * @return Response\n     */\n    * @throws JSONException\n     */\n    * @GET\n     * @Produces(MediaType.APPLICATION_JSON)\n     public Response list() throws JSONException {\n\n        ThemeDao themeDao = new ThemeDao();\n        List<String> themeList = themeDao.findAll();\n\n        JSONObject response = new JSONObject();\n        List<JSONObject> items = new ArrayList<>();\n        for (String theme : themeList) {\n            JSONObject item = new JSONObject();\n            item.put("id", theme);\n            items.add(item);\n        }\n        response.put("themes", items);\n        return Response.ok().entity(response).build();\n    }\n\n    /**\n     * role='assistant', function_call=None, tool_calls=None)\n    ]], created=1708700405, model='gpt-3.5-turbo-0125', object='chat.completion', system_fingerprint='fp_cdbd91ce3f', usage=CompletionUsage(completion_tokens=343, prompt_tokens=312, total_tokens=655))
```

- 1 commit

1 file changed

1 contributor

Commits on Feb 23, 2024

Update books-web/src/main/java/com/sismics/books/rest/resource/ThemeR...

ea93a22

<>

MadhusreeBera

committed 11 minutes ago

Showing 1 changed file with 1 addition and 1 deletion.

Split Unified

books-web/src/main/java/com/sismics/books/rest/resource/ThemeResource.java

@@ -18,7 +18,7 @@

18 \* @author jtremaux

19 \*/

20 @Path("/theme")

21 - public class ThemeResource implements IResource{

22 /\*\*

23 \* Returns the list of all themes.

24 \*

18 \* @author jtremaux

19 \*/

20 @Path("/theme")



21 + public class ThemeResource {


22 /\*\*


23 \* Returns the list of all themes.


24 \*


- # Fixed Broken Hierarchy in ThemeResource.java #24


 Open MadhusreeBera wants to merge 1 commit into [bonus](#) from [refactored\\_broken\\_hierarchy\\_ThemeResource](#) 

 Conversation **0**

 Commits **1**


 Checks **0**


 Files changed **1**





**MadhusreeBera** commented 13 minutes ago


Solution given by ChatGPT







 Update `books-web/src/main/java/com/sismics/books/rest/resource/ThemeR...`



ea93a22

## **Tools and Technologies Used**

- **GitHub API:** For accessing and monitoring GitHub repositories.
- **Language Models:** Utilize LLMs for design smell detection and refactoring.
- **Python:** Use Python for scripting and interacting with APIs.

## **Summary**

The automated pipeline scans the code file, utilizes LLMs for design smell detection and refactoring, and generates pull requests.