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**Code Review of ‘Text Editor’ (210210, 210223)**

**Code Reviews:**

1. **Code smells:**
2. **Incomplete error handling:**

**import** tkinter **as** tk

**from** tkinter **import** filedialog,messagebox

**import** GUI

**def** **AutoSave**(master: GUI.App):

**def** **inner\_function**(event=None):

**if**(master.autoSave == False): **return**

content=master.main\_text\_box.get('1.0',tk.END)

# print(content)

**if** (master.file\_path==''):

print("No file path was given")

**return**

print(master.file\_path)

**with** open(master.file\_path,'w') **as** fw:

fw.write(content)

**return** inner\_function;

The problem with the code is that it doesn’t handle the error properly. There can occur attribute error, value error, IO error.

**Improved error handling:**

**import** tkinter **as** tk

**from** tkinter import **messagebox**

**import** GUI

**def AutoSave**(master: GUI.App):

**def** **inner\_function**(event=None):

**try:**

**if** not getattr(master, 'autoSave', False):

messagebox.showinfo("AutoSave", "AutoSave is disabled")

**save\_content**(master)

**except** Exception **as** e:

messagebox.showerror("AutoSave Error", str(e))

**def** **save\_content**(master):

content = master.main\_text\_box.get('1.0', tk.END)

**if** not master.file\_path:

raise ValueError("No file path was given")

**with** open(master.file\_path, 'w') as fw:

fw.write(content)

**return** inner\_function

The modified AutoSave function with improved error handling can handle various types of errors that may occur during its execution. Some of the potential errors that it addresses include:

1. **AttributeError:** If **master** does not have the attribute **autoSave**, it will not raise an **AttributeError** but will show an info messagebox indicating that **AutoSave is disabled.**

2. **ValueError:** If **master.file**\_path is empty or not set, it will raise a **ValueError**, indicating that **no file path was given**.

3. **IOError:** If there are any issues with opening or writing to the file, such as file permission errors or file not found errors, they would typically be caught by the **open** function and raised as **IOError**.

4. **Any other Exception:** If any other unexpected errors occur during the execution of the function, they will be caught by the generic **except Exception** clause and shown in a messagebox as an error message. This provides a catch-all mechanism to handle unforeseen exceptions and inform the user about the issue.

1. **Large or Complex Methods:**

import tkinter as tk

from tkinter import scrolledtext

import utils

class App(tk.Tk):

def \_\_init\_\_(self, \*args, \*\*kwargs):

super().\_\_init\_\_(\*args, \*\*kwargs)

self.file\_path: str = ""

self.content: str = ""

self.isSaved: bool = False;

self.isEdited:bool = False;

self.autoSave:bool = False

self.title("Text Editor")

self.option\_add("\*Font",'aerial 13')

self.geometry("700x500")

self.menu\_bar = tk.Menu(master=self)

self.menu\_item\_File = tk.Menu(self.menu\_bar,tearoff=0)

self.menu\_item\_Edit = tk.Menu(self.menu\_bar,tearoff=0)

self.menu\_bar.add\_cascade(label="File",menu=self.menu\_item\_File)

self.menu\_bar.add\_cascade(label="Edit",menu=self.menu\_item\_Edit)

self.config(menu=self.menu\_bar)

## Find all

self.find\_frame = tk.Frame(master=self)

self.find\_frame.pack()

self.find\_text\_label = tk.Label(master=self.find\_frame,text='Search: ')

self.find\_text\_entry = tk.Entry(master=self.find\_frame)

self.find\_text\_btn = tk.Button(master=self.find\_frame,

text="Find All Occurances",

command=utils.FindAll(master=self)

)

self.find\_text\_label.grid(row=0,column=0,pady=2)

self.find\_text\_entry.grid(row=0,column=1,columnspan=2,pady=2)

self.find\_text\_btn.grid(row=0,column=3,pady=2,padx=8)

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## Replace all

self.replace\_frame = tk.Frame(master=self)

self.replace\_frame.pack()

self.replace\_text\_label = tk.Label(master=self.replace\_frame,text='replace: ')

self.replace\_text\_entry = tk.Entry(master=self.replace\_frame)

self.replace\_text\_btn = tk.Button(master=self.replace\_frame,

text="replace All Occurances",

command=utils.ReplaceAll(master=self)

)

self.replace\_text\_label.grid(row=0,column=0,pady=2)

self.replace\_text\_entry.grid(row=0,column=1,columnspan=2,pady=2)

self.replace\_text\_btn.grid(row=0,column=3,pady=2,padx=8)

## Text Box

self.main\_text\_box = scrolledtext.ScrolledText(master=self,undo=True)

self.main\_text\_box.pack(padx=10,pady=10,expand='yes',fill='both')

self.menu\_item\_File.add\_command(label="Open",

command=utils.Open(master=self),

accelerator="Ctrl+O".rjust(15),

)

self.menu\_item\_File.add\_command(label="Save As",

command=utils.SaveAs(master=self),

accelerator="Ctrl+Shift+S".rjust(15),

)

self.menu\_item\_File.add\_command(label="Save",

command=utils.Save(master=self),

accelerator="Ctrl+S".rjust(15),

)

self.menu\_item\_File.add\_command(label="Exit",

command=utils.Exit(master=self),

accelerator="Ctrl+Shift+X".rjust(15),

)

self.menu\_item\_Edit.add\_command(label="Copy All",

command=utils.CopyAll(master=self),

accelerator="Ctrl+Shift+C".rjust(15),

)

self.menu\_item\_Edit.add\_command(label="Clear",

command=utils.Clear(master=self),

accelerator="Ctrl+Shift+D".rjust(15),

)

self.menu\_item\_Edit.add\_command(label="Undo",

command=self.main\_text\_box.edit\_undo,

accelerator="Ctrl+Z".rjust(15),

)

self.menu\_item\_Edit.add\_command(label="Redo",

command=self.main\_text\_box.edit\_redo,

accelerator="Ctrl+Y".rjust(15),

self.menu\_item\_Edit.add\_command(label="Highlight",

command=utils.Highlight(master=self),

)

self.menu\_item\_Edit.add\_command(label="Toggle Auto Save",

command=utils.toggleAutoSave(master=self),

)

self.menu\_item\_Edit.add\_command(label="Word count",

command=utils.CountWords(master=self),

)

## Bindings

self.bind\_all('<Control-o>', utils.Open(master=self))

self.bind\_all('<Control-s>', utils.Save(master=self))

self.bind\_all('<Control-S>', utils.SaveAs(master=self))

self.bind\_all('<Control-X>', utils.Exit(master=self))

self.bind\_all('<Control-C>', utils.CopyAll(master=self))

self.wm\_protocol("WM\_DELETE\_WINDOW", utils.Exit(master=self))

def auto\_save\_text\_file(self):

utils.AutoSave(master=self)()

self.after(3000,self.auto\_save\_text\_file)

if \_\_name\_\_ == '\_\_main\_\_':

app = App()

app.auto\_save\_text\_file()

app.mainloop()

There exists a large and complex method **def** \_\_init\_\_**(self, \*args, \*\*kwargs).** It is difficult to handle such a complex and large method**.** This method is responsible for both managing the user interface (UI) components (like menus, buttons, text boxes) and integrating them with the application's functionality (like file operations, editing actions). This violates SRP, as a method should ideally have only one reason to change

**Convert into simple and easy handled method:**

**import** tkinter **as** tk

**from** tkinter **import** scrolledtext

**import** utils

**class** App(tk.Tk):

**def \_\_**init\_\_(self, \*args, \*\*kwargs):

super().\_\_init\_\_(\*args, \*\*kwargs)

self.file\_path: str = ""

self.content: str = ""

self.isSaved: bool = False

self.isEdited: bool = False

self.autoSave: bool = False

self.title("Text Editor")

self.option\_add("\*Font", "aerial 13")

self.geometry("700x500")

self.create\_menu\_bar()

self.create\_find\_replace\_widgets()

self.create\_main\_text\_box()

**def** create\_menu\_bar(self):

self.menu\_bar = tk.Menu(master=self)

self.menu\_bar.add\_cascade(label="File", menu=self.create\_file\_menu())

self.menu\_bar.add\_cascade(label="Edit", menu=self.create\_edit\_menu())

self.config(menu=self.menu\_bar)

**def** create\_file\_menu(self):

file\_menu = tk.Menu(self.menu\_bar, tearoff=0)

file\_menu.add\_command(label="Open", command=utils.Open(master=self), accelerator="Ctrl+O")

file\_menu.add\_command(label="Save As", command=utils.SaveAs(master=self), accelerator="Ctrl+Shift+S")

file\_menu.add\_command(label="Save", command=utils.Save(master=self), accelerator="Ctrl+S")

file\_menu.add\_command(label="Exit", command=utils.Exit(master=self), accelerator="Ctrl+Shift+X")

return file\_menu

**def** create\_edit\_menu(self):

edit\_menu = tk.Menu(self.menu\_bar, tearoff=0)

edit\_menu.add\_command(label="Copy All", command=utils.CopyAll(master=self), accelerator="Ctrl+Shift+C")

edit\_menu.add\_command(label="Paste", command=utils.Paste(master=self), accelerator="Ctrl+Shift+V")

edit\_menu.add\_command(label="Clear", command=utils.Clear(master=self), accelerator="Ctrl+Shift+D")

edit\_menu.add\_command(label="Undo", command=self.main\_text\_box.edit\_undo, accelerator="Ctrl+Z")

edit\_menu.add\_command(label="Redo", command=self.main\_text\_box.edit\_redo, accelerator="Ctrl+Y")

edit\_menu.add\_command(label="Highlight", command=utils.Highlight(master=self))

edit\_menu.add\_command(label="Toggle Auto Save", command=utils.toggleAutoSave(master=self))

edit\_menu.add\_command(label="Word count", command=utils.CountWords(master=self))

return edit\_menu

**def** create\_find\_replace\_widgets(self):

find\_frame = tk.Frame(master=self)

find\_frame.pack()

find\_text\_label = tk.Label(master=find\_frame, text='Search: ')

find\_text\_entry = tk.Entry(master=find\_frame)

find\_text\_btn = tk.Button(master=find\_frame, text="Find All Occurrences",

command=utils.FindAll(master=self))

find\_text\_label.grid(row=0, column=0, pady=2)

find\_text\_entry.grid(row=0, column=1, columnspan=2, pady=2)

find\_text\_btn.grid(row=0, column=3, pady=2, padx=8)

replace\_frame = tk.Frame(master=self)

replace\_frame.pack()

replace\_text\_label = tk.Label(master=replace\_frame, text='Replace: ')

replace\_text\_entry = tk.Entry(master=replace\_frame)

replace\_text\_btn = tk.Button(master=replace\_frame, text="Replace All Occurrences",

command=utils.ReplaceAll(master=self))

replace\_text\_label.grid(row=0, column=0, pady=2)

replace\_text\_entry.grid(row=0, column=1, columnspan=2, pady=2)

replace\_text\_btn.grid(row=0, column=3, pady=2, padx=8)

**def** create\_main\_text\_box(self):

self.main\_text\_box = scrolledtext.ScrolledText(master=self, undo=True)

self.main\_text\_box.pack(padx=10, pady=10, expand='yes', fill='both')

**def** auto\_save\_text\_file(self):

utils.AutoSave(master=self)()

self.after(3000, self.auto\_save\_text\_file)

if \_\_name\_\_ == '\_\_main\_\_':

app = App()

app.auto\_save\_text\_file()

app.mainloop()

The **create\_menu\_bar**, **create\_file\_menu**, and **create\_edit\_menu** methods are simplified by removing redundant code. It makes the code easy to read and understand.

The **create\_find\_replace\_widgets** method is refactored to directly create and pack the find and replace widgets without excessive nesting.

The code is made more concise and easier to read by breaking down complex methods into smaller, more manageable parts.

1. **Duplicate code:**

**Save.py:**

**import** tkinter **as** tk

**from** tkinter **import** filedialog,messagebox

**import** GUI

**def** **Save**(master: GUI.App):

**def** **inner\_function**(event=None):

content=master.main\_text\_box.get('1.0',tk.END)

print(content)

**if** (master.file\_path==''):

master.file\_path=filedialog.asksaveasfilename(filetypes=[("txt files ",".txt")],defaultextension=".txt")

print(master.file\_path)

**with** open(master.file\_path,'w') **as** fw:

fw.write(content)

**return** inner\_function;

**Saveas.py:**

**import** tkinter **as** tk

**from** tkinter **import** filedialog,messagebox

**import** GUI

**def** **SaveAs**(master: GUI.App):

**def** **inner\_function**(event=None):

content=master.main\_text\_box.get('1.0',tk.END)

print(content)

master.file\_path=filedialog.asksaveasfilename(filetypes=[("txt files ",".txt")],defaultextension=".txt")

print(master.file\_path)

**with** open(master.file\_path,'w') **as** fw:

fw.write(content)

**return** inner\_function

There exists duplication of code between the Save and SaveAs functions. Both functions contain similar logic for saving the content of the text box to a file using the filedialog.asksaveasfilename dialog.

To remove the duplication, need to create a common function that handles the saving functionality and call it from both Save and SaveAs. Here's how the code can be refactored:

Making a new file of **common\_save\_function.py:**

**import** tkinter **as** tk

**from** tkinter **import** filedialog

**def** **save\_content**(master: GUI.App, default\_extension=".txt"):

content = master.main\_text\_box.get('1.0', tk.END)

**file\_path** = filedialog.asksaveasfilename(filetypes=[("txt files ", default\_extension)], defaultextension=default\_extension)

if file\_path:

with **open**(file\_path, 'w') as fw:

fw.**write**(content)

master.file\_path = file\_path

Then, import and use this common function in both Save and SaveAs:

**Save.py:**

**import** GUI

**import common\_save\_function**

**def** **Save**(master: GUI.App):

**def** **inner\_function**(event=None):

common\_save\_function.save\_content(master)

**return** inner\_function

**SaveAs.Py:**

**import** GUI

**import common\_save\_function**

**def SaveAs**(master: GUI.App):

**def inner\_function**(event=None):

common\_save\_function.save\_content(master)

**return** inner\_function

With this refactoring, the duplication of code has been removed, and both **Save** and **SaveAs** functions share the common logic for saving the content to a file.

1. **Architecture:**
2. **Does the code follows the architecture pattern or not:**

**Single Responsibility Principle (SRP):** The GUI class is responsible for both managing the user interface (UI) components (like menus, buttons, text boxes) and integrating them with the application's functionality (like file operations, editing actions). This violates SRP, as a class should ideally have only one reason to change.

**Separation of Concerns:** The GUI class intertwines UI-related tasks (like widget layout, menu creation) with application logic (like file operations, editing actions). In a repository architecture, concerns should be separated more clearly, with UI tasks handled separately from business logic.

**Modularity and Extensibility:** While the GUI class does encapsulate the UI-related functionalities, it's tightly coupled with the application's specific functionalities. This could make it harder to extend or modify the application in the future without affecting the UI.

**Testability:** Testing the application becomes more complex when UI and application logic are tightly coupled in the same class. Ideally, UI components and application functionalities should be testable independently.

**Flexibility:** The tight coupling between UI and application logic could limit the flexibility of the application, making it harder to replace or modify UI components without affecting the underlying functionalities.

For fully coping up with the proposed architecture ‘Repository architecture pattern’ the above functionality should be fulfilled properly.

1. **Does the design pattern is appropriate for the project or not:**

After thoroughly reviewing the codebase and considering the problem context, it appears that the **Repository Architecture pattern** is not fully appropriate for the codebase. While the code does demonstrate modularity and separation of concerns to some extent, the tight coupling between UI-related tasks and application logic within the GUI class indicates that a different architectural pattern might be more suitable.

A more suitable design pattern for this codebase could be the **Model-View-Controller (MVC) pattern**. MVC separates an application into three main components: the Model (handles data), the View (handles user interface and presentation logic), and the Controller (mediates between the Model and View, handling user input and updating the Model).

In this context:

**Model:** This would encapsulate the core functionality of the text editor, including file operations, text manipulation, manages the system data and associated operations on that data.

**View:** The GUI class and associated UI components would fall under the View layer. They would be responsible for rendering the user interface and handling user interactions and defines and manages how the data is presented to the user.

**Controller:** This layer would handle user input events from the View, delegate tasks to the appropriate components in the Model, and update the View accordingly.

Adopting the MVC pattern would promote better **separation of concerns, making the codebase more modular**, **maintainable**, and **testable**. It would also facilitate future enhancements and modifications to the application, as each component's responsibilities are clearly defined.

Therefore, while the Repository Architecture pattern demonstrates some beneficial aspects in the codebase, considering the context and problem requirements, the MVC pattern would likely be a more appropriate choice for achieving a well-structured and maintainable design.

1. **Modularity or separation of concern:**

**Separation of Concerns:** The GUI class intertwines UI-related tasks (like widget layout, menu creation) with application logic (like file operations, editing actions). Concerns should be separated more clearly, with UI tasks handled separately from business logic.

**Modularity:** While the GUI class does encapsulate the UI-related functionalities, it's tightly coupled with the application's specific functionalities. This could make it harder to extend or modify the application in the future without affecting the UI.