

Supplementary Exercise on Command Pattern

- (a) Draw a class diagram to illustrate the Command Pattern. [4 marks]
- (b) Briefly describe the roles of the classes in the Command Pattern. [3 marks]
- (c) Dickson is a junior programmer who has developed a program to handle the operations for a document. The following codes are written for the *DocumentController* and *Document* classes. Two operations: edit and display, are available in the *DocumentController* class. The edit operation is to get user input and save it as the content of the document. The display operation is to display the content of the document.

```
import java.util.Scanner;
public class DocumentController {
    public static void main(String[] arg){
        Document doc = new Document();
        Scanner scanner = new Scanner(System.in);

        // edit the content of document -- start
        System.out.println("Please input your content");
        String value = scanner.nextLine();
        doc.setContent(value);
        // edit the content of document -- end

        // display the content of the document -- start
        System.out.println("The current content is "+
        doc.getContent());
        // display the content of the document -- end

    }
} // end class DocumentController

public class Document {
    private String content="" ;
    public String getContent() { return content; }
    public void setContent(String content) {
        this.content = content;
    }
} // end class Document
```

Dickson has shown his program to his supervisor, Steven. Steven recommended him to use the ***Command Pattern*** to re-design the program so that new operations can be easily added for document. In addition, an undo function should be implemented to correct mistaken operations.

You are asked to help Dickson to re-design the program. The program should support the undo operation. Draw a class diagram to show the new design of the program. The class diagram is only required to support the existing operations: edit the document and display the document. You must show all the necessary methods, classes, interface(s) and association(s) in your class diagram. [12 marks]

- (d) With reference to the class diagram given in your answer to part (c), write Java codes for implementing the command interface and the class which implements the command interface and provides the edit operation. [6 marks]
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