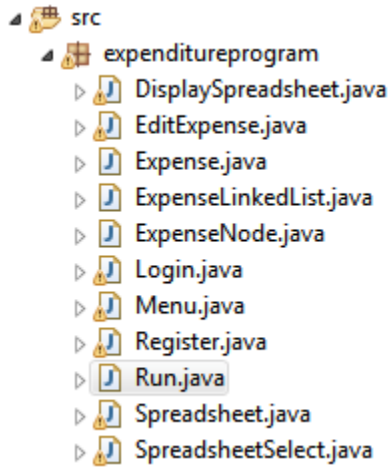
Appendix A: Source Code

List of classes:



DisplaySpreadsheet.java

```
package expendituresprogram;


import java.awt.BorderLayout;
import java.awt.Dimension;
import java.awt.Font;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.awt.print.PrinterException;
import java.io.BufferedWriter;
import java.io.File;
import java.io.FileWriter;
import java.io.IOException;
import java.io.PrintWriter;
import java.text.MessageFormat;
import java.util.Scanner;
```

```
import java.util.logging.Level;
import java.util.logging.Logger;

import javax.swing.BoxLayout;
import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JLabel;
import javax.swing.JOptionPane;
import javax.swing.JPanel;
import javax.swing.JScrollPane;
import javax.swing.JTable;
import javax.swing.JTextField;
import javax.swing.ListSelectionModel;
import javax.swing.table.JTableHeader;
import javax.swing.table.TableModel;

/**
 * This class displays a spreadsheet that can be modified by the user
 * @author Bobby Liang
 *
 */

public class DisplaySpreadsheet extends JFrame {

	// declaration and initialization of variables

	// dimensions of the window
	private final static int WIDTH = 1180;
	private final static int HEIGHT = 500;
```

```
private static Spreadsheet sheet;

private JLabel spreadsheetNameLabel;
private JButton addRow;
private JButton deleteExpense;
private JButton editExpense;
private JButton back;
private JButton save;
private JButton print;
private JButton getMonthlyTotals;

private JTextField janField;
private JTextField febField;
private JTextField marField;
private JTextField aprField;
private JTextField mayField;
private JTextField junField;
private JTextField julField;
private JTextField augField;
private JTextField septField;
private JTextField octField;
private JTextField novField;
private JTextField decField;
private JTextField yearField;

private static JPanel mainPanel;
private static JPanel topPanel;
```

```
private static JPanel centerPanel;
private static JPanel bottomPanel;

private JTable spreadsheet;

private static int rowIndex;

private static boolean isEditedClicked;
private boolean isSpreadsheetSaved = false;
private static String spreadsheetName;

// default empty constructor
public DisplaySpreadsheet() {

}

/**
 * Constructor that displays a spreadsheet
 * @param sheet, the Spreadsheet to be displayed
 */
public DisplaySpreadsheet(Spreadsheet sheet) {
        // initializing the name and size of the JFrame
        super("Expenditures");
        setPreferredSize(new Dimension(WIDTH, HEIGHT));
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

        // declaration of panels
        mainPanel = new JPanel();
        topPanel = new JPanel();
```

```
centerPanel = new JPanel();
bottomPanel = new JPanel();

// setting the layout and adding the panels to the main panel
mainPanel.setLayout(new BoxLayout(mainPanel, BoxLayout.Y_AXIS));
mainPanel.add(topPanel, BorderLayout.NORTH);
mainPanel.add(centerPanel, BorderLayout.CENTER);
mainPanel.add(bottomPanel, BorderLayout.SOUTH);

// get the name of the spreadsheet
spreadsheetName = sheet.getSpreadsheetName();
// initialize the spreadsheet that is being displayed
DisplaySpreadsheet.sheet = sheet;

// initializing the JTable
spreadsheet = new JTable(DisplaySpreadsheet.sheet);
spreadsheet.setPreferredScrollableViewportSize(new Dimension(WIDTH, HEIGHT));
spreadsheet.setFillsViewportHeight(true);
// prevents user from dragging columns around
spreadsheet.getTableHeader().setReorderingAllowed(false);
// user can only select one row at a time
spreadsheet.setSelectionMode(ListSelectionModel.SINGLE_SELECTION);

// gets the column names of the spreadsheet
JTableHeader header = spreadsheet.getTableHeader();

// adding the buttons, labels, and text fields of the panel
addRow = new JButton("Add an expense.");
addRow.setBounds(75, 25, 150, 30);
```

```
		addRow.addActionListener(new ActionListener() {
			public void actionPerformed(ActionEvent arg0) {
				// user chooses to add an expense, a new JFrame will pop up to add this
expense
				EditExpense edit = new EditExpense();
				edit.setVisible(true);
				edit.setLocationRelativeTo(null);
				edit.setDefaultCloseOperation(JFrame.DISPOSE_ON_CLOSE);
				// the spreadsheet will change and therefore it is not saved
				isSpreadsheetSaved = false;
			}
		});

		editExpense = new JButton("Edit an expense.");
		editExpense.setBounds(95, 25, 150, 30);
		editExpense.addActionListener(new ActionListener() {
			public void actionPerformed(ActionEvent arg0) {
				if (sheet.getRowCount() == -1) {
					JOptionPane.showMessageDialog(null, "Please select an
expense to edit.",
							"Expense not selected",
JOptionPane.ERROR_MESSAGE);
				}

				// the user chooses to edit an existing expense
				isEditedClicked = true;
				// determines whether the spreadsheet is empty or not, if so, a message
will indicate that it is empty
				if (sheet.getRowCount() == 0) {
```

```
                                        JOptionPane.showMessageDialog(null, "There are no expenses
in the spreadsheet!",
                                                                "Spreadsheet is empty",
JOptionPane.ERROR_MESSAGE);
                                // otherwise, the spreadsheet is not empty and a new JFrame will open
up
                                // the text fields will display the current values for the expenses
                                } else {
                                        rowIndex = spreadsheet.getSelectedRow();
                                        EditExpense editedExpense = new EditExpense();
                                        String expenseName = spreadsheet.getValueAt(rowIndex,
0).toString();
                                        String janExpense = spreadsheet.getValueAt(rowIndex,
1).toString();
                                        String febExpense = spreadsheet.getValueAt(rowIndex,
2).toString();
                                        String marExpense = spreadsheet.getValueAt(rowIndex,
3).toString();
                                        String aprExpense = spreadsheet.getValueAt(rowIndex,
4).toString();
                                        String mayExpense = spreadsheet.getValueAt(rowIndex,
5).toString();
                                        String junExpense = spreadsheet.getValueAt(rowIndex,
6).toString();
                                        String julExpense = spreadsheet.getValueAt(rowIndex,
7).toString();
                                        String augExpense = spreadsheet.getValueAt(rowIndex,
8).toString();
                                        String septExpense = spreadsheet.getValueAt(rowIndex,
9).toString();
                                        String octExpense = spreadsheet.getValueAt(rowIndex,
10).toString();
                                        String novExpense = spreadsheet.getValueAt(rowIndex,
11).toString();
```

```
                                        String decExpense = spreadsheet.getValueAt(rowIndex,
12).toString();

                                        editedExpense.expenseName.setText(expenseName);
                                        editedExpense.expenseJan.setText(janExpense);
                                        editedExpense.expenseFeb.setText(febExpense);
                                        editedExpense.expenseMar.setText(marExpense);
                                        editedExpense.expenseApr.setText(aprExpense);
                                        editedExpense.expenseMay.setText(mayExpense);
                                        editedExpense.expenseJun.setText(junExpense);
                                        editedExpense.expenseJul.setText(julExpense);
                                        editedExpense.expenseAug.setText(augExpense);
                                        editedExpense.expenseSept.setText(septExpense);
                                        editedExpense.expenseOct.setText(octExpense);
                                        editedExpense.expenseNov.setText(novExpense);
                                        editedExpense.expenseDec.setText(decExpense);
                                        isSpreadsheetSaved = false;

                                        editedExpense.setVisible(true);
                                        editedExpense.setLocationRelativeTo(null);

    editedExpense.setDefaultCloseOperation(JFrame.DISPOSE_ON_CLOSE);
                                    }
                                }
                            });

                            deleteExpense = new JButton("Delete an Expense.");
                            deleteExpense.setBounds(400, 25, 150, 30);
                            deleteExpense.addActionListener(new ActionListener() {
```

```
                public void actionPerformed(ActionEvent arg0) {
                        rowIndex = spreadsheet.getSelectedRow();
                        // checks if the expense exists in the JTable
                        if (rowIndex >= 0) {
                                // calls the method that deletes the row at that specific index
                                deleteRowAtIndex(rowIndex);
                                isSpreadsheetSaved = false;
                        // otherwise, the spreadsheet is empty and nothing is deleted
                        } else if (sheet.getRowCount() == 0) {
                                JOptionPane.showMessageDialog(null,
                                                "The spreadsheet is empty. There are no more
expenses to delete!", "Spreadsheet is empty",
                                                JOptionPane.ERROR_MESSAGE);
                        }

                        else {
                                JOptionPane.showMessageDialog(null,
                                                "Please select an expense to delete.", "Select an
expense.",
                                                JOptionPane.ERROR_MESSAGE);
                        }
                }
        });

        save = new JButton("Save spreadsheet.");
        save.addActionListener(new ActionListener() {
                public void actionPerformed(ActionEvent arg0) {
                        // save the contents of the spreadsheet/JTable into a text file
                        saveSheet();
```

```
                        // save the spreadsheet name in a text file
                        storeSpreadsheetNames();
                }
        });

        print = new JButton("Print");
        print.addActionListener(new ActionListener() {
                public void actionPerformed(ActionEvent arg0) {
                        print();
                }
        });

        back = new JButton("Back to Menu.");
        back.addActionListener(new ActionListener() {
                public void actionPerformed(ActionEvent arg0) {
                        // if the spreadsheet is not saved, the user is prompted to reconsider
this decision
                        // acts as a reminder for them to save their spreadsheet unless
otherwise indicated
                        if (isSpreadsheetSaved == false) {
                                int reply = JOptionPane.showConfirmDialog(null,
                                                "Your spreadsheet has not been saved. Are you
sure you want to leave?",
                                                "Spreadsheet not saved",
JOptionPane.YES_NO_OPTION);
                                if (reply == JOptionPane.YES_OPTION) {
                                        // user indicates that the spreadsheet will not be saved,
redirected back to the menu
                                        new Menu();
                                        dispose();
```

```
                                        // user chooses to reconsider, nothing happens to the
spreadsheet
                                        } else {
                                                return;
                                        }
                                // the spreadsheet is confirmed to be saved, and the user can go back to
the menu
                                } else {
                                        new Menu();
                                        dispose();
                                }

                        }
                });

                getMonthlyTotals = new JButton("Get Monthly Totals");
                getMonthlyTotals.setPreferredSize(new Dimension(150, 20));
                getMonthlyTotals.addActionListener(new ActionListener() {
                        public void actionPerformed(ActionEvent arg0) {
                                // calls the method that sets the text fields to display the
monthly/yearly totals of all expenses
                                getColumnsTotals();
                        }
                });

                spreadsheetNameLabel = new JLabel(spreadsheetName);
                spreadsheetNameLabel.setBounds(65, 10, 400, 25);
                spreadsheetNameLabel.setFont(new Font("Verdana", 1, 20));

                janField = new JTextField(5);
```

```
febField = new JTextField(5);
marField = new JTextField(5);
aprField = new JTextField(5);
mayField = new JTextField(5);
junField = new JTextField(5);
julField = new JTextField(5);
augField = new JTextField(5);
septField = new JTextField(5);
octField = new JTextField(5);
novField = new JTextField(5);
decField = new JTextField(5);
yearField = new JTextField(5);

janField.setText("Jan");
febField.setText("Feb");
marField.setText("Mar");
aprField.setText("Apr");
mayField.setText("May");
junField.setText("Jun");
julField.setText("Jul");
augField.setText("Aug");
septField.setText("Sept");
octField.setText("Oct");
novField.setText("Nov");
decField.setText("Dec");
yearField.setText("Year");

// adding the buttons, text fields, labels and JTable to respective panels
```

```
        topPanel.add(spreadsheetNameLabel, BorderLayout.NORTH);
        topPanel.add(save);
        topPanel.add(addRow);
        topPanel.add(deleteExpense);
        topPanel.add(editExpense);
        topPanel.add(print);
        topPanel.add(back);

        centerPanel.add(getMonthlyTotals);
        centerPanel.add(janField);
        centerPanel.add(febField);
        centerPanel.add(marField);
        centerPanel.add(aprField);
        centerPanel.add(mayField);
        centerPanel.add(junField);
        centerPanel.add(julField);
        centerPanel.add(augField);
        centerPanel.add(septField);
        centerPanel.add(octField);
        centerPanel.add(novField);
        centerPanel.add(decField);
        centerPanel.add(yearField);

        bottomPanel.add(header, BorderLayout.CENTER);
        bottomPanel.add(spreadsheet, BorderLayout.CENTER);

        // adds a scroll pane for the user
        JScrollPane scrollPane = new JScrollPane(spreadsheet,
JScrollPane.VERTICAL_SCROLLBAR_AS_NEEDED, JScrollPane.HORIZONTAL_SCROLLBAR_AS_NEEDED);
```

```
		scrollPane.setVisible(true);
		mainPanel.add(scrollPane, BorderLayout.CENTER);

		// sets the content pane of the window to be the main panel that consists of all other panels and features
		setContentPane(mainPanel);
		pack();
		// displays the window
		setVisible(true);
	}

	/**
	 * Method that sums up all the monthly and yearly expenses
	 * Prints out the sum as a string in the text field
	 */
	public void getColumnsTotals() {
		int rowCount = spreadsheet.getRowCount();

		double janTotal = 0;
		double febTotal = 0;
		double marTotal = 0;
		double aprTotal = 0;
		double mayTotal = 0;
		double junTotal = 0;
		double julTotal = 0;
		double augTotal = 0;
		double septTotal = 0;
		double octTotal = 0;
		double novTotal = 0;
```

```
double decTotal = 0;
double yearlyTotal = 0;

for (int i = 0; i < rowCount; i++) {
        janTotal += Double.parseDouble(spreadsheet.getValueAt(i, 1).toString());
        febTotal += Double.parseDouble(spreadsheet.getValueAt(i, 2).toString());
        marTotal += Double.parseDouble(spreadsheet.getValueAt(i, 3).toString());
        aprTotal += Double.parseDouble(spreadsheet.getValueAt(i, 4).toString());
        mayTotal += Double.parseDouble(spreadsheet.getValueAt(i, 5).toString());
        junTotal += Double.parseDouble(spreadsheet.getValueAt(i, 6).toString());
        julTotal += Double.parseDouble(spreadsheet.getValueAt(i, 7).toString());
        augTotal += Double.parseDouble(spreadsheet.getValueAt(i, 8).toString());
        septTotal += Double.parseDouble(spreadsheet.getValueAt(i, 9).toString());
        octTotal += Double.parseDouble(spreadsheet.getValueAt(i, 10).toString());
        novTotal += Double.parseDouble(spreadsheet.getValueAt(i, 11).toString());
        decTotal += Double.parseDouble(spreadsheet.getValueAt(i, 12).toString());
        yearlyTotal += Double.parseDouble(spreadsheet.getValueAt(i, 13).toString());
}

janField.setText(String.valueOf(janTotal));
febField.setText(String.valueOf(febTotal));
marField.setText(String.valueOf(marTotal));
aprField.setText(String.valueOf(aprTotal));
mayField.setText(String.valueOf(mayTotal));
junField.setText(String.valueOf(junTotal));
julField.setText(String.valueOf(julTotal));
augField.setText(String.valueOf(augTotal));
septField.setText(String.valueOf(septTotal));
octField.setText(String.valueOf(octTotal));
```

```
		novField.setText(String.valueOf(novTotal));
		decField.setText(String.valueOf(decTotal));
		yearField.setText(String.valueOf(yearlyTotal));

}

/**
 * Adds a new expense to the spreadsheet and JTable
 * @param newExpense must be declared
 */
public static void addRowToSpreadsheet(Expense newExpense) {
		sheet.addExpense(newExpense);
}



/**
 * Deletes an expense from the spreadsheet at a specific index
 * @param i, the index at which the expense is deleted must be specified
 */
public static void deleteRowAtIndex(int i) {
		sheet.removeExpense(i);
}

/**
 * Method that retrieves the row that the user clicked on in the JTable
 * @return the index of the row that the user selected
 */
public static int getRowIndex() {
		return rowIndex;
```

```
	}

	/**
	 * Mutator method that sets whether an expense is edited or not
	 * @param reset, sets isEditedClicked to true or false depending on whether the expense is edited
	 */
	public static void setEditedClicked(boolean reset) {
		isEditedClicked = reset;
	}

	/**
	 * Accessor method that returns the boolean variable isEditedClicked
	 * @return the variable isEditedClicked
	 */
	public static boolean getEditedClicked() {
		return isEditedClicked;
	}

	/**
	 * Accessor method that returns the name of the spreadsheet
	 * @return the variable spreadsheetName
	 */
	public String getSpreadsheetName() {
		return spreadsheetName;
	}

	/**
	 * Accessor method that returns the spreadsheet
```

```
 * @return the variable sheet
 */
public static Spreadsheet getSpreadsheet() {
	return sheet;
}

/**
 * Method that saves the spreadsheet as an Excel file and a text file
 */
public void saveSheet() {
	// saving a copy as an Excel file
	boolean ifSaved = false;
	try {
		File tableInExcel = new File(spreadsheetName + ".xls");
		TableModel model = spreadsheet.getModel();
		FileWriter excel = new FileWriter(tableInExcel);
		// writes the column names into Excel
		for (int i = 0; i < model.getColumnCount(); i++) {
			excel.write(model.getColumnName(i) + "\t");
		}
		excel.write("\n");
		// writes a new expense on a new line
		for (int i = 0; i < model.getColumnCount(); i++) {
			for (int j = 0; j < model.getColumnCount(); j++) {
				String data = String.valueOf(model.getValueAt(i, j));
				if (data == "null") {
					data = "";
				}
				excel.write(data + "\t");
```

```
                    }
                    excel.write("\n");
                }
                excel.close();
                ifSaved = true;
            } catch (IOException e) {
                Logger.getLogger(DisplaySpreadsheet.class.getName()).log(Level.SEVERE, null,
e);
            }
            // saving a copy as text file, easier to load the spreadsheet
            String filePath = spreadsheetName + ".txt";
            File file = new File(filePath);
            try {
                FileWriter fw = new FileWriter(file);
                BufferedWriter bw = new BufferedWriter(fw);
                for (int i = 0; i < spreadsheet.getRowCount(); i++) {
                    for (int j = 0; j < spreadsheet.getColumnCount(); j++) {
                        bw.write(String.valueOf(spreadsheet.getValueAt(i, j)));
                        // separate each entry with an asterisk
                        bw.write("*");
                    }
                    // new line for a new expense
                    bw.newLine();
                }
                bw.close();
                fw.close();
                ifSaved = true;
            } catch (IOException e) {
```

```
                    Logger.getLogger(DisplaySpreadsheet.class.getName()).log(Level.SEVERE, null,
e);
            }

            // once the files are saved, display a message to the user that the files are saved
            if (ifSaved) {
                    JOptionPane.showMessageDialog(null, "File Successfully Saved!", "File Saved.",
                                    JOptionPane.INFORMATION_MESSAGE);
                    isSpreadsheetSaved = true;
            }
    }

    /**
     * Method that stores the name of the spreadsheet being used
     */
    public static void storeSpreadsheetNames() {
            boolean alreadyExists = false;
            try {
                    // file name is specified
                    File file = new File ("listOfSpreadsheets.txt");
                    // create the file if the file is not already created
                    if (!file.exists()) {
                            file.createNewFile();
                    }

                    Scanner scanner = new Scanner (file);
                    while (scanner.hasNextLine()) {
                            String line = scanner.nextLine();
```

```
                        // if the spreadsheet name already exists in the file, this text file is not
changed
                        if (line.equals(spreadsheetName)) {
                                alreadyExists = true;
                        }
                }
                scanner.close();

                if (!alreadyExists) {
                        // if the spreadsheet name does not exist, add the name of the
spreadsheet to the text file
                        FileWriter fw = new FileWriter(file,true);
                        BufferedWriter bw = new BufferedWriter(fw);
                        PrintWriter pw = new PrintWriter(bw);
                        pw.println(spreadsheetName);
                        pw.close();
                }

        } catch (IOException e) {
                Logger.getLogger(DisplaySpreadsheet.class.getName()).log(Level.SEVERE, null,
e);
        }
    }

    /**
     * Method that allows the user to print the given spreadsheet
     */
    private void print() {
        MessageFormat header = new MessageFormat("Print Expenses");
        try {
```

```
                        boolean complete = spreadsheet.print(JTable.PrintMode.NORMAL, header,
null);
                        if (complete) {
                                JOptionPane.showMessageDialog(null, "Printing successful!");
                        }
                } catch (PrinterException e) {
                        JOptionPane.showMessageDialog(null, "Could not print.", "Error",
JOptionPane.INFORMATION_MESSAGE);
                }
        }

        public static void main(String[] args) {
                // TODO Auto-generated method stub
                new DisplaySpreadsheet();

        }

}
```

EditExpense.java

```
package expenditureprogram;

import java.awt.Font;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;

import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JLabel;
import javax.swing.JOptionPane;
import javax.swing.JTextField;

/**
 * This class allows the user to edit a specific expense in a separate JFrame
 * and updates the original spreadsheet
 * @author Bobby Liang
 *
 */

public class EditExpense extends JFrame {
```

```
// declaration of variables

JTextField expenseName;
JTextField expenseJan;
JTextField expenseFeb;
JTextField expenseMar;
JTextField expenseApr;
JTextField expenseMay;
JTextField expenseJun;
JTextField expenseJul;
JTextField expenseAug;
JTextField expenseSept;
JTextField expenseOct;
JTextField expenseNov;
JTextField expenseDec;

JLabel panelTitle;
JLabel expenseNameLabel;
JLabel expenseJanLabel;
JLabel expenseFebLabel;
JLabel expenseMarLabel;
JLabel expenseAprLabel;
JLabel expenseMayLabel;
JLabel expenseJunLabel;
JLabel expenseJulLabel;
JLabel expenseAugLabel;
JLabel expenseSeptLabel;
JLabel expenseOctLabel;
JLabel expenseNovLabel;
JLabel expenseDecLabel;

JButton addExpense;
JButton exitButton;

Expense expense = new Expense();

/**
 * Constructor that modifies an expense
 */
public EditExpense() {
	setTitle("Edit an expense");
	setLayout(null);
	setSize(500, 500);
	setDefaultCloseOperation(JFrame.DISPOSE_ON_CLOSE);

	// adding labels
	panelTitle = new JLabel("Edit an Expense");
	panelTitle.setBounds(150, 10, 300, 25);
	panelTitle.setFont(new Font("Verdana", 1, 20));
	add(panelTitle);

	expenseNameLabel = new JLabel("Name of Expense");
	expenseNameLabel.setBounds(75, 50, 300, 25);
	add(expenseNameLabel);
```

```
expenseJanLabel = new JLabel("January Expenses");
expenseJanLabel.setBounds(75, 80, 300, 25);
add(expenseJanLabel);

expenseFebLabel = new JLabel("February Expenses");
expenseFebLabel.setBounds(75, 110, 300, 25);
add(expenseFebLabel);

expenseMarLabel = new JLabel("March Expenses");
expenseMarLabel.setBounds(75, 140, 300, 25);
add(expenseMarLabel);

expenseAprLabel = new JLabel("April Expenses");
expenseAprLabel.setBounds(75, 170, 300, 25);
add(expenseAprLabel);

expenseMayLabel = new JLabel("May Expenses");
expenseMayLabel.setBounds(75, 200, 300, 25);
add(expenseMayLabel);

expenseJunLabel = new JLabel("June Expenses");
expenseJunLabel.setBounds(75, 230, 300, 25);
add(expenseJunLabel);

expenseJulLabel = new JLabel("July Expenses");
expenseJulLabel.setBounds(75, 260, 300, 25);
add(expenseJulLabel);

expenseAugLabel = new JLabel("August Expenses");
expenseAugLabel.setBounds(75, 290, 300, 25);
add(expenseAugLabel);

expenseSeptLabel = new JLabel("September Expenses");
expenseSeptLabel.setBounds(75, 320, 300, 25);
add(expenseSeptLabel);

expenseOctLabel = new JLabel("October Expenses");
expenseOctLabel.setBounds(75, 350, 300, 25);
add(expenseOctLabel);

expenseNovLabel = new JLabel("November Expenses");
expenseNovLabel.setBounds(75, 380, 300, 25);
add(expenseNovLabel);

expenseDecLabel = new JLabel("December Expenses");
expenseDecLabel.setBounds(75, 410, 300, 25);
add(expenseDecLabel);

// adding text fields
// indicates the length of the text field
expenseName = new JTextField(20);
// the location of the text field
expenseName.setBounds(225, 50, 165, 25);
add(expenseName);
```

```
// indicates the length of the text field
expenseJan = new JTextField(20);
// the location of the text field
expenseJan.setBounds(225, 80, 165, 25);
add(expenseJan);

// indicates the length of the text field
expenseFeb = new JTextField(20);
// the location of the text field
expenseFeb.setBounds(225, 110, 165, 25);
add(expenseFeb);

// indicates the length of the text field
expenseMar = new JTextField(20);
// the location of the text field
expenseMar.setBounds(225, 140, 165, 25);
add(expenseMar);

// indicates the length of the text field
expenseApr = new JTextField(20);
// the location of the text field
expenseApr.setBounds(225, 170, 165, 25);
add(expenseApr);

// indicates the length of the text field
expenseMay = new JTextField(20);
// the location of the text field
expenseMay.setBounds(225, 200, 165, 25);
add(expenseMay);

// indicates the length of the text field
expenseJun = new JTextField(20);
// the location of the text field
expenseJun.setBounds(225, 230, 165, 25);
add(expenseJun);

// indicates the length of the text field
expenseJul = new JTextField(20);
// the location of the text field
expenseJul.setBounds(225, 260, 165, 25);
add(expenseJul);

// indicates the length of the text field
expenseAug = new JTextField(20);
// the location of the text field
expenseAug.setBounds(225, 290, 165, 25);
add(expenseAug);

// indicates the length of the text field
expenseSept = new JTextField(20);
// the location of the text field
expenseSept.setBounds(225, 320, 165, 25);
add(expenseSept);
```

```
		// indicates the length of the text field
		expenseOct = new JTextField(20);
		// the location of the text field
		expenseOct.setBounds(225, 350, 165, 25);
		add(expenseOct);

		// indicates the length of the text field
		expenseNov = new JTextField(20);
		// the location of the text field
		expenseNov.setBounds(225, 380, 165, 25);
		add(expenseNov);

		// indicates the length of the text field
		expenseDec = new JTextField(20);
		// the location of the text field
		expenseDec.setBounds(225, 410, 165, 25);
		add(expenseDec);

		addExpense = new JButton("Update Table");
		addExpense.setBounds(75, 440, 125, 25);
		addExpense.addActionListener(new ActionListener() {
			public void actionPerformed(ActionEvent arg0) {
				boolean isExpenseValid = true;
				boolean isEditedClicked =
DisplaySpreadsheet.getEditedClicked();
				// checks if user input a name for their expense
				if (expenseName.getText().equals("")) {
					JOptionPane.showMessageDialog(null, "Expense Name
cannot be left blank. \nPlease try again.",
							"Input Error",
JOptionPane.ERROR_MESSAGE);
					isExpenseValid = false;
				} else if (isEditedClicked == false){
					expense.setExpenseName(expenseName.getText());
				} else {

	DisplaySpreadsheet.getSpreadsheet().setValueAt(String.valueOf(expenseName.getT
ext()), DisplaySpreadsheet.getRowIndex(), 0);
				}

				try {
					// checks if user input is a positive double value
					if (Double.parseDouble(expenseJan.getText()) < 0 ||
Double.parseDouble(expenseFeb.getText()) < 0
							||
Double.parseDouble(expenseJan.getText()) < 0
							||
Double.parseDouble(expenseFeb.getText()) < 0
							||
Double.parseDouble(expenseMar.getText()) < 0
							||
Double.parseDouble(expenseApr.getText()) < 0
							||
Double.parseDouble(expenseMay.getText()) < 0
```

```
                                                ||
Double.parseDouble(expenseJun.getText()) < 0
                                                ||
Double.parseDouble(expenseJul.getText()) < 0
                                                ||
Double.parseDouble(expenseAug.getText()) < 0
                                                ||
Double.parseDouble(expenseSept.getText()) < 0
                                                ||
Double.parseDouble(expenseOct.getText()) < 0
                                                ||
Double.parseDouble(expenseNov.getText()) < 0
                                                ||
Double.parseDouble(expenseDec.getText()) < 0) {
                                        JOptionPane.showMessageDialog(null, "Expenses
cannot be a negative number. \nPlease try again.",
                                                        "Input Error",
JOptionPane.ERROR_MESSAGE);
                                        isExpenseValid = false;
                                        // if the expense already exists but the user
wants to change its contents
                                    } else if (DisplaySpreadsheet.getRowIndex() >= 0 &&
DisplaySpreadsheet.getEditedClicked() == true) {

      DisplaySpreadsheet.getSpreadsheet().setValueAt(Double.parseDouble(expenseJan.g
etText()), DisplaySpreadsheet.getRowIndex(), 1);

      DisplaySpreadsheet.getSpreadsheet().setValueAt(Double.parseDouble(expenseFeb.g
etText()), DisplaySpreadsheet.getRowIndex(), 2);

      DisplaySpreadsheet.getSpreadsheet().setValueAt(Double.parseDouble(expenseMar.g
etText()), DisplaySpreadsheet.getRowIndex(), 3);

      DisplaySpreadsheet.getSpreadsheet().setValueAt(Double.parseDouble(expenseApr.g
etText()), DisplaySpreadsheet.getRowIndex(), 4);

      DisplaySpreadsheet.getSpreadsheet().setValueAt(Double.parseDouble(expenseMay.g
etText()), DisplaySpreadsheet.getRowIndex(), 5);

      DisplaySpreadsheet.getSpreadsheet().setValueAt(Double.parseDouble(expenseJun.g
etText()), DisplaySpreadsheet.getRowIndex(), 6);

      DisplaySpreadsheet.getSpreadsheet().setValueAt(Double.parseDouble(expenseJul.g
etText()), DisplaySpreadsheet.getRowIndex(), 7);

      DisplaySpreadsheet.getSpreadsheet().setValueAt(Double.parseDouble(expenseAug.g
etText()), DisplaySpreadsheet.getRowIndex(), 8);

      DisplaySpreadsheet.getSpreadsheet().setValueAt(Double.parseDouble(expenseSept.
getText()), DisplaySpreadsheet.getRowIndex(), 9);

      DisplaySpreadsheet.getSpreadsheet().setValueAt(Double.parseDouble(expenseOct.g
etText()), DisplaySpreadsheet.getRowIndex(), 10);
```

```
	DisplaySpreadsheet.getSpreadsheet().setValueAt(Double.parseDouble(expenseNov.g
etText()), DisplaySpreadsheet.getRowIndex(), 11);

	DisplaySpreadsheet.getSpreadsheet().setValueAt(Double.parseDouble(expenseDec.g
etText()), DisplaySpreadsheet.getRowIndex(), 12);
				} else {
				// otherwise, the expense does not exist and needs
to be added to the spreadsheet

	expense.setJanuary(Double.parseDouble(expenseJan.getText()));

	expense.setFebruary(Double.parseDouble(expenseFeb.getText()));

	expense.setMarch(Double.parseDouble(expenseMar.getText()));

	expense.setApril(Double.parseDouble(expenseApr.getText()));

	expense.setMay(Double.parseDouble(expenseMay.getText()));

	expense.setJune(Double.parseDouble(expenseJun.getText()));

	expense.setJuly(Double.parseDouble(expenseJul.getText()));

	expense.setAugust(Double.parseDouble(expenseAug.getText()));

	expense.setSeptember(Double.parseDouble(expenseSept.getText()));

	expense.setOctober(Double.parseDouble(expenseOct.getText()));

	expense.setNovember(Double.parseDouble(expenseNov.getText()));

	expense.setDecember(Double.parseDouble(expenseDec.getText()));
				}
			} catch (NumberFormatException e) {
				JOptionPane.showMessageDialog(null,
					"Please enter a number value for the
expenses.",
					"Input Error",
JOptionPane.ERROR_MESSAGE);
				isExpenseValid = false;
			}

			// if the user clicked on Edit an Expense button, then the
expense is updated, close the window afterwards
			if (isExpenseValid &&
DisplaySpreadsheet.getEditedClicked() == true) {
				DisplaySpreadsheet.setEditedClicked(false);
				JOptionPane.showMessageDialog(null,
					"Expense Successfully Updated!",
					"Expense updated",
JOptionPane.INFORMATION_MESSAGE);
				dispose();
			// otherwise the user clicked on Add an Expense, and the
expense is added, close the window afterwards
```

```
                        } else if (isExpenseValid &&
DisplaySpreadsheet.getEditedClicked() == false) {
                                DisplaySpreadsheet.addRowToSpreadsheet(expense);
                                JOptionPane.showMessageDialog(null,
                                            "Expense Successfully Added!",
                                            "Expense added",
JOptionPane.INFORMATION_MESSAGE);
                                dispose();
                        }
                }
        });
        add(addExpense);

        exitButton = new JButton("Back to Table");
        exitButton.setBounds(265, 440, 125, 25);
        exitButton.addActionListener(new ActionListener() {
                public void actionPerformed(ActionEvent arg0) {
                        // close the window
                        dispose();
                }
        });
        add(exitButton);
    }

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        java.awt.EventQueue.invokeLater(new Runnable() {
                public void run() {
                        new EditExpense().setVisible(true);
                }
        });
    }

}
```

Expense.java

```
package expenditureprogram;

/**
 * This class creates an expense that specifies the name of the expense
 * and how much is spent on this expense every month
 * @author Bobby Liang
 *
 */

public class Expense {

    private String expenseName;
    private double januaryExpenses;
    private double februaryExpenses;
    private double marchExpenses;
    private double aprilExpenses;
    private double mayExpenses;
```

```java
private double juneExpenses;
private double julyExpenses;
private double augustExpenses;
private double septemberExpenses;
private double octoberExpenses;
private double novemberExpenses;
private double decemberExpenses;


//empty constructor
public Expense() {
}

/**
 * Constructor that creates a new expense with a given name
 * @param newName, the name of the expense
 */
public Expense(String newName) {
	setExpenseName(newName);
}

/**
 * Method that sets the name of the expense
 * @param newName, the name of the expense
 */
public void setExpenseName(String newName) {
	expenseName = newName;
}

/**
 * Modifier method that sets the expenses spent in January
 * @param jan, the amount spent in January
 */
public void setJanuary(double jan) {
	januaryExpenses = jan;
}

/**
 * Modifier method that sets the expenses spent in February
 * @param feb, the amount spent in February
 */
public void setFebruary(double feb) {
	februaryExpenses = feb;
}

/**
 * Modifier method that sets the expenses spent in March
 * @param mar, the amount spent in March
 */
public void setMarch(double mar) {
	marchExpenses = mar;
}

/**
 * Modifier method that sets the expenses spent in April
```

```
 * @param apr, the amount spent in April
 */
public void setApril(double apr) {
	aprilExpenses = apr;
}

/**
 * Modifier method that sets the expenses spent in May
 * @param may, the amount spent in May
 */
public void setMay(double may) {
	mayExpenses = may;
}

/**
 * Modifier method that sets the expenses spent in June
 * @param jun, the amount spent in June
 */
public void setJune(double jun) {
	juneExpenses = jun;
}

/**
 * Modifier method that sets the expenses spent in July
 * @param jul, the amount spent in July
 */
public void setJuly(double jul) {
	julyExpenses = jul;
}

/**
 * Modifier method that sets the expenses spent in August
 * @param aug, the amount spent in August
 */
public void setAugust(double aug) {
	augustExpenses = aug;
}

/**
 * Modifier method that sets the expenses spent in September
 * @param sept, the amount spent in September
 */
public void setSeptember(double sept) {
	septemberExpenses = sept;
}

/**
 * Modifier method that sets the expenses spent in October
 * @param oct, the amount spent in October
 */
public void setOctober(double oct) {
	octoberExpenses = oct;
}

/**
```

```java
 * Modifier method that sets the expenses spent in November
 * @param nov, the amount spent in November
 */
public void setNovember(double nov) {
	novemberExpenses = nov;
}

/**
 * Modifier method that sets the expenses spent in December
 * @param dec, the amount spent in December
 */
public void setDecember(double dec) {
	decemberExpenses = dec;
}

/**
 * Accessor method that returns the name of the expense
 * @return expenseName, the name of the expense
 */
public String getExpenseName() {
	return expenseName;
}

/**
 * Accessor method that returns the money spent in January
 * @return januaryExpenses, amount spent on expense in January
 */
public double getJanuary() {
	return januaryExpenses;
}

/**
 * Accessor method that returns the money spent in February
 * @return februaryExpenses, amount spent on expense in February
 */
public double getFebruary() {
	return februaryExpenses;
}

/**
 * Accessor method that returns the money spent in March
 * @return marchExpenses, amount spent on expense in March
 */
public double getMarch() {
	return marchExpenses;
}

/**
 * Accessor method that returns the money spent in April
 * @return aprilExpenses, amount spent on expense in April
 */
public double getApril() {
	return aprilExpenses;
}
```

```java
/**
 * Accessor method that returns the money spent in May
 * @return mayExpenses, amount spent on expense in May
 */
public double getMay() {
	return mayExpenses;
}

/**
 * Accessor method that returns the money spent in June
 * @return juneExpenses, amount spent on expense in June
 */
public double getJune() {
	return juneExpenses;
}

/**
 * Accessor method that returns the money spent in July
 * @return julyExpenses, amount spent on expense in July
 */
public double getJuly() {
	return julyExpenses;
}

/**
 * Accessor method that returns the money spent in August
 * @return augustExpenses, amount spent on expense in August
 */
public double getAugust() {
	return augustExpenses;
}

/**
 * Accessor method that returns the money spent in September
 * @return septemberExpenses, amount spent on expense in September
 */
public double getSeptember() {
	return septemberExpenses;
}

/**
 * Accessor method that returns the money spent in October
 * @return octoberExpenses, amount spent on expense in October
 */
public double getOctober() {
	return octoberExpenses;
}

/**
 * Accessor method that returns the money spent in November
 * @return novemberExpenses, amount spent on expense in November
 */
public double getNovember() {
	return novemberExpenses;
}
```

```
	/**
	 * Accessor method that returns the money spent in December
	 * @return decemberExpenses, amount spent on expense in December
	 */
	public double getDecember() {
		return decemberExpenses;
	}

	/**
	 * Method that returns the yearly total spent on an expense
	 * @return the sum of all monthly expenses
	 */

	public double getYearlyTotal() {
		return januaryExpenses + februaryExpenses + marchExpenses +
aprilExpenses + mayExpenses + juneExpenses + julyExpenses
				+ augustExpenses + septemberExpenses + octoberExpenses +
novemberExpenses + decemberExpenses;
	}

}
```

ExpenseLinkedList.java

```
package expenditureprogram;

/**
 * This class stores all ExpenseNodes in a custom linked list and allows the
Spreadsheet class
 * to modify the linked list based on user input
 * @author Bobby Liang
 *
 */

public class ExpenseLinkedList {

	private ExpenseNode head;
	private ExpenseNode tail;
	private int size = 0;

	/**
	 * Method returns the size of the linked list
	 * @return size, the size of the linked list
	 */
	public int getSize() {
		return size;
	}

	/**
	 * Method to add a node at the end of the linked list
	 * @param expense, a valid Expense
	 */
	public void addBack (Expense expense) {
```

```
		if (head == null) {
			head = new ExpenseNode(expense, null, null);
			tail = head;
		} else {
			ExpenseNode node = new ExpenseNode (expense, null, tail);
			this.tail.setNext(node);
			this.tail = node;
		}
		size++;
	}

	/**
	 * Removes the head of the linked list
	 * @return temp, the ExpenseNode corresponding to the head of the linked list
	 */
	public ExpenseNode removeFront() {
		// the linked list is already empty, so null is returned
		if (head == null) {
			return null;
		}

		ExpenseNode temp = head;
		head = head.getNext();
		// unlink it from the linked list
		temp.setNext(null);
		// size of linked list decreases by one
		size--;
		return temp;
	}

	/**
	 * Method to delete an expense at a specific index
	 * @param i, the index of the specified expense in the linked list
	 */
	public void deleteAt(int i) {
		// if the linked list is empty, nothing happens
		if (head == null) {
			return;
		}

		// store the head node
		ExpenseNode temp = head;

		if (i == 0) {
			head = temp.getNext();
			return;
		}

		// search for the previous node of the node to be deleted
		for (int j = 0; temp != null && j < i-1; j++) {
			temp = temp.getNext();
		}

		// if the selected index is more than the number of nodes, nothing is
returned
```

```
            if (temp == null || temp.getNext() == null) {
                  return;
            }

            // the ExpenseNode temp.getNext is the selected node to be deleted
            // store the pointer to the next of the ExpenseNode to be deleted
            ExpenseNode next = temp.getNext().getNext();

            // unlink the deleted node from the list
            temp.setNext(next);
            // size of the linked list decrements by one
            size--;
      }



      /**
       * Method to access an expense given a specific index
       * @param i, the position of the expense in the linked list
       * @return current.getExpense(), the expense stored in the ExpenseNode
       */
      public Expense getExpense(int i) {
            ExpenseNode current = head;
            int count = 0;

            while (current != null) {
                  if (count == i) {
                        return current.getExpense();
                  }
                  count++;
                  current = current.getNext();
            }
            // the user was asking for a non-existent element, so
            // assert fail
            assert (false);
            return null;
      }

}
```

ExpenseNode.java

```
package expenditureprogram;

/**
 * This class stores the nodes of the ExpenseLinkedList
 * @author Bobby Liang
 *
 */

public class ExpenseNode {

      private ExpenseNode next;
      private ExpenseNode prev;
```

```
	private Expense node;

	/**
	 * Constructor that creates an expense node and sets the positions in front
and behind it
	 * @param node, the expense stored in this node
	 * @param next, the ExpenseNode in front of this node
	 * @param prev, the ExpenseNode behind this node
	 */
	public ExpenseNode(Expense node, ExpenseNode next, ExpenseNode prev) {
		this.node = node;
		this.next = next;
		this.prev = prev;
	}

	/**
	 * Modifier method that sets the expense of this node
	 * @param node, the Expense of the current node
	 */
	public void setValue (Expense node) {
		this.node = node;
	}

	/**
	 * Modifier method that links the next node to the current one
	 * @param node, the next ExpenseNode
	 */
	public void setNext (ExpenseNode node) {
		next = node;
	}

	/**
	 * Modifier method that links the previous node to the current one
	 * @param node, the previous ExpenseNode
	 */
	public void setPrev (ExpenseNode node) {
		prev = node;
	}

	/**
	 * Method that returns the data stored in the ExpenseNode
	 * @return node, the Expense stored in the ExpenseNode
	 */
	public Expense getExpense() {
		return node;
	}

	/**
	 * Accessor method that returns the node in front of the current node
	 * @return next, the node in front of a specific node
	 */
	public ExpenseNode getNext() {
		return next;
	}
```

```
	/**
	 * Accessor method that returns the node behind the current node
	 * @return prev, the node behind a specific node
	 */
	public ExpenseNode getPrev() {
		return prev;
	}

}
```

Login.java

```
package expenditureprogram;

import java.awt.Font;
import java.awt.Panel;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.io.IOException;
import java.io.RandomAccessFile;

import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JLabel;
import javax.swing.JOptionPane;
import javax.swing.JPanel;
import javax.swing.JPasswordField;
import javax.swing.JTextField;

/**
 * This class displays the login screen when the user launches the program
 * @author Bobby Liang
 *
 */

public class Login extends JFrame {

	// declaration of instance fields
	private JLabel userLabel;
	private JLabel passwordLabel;
	private JLabel title;
	private static JTextField userText;
	private JPasswordField passwordText;
	private JButton loginButton;
	private JButton registerButton;
	private static JPanel loginPanel;

	/**
	 * Constructor that sets the design of the login screen
	 */
	public Login() {
		// sets the title, size, and close operation of the window
		super("Expenditures Program");
		setSize(500, 500);
```

```
		setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);


		// initializing the panel and adding it to the window
		loginPanel = new JPanel();
		loginPanel.setLayout(null);
		add(loginPanel);

		// Initializing buttons, text fields, and labels
		title = new JLabel("Login");
		title.setBounds(200, 10, 80, 25);
		title.setFont(new Font("Verdana", 1, 20));

		userLabel = new JLabel("Username");
		userLabel.setBounds(125, 80, 80, 25);

		userText = new JTextField(20);
		userText.setBounds(200, 80, 165, 25);

		passwordLabel = new JLabel("Password");
		passwordLabel.setBounds(125, 160, 80, 25);

		// changes the password into dots, hides the password information
		passwordText = new JPasswordField();
		passwordText.setBounds(200, 160, 165, 25);

		registerButton = new JButton("Register");
		registerButton.setBounds(270, 240, 100, 25);
		registerButton.addActionListener(new ActionListener() {
			public void actionPerformed(ActionEvent e) {
				// if the user is not registered, then the user is
redirected to the register section
				if (!userRegistered()) {
					userText.setText("");
					passwordText.setText("");
					loginPanel.hide();
					Register newUser = new Register();
					// adds the panel onto the JFrame
					add(newUser);
				// otherwise, the user already has an account and can
proceed to login
				} else {
					JOptionPane.showMessageDialog(null, "You already
registered! \nPlease login.", "User already registered",
							JOptionPane.NO_OPTION);
				}
			}
		});

		loginButton = new JButton("Login");
		loginButton.setBounds(125, 240, 80, 25);
		loginButton.addActionListener(new ActionListener() {
			public void actionPerformed(ActionEvent e) {
				// if the username and password match, the login screen
will be disposed and the user enters the menu
```

```
                        if (checkCredentials()) {
                                loginPanel.hide();
                                new Menu();
                                setVisible(false);
                        // otherwise, the user entered invalid login credentials
                        } else {
                                JOptionPane.showMessageDialog(null, "Invalid login
credentials! \nPlease try again.", "Login Error",
                                                JOptionPane.ERROR_MESSAGE);
                        }
                }
        });

        // adds all text fields, labels, and buttons to the panel
        loginPanel.add(title);
        loginPanel.add(userLabel);
        loginPanel.add(userText);
        loginPanel.add(passwordLabel);
        loginPanel.add(passwordText);
        loginPanel.add(registerButton);
        loginPanel.add(loginButton);

        // sets the frame to be visible
        setVisible(true);
    }

    /**
     * Method that determines whether the user has registered or not
     * @return true if the text file exists, false if the text file does not exist
     */
    public static boolean userRegistered() {
        try {
                final RandomAccessFile users = new RandomAccessFile("users.txt",
"rw");
                // if the text file does not exist, then the user has not
registered and return false, otherwise return true
                if (users.length() == 0L) {
                        return false;
                } else {
                        return true;
                }
        } catch (IOException e) {
                e.getMessage();
        }
        return false;
    }

    /**
     * Method that determines whether the user's username and password match
     * @return true if the username and password match the credentials saved in
the text file, otherwise return false
     */
    public boolean checkCredentials() {
        boolean loggedIn = false;
        try {
```

```
                    RandomAccessFile credentials = new RandomAccessFile("users.txt",
"r");

                    String readFile = credentials.readLine();
                    String name = readFile.substring(0, readFile.indexOf("\\"));
                    String savedPassword = readFile.substring(readFile.indexOf("\\")
+ 1);

                    String password = "";

                    //
                    for (int i = 0; i < savedPassword.length(); ++i) {
                int j = savedPassword.charAt(i) + '\u0003';
                password += (char)j;
            }

                    if (name.equals(userText.getText()) &&
password.equals(passwordText.getText())) {
                          loggedIn = true;
                    } else {
                          loggedIn = false;
                    }
                    credentials.close();
             } catch (IOException e) {
                    e.getMessage();
             }
             return loggedIn;
       }

       /**
        * Method for the user to return to the login screen
        */
       public static void returnToLogin() {
             loginPanel.setVisible(true);
       }

       /**
        * Accessor method to get the username of the user
        * @return a String within the userText text field
        */
       public static String getUsername() {
             return userText.getText();
       }

}
```

Menu.java

```
package expenditureprogram;


import java.awt.Font;
```

```
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.io.File;
import java.io.IOException;
import java.util.Scanner;

import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JLabel;
import javax.swing.JOptionPane;
import javax.swing.JPanel;
import javax.swing.SwingConstants;

/**
 * This class displays the main menu of the program once the user has logged in
 * @author Bobby Liang
 *
 */

public class Menu extends JFrame {

	// declaration of variables
	private static JPanel menuPanel;
	private JLabel menuTitle;
	private JLabel userLabel;
	private JButton exitButton;
	private JButton existingSpreadsheetButton;
	private JButton newSpreadsheetButton;
	private static String spreadsheetName;
```

```
/**
 * Constructor that displays the design and layout of the menu
 */
public Menu() {
	super("Expenditures Menu");
	menuPanel = new JPanel();
	this.setSize(500, 500);
	// default close operation
	this.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
	this.setResizable(false);
	// adds the JPanel to the window
	this.add(menuPanel);

	menuPanel.setLayout(null);

	// initialization of labels and buttons
	menuTitle = new JLabel("Expenditures Menu");
	menuTitle.setBounds(145, 10, 400, 25);
	menuTitle.setFont(new Font("Verdana", 1, 20));

	String welcomeMessage = "Welcome " + Login.getUsername() + "!";

	userLabel = new JLabel(welcomeMessage);
	userLabel.setBounds(120, 65, 300, 25);
	userLabel.setFont(new Font("Verdana", 1, 20));

	existingSpreadsheetButton = new JButton("Select Existing Spreadsheet");
	existingSpreadsheetButton.setBounds(25, 110, 200, 50);
```

```
		existingSpreadsheetButton.addActionListener(new ActionListener() {
			public void actionPerformed(ActionEvent arg0) {
				// redirects user to new JFrame to choose saved spreadsheets
				if (checkFileExists()) {
					new SpreadsheetSelect();
					dispose();
				// there are no spreadsheets that are saved because the file containing the spreadsheet
				// names does not exist
				} else {
					JOptionPane.showMessageDialog(null, "You have no saved spreadsheets!",
							"Spreadsheet loading error", JOptionPane.INFORMATION_MESSAGE);
				}

			}
		});

		newSpreadsheetButton = new JButton("Create New Spreadsheet");
		newSpreadsheetButton.setBounds(250, 110, 200, 50);
		newSpreadsheetButton.addActionListener(new ActionListener() {
			public void actionPerformed(ActionEvent arg0) {
				spreadsheetName = JOptionPane.showInputDialog("Enter a name for your spreadsheet:");
				// the spreadsheet name cannot be left blank
				if (spreadsheetName == null || (spreadsheetName != null && ("".equals(spreadsheetName)))) {
					JOptionPane.showMessageDialog(null, "Spreadsheet name cannot be left blank.",
```

```
                                                    "Spreadsheet Name Error",
JOptionPane.INFORMATION_MESSAGE);
                        // the spreadsheet name cannot be the same name as a previously
stored spreadsheet
                        } else if (checkNameExists(spreadsheetName)){
                                JOptionPane.showMessageDialog(null, "This spreadsheet name
already exists! \nPlease choose a different name.",
                                                    "Spreadsheet Name Error",
JOptionPane.ERROR_MESSAGE);
                        } else {
                                Spreadsheet sheet = new Spreadsheet(spreadsheetName, new
ExpenseLinkedList());
                                new DisplaySpreadsheet(sheet);
                                dispose();
                        }
                }
        });

        exitButton = new JButton("Log out");
        exitButton.setBounds(175, 250, 125, 40);

        exitButton.addActionListener(new ActionListener() {
                @Override
                public void actionPerformed(ActionEvent arg0) {
                        // TODO Auto-generated method stub
                        System.exit(0);
                }
        });
```

```
        // adding the buttons and labels to the menu panel
        menuPanel.add(menuTitle);
        menuPanel.add(userLabel);
        menuPanel.add(existingSpreadsheetButton);
        menuPanel.add(newSpreadsheetButton);
        menuPanel.add(exitButton);
        this.setVisible(true);

}

/**
 * Checks whether the user input for the spreadsheet name is stored in listOfSpreadsheets.txt
 * @param name, the name of the spreadsheet
 * @return true if the spreadsheet name already exists, false otherwise
 */
public boolean checkNameExists(String name) {
        try {
                // file name is specified
                File file = new File("listOfSpreadsheets.txt");
                // create the file if the file is not already created
                if (!file.exists()) {
                        file.createNewFile();
                }

                Scanner scanner = new Scanner(file);
                while (scanner.hasNextLine()) {
                        String line = scanner.nextLine();
                        if (line.equals(name)) {
                                scanner.close();
```

```
                                        return true;
                                }
                        }
                        scanner.close();
                } catch (IOException e) {
                        e.printStackTrace();
                }
                return false;
}

/**
 * Checks whether the listOfSpreadsheets.txt exists
 * Useful when the user logs in the first time and does not have any saved spreadsheets
 * @return true if it does, false otherwise
 */
public boolean checkFileExists() {
        // file name is specified
        File file = new File("listOfSpreadsheets.txt");
        // create the file if the file is not already created
        if (!file.exists()) {
                return false;
        } else {
                return true;
        }
}

/**
 * Returns the user input for the spreadsheet name
 * @return spreadsheetName, the name of the spreadsheet
```

```
	 */
	public static String getSpreadsheetName() {
		return spreadsheetName;
	}

	/**
	 * Method that returns the user to the main menu
	 */
	public static void returnToMenu() {
		menuPanel.setVisible(true);
	}

}
```

Register.java

```
package expenditureprogram;

import java.awt.BorderLayout;
import java.awt.Font;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.io.IOException;
import java.io.RandomAccessFile;

import javax.swing.JButton;
import javax.swing.JLabel;
import javax.swing.JOptionPane;
import javax.swing.JPanel;
import javax.swing.JPasswordField;
import javax.swing.JTextField;
```

```
/**
 * This class displays the register section of the program, used only when the user logs into the program
 * without an account
 * @author Bobby Liang
 *
 */

public class Register extends JPanel {

	private static boolean isRegistered = false;

	// text field declaration
	private static JTextField userText;
	private static JPasswordField passwordText;

	// button declaration
	private static JButton register;
	private static JButton back;

	// label declaration
	private static JLabel userLabel;
	private static JLabel passwordLabel;
	private static JLabel title;

	// string declaration
	private String username;
	private String password;
```

```
/**
 * Constructor that sets the layout of the Register class
 */
public Register() {
	super(new BorderLayout());

	// adds title to the middle of the panel
	title = new JLabel("Account Registration");
	title.setBounds(125, 10, 300, 25);
	title.setFont(new Font ("Verdana", 1, 20));
	add(title);

	// sets title and location of username
	userLabel = new JLabel("Create a username");
	userLabel.setBounds(75, 80, 300, 25);
	// adds the label onto the panel
	add(userLabel);

	// indicates the length of the text field
	userText = new JTextField(20);
	// the location of the text field
	userText.setBounds(200,80,165,25);
	add(userText);

	// initializing password label
	passwordLabel = new JLabel("Create a password");
	passwordLabel.setBounds(75, 160, 300, 25);
	add(passwordLabel);
```

```
		// changes the password into dots, hides the password information
		passwordText = new JPasswordField();
		passwordText.setBounds(200, 160, 165, 25);
		add(passwordText);

		// register button
		register = new JButton ("Register");
		register.setBounds(270, 240, 100, 25);
		add(register);
		// once the register button is clicked, calls on the createAccount method
		register.addActionListener (new ActionListener() {
			public void actionPerformed (ActionEvent e) {
				if (userText.getText().equals("") || passwordText.getText().equals("")) {
					JOptionPane.showMessageDialog(null, "Username and
password fields cannot be left blank. \nPlease try again.", "Login Error",
							JOptionPane.ERROR_MESSAGE);
				} else {
					createAccount();
					if (isRegistered = true) {
						hide();
						Login.returnToLogin();
					}
				}
			}
		});

		// back button to return to the login screen
		back = new JButton ("Back to Login");
		back.setBounds(75, 240, 125, 25);
```

```
		add(back);
		back.addActionListener(new ActionListener() {
			public void actionPerformed (ActionEvent e) {
				hide();
				Login.returnToLogin();
			}
		});

		setLayout(null);
	}

	/**
	 * Method to create an account for the user
	 */
	public void createAccount() {
		// gets the user input in the username and password text fields
		String username = userText.getText();
		String password = passwordText.getText();
		String modifiedPassword = "";

		//String savedCredentials = "";
		try {
			// creates a new text file storing the user's credentials
			RandomAccessFile credentials = new RandomAccessFile("users.txt", "rw");
			for (int i = 0; i < password.length(); ++i) {
	// encodes the password using the Caesar cipher by shifting characters of password back three letters
				int k = password.charAt(i) - '\u0003';
	modifiedPassword += (char)k;
```

```
	}
			credentials.writeBytes(username + "\\" + modifiedPassword + "\n");
			credentials.writeBytes("");
		} catch (IOException e) {
			System.out.println("Error with saving file.");
			isRegistered = false;
		}
		userText.setText("");
		passwordText.setText("");
		JOptionPane.showMessageDialog(null, "Account successfully created. You will be redirected to the login page.", "Account succesfully created",
				JOptionPane.INFORMATION_MESSAGE);
		isRegistered = true;

	}

}
```

Run.java

```
package expenditureprogram;

import javax.swing.SwingUtilities;

/**
 * This class allows the user to launch and run the program
 * @author Bobby Liang
 *
 */

public class Run {

	public static void main(String[] args) {
		// TODO Auto-generated method stub
		SwingUtilities.invokeLater(new Runnable() {
			public void run() {
				new Login();
			}
		});

	}
```

```
}
```

Spreadsheet.java

```
package expenditureprogram;

import javax.swing.table.AbstractTableModel;

/**
 * This class displays the expenses in a table, similar to a spreadsheet format
 * @author Bobby Liang
 *
 */

public class Spreadsheet extends AbstractTableModel {

	// testing with column names and cells
	private String[] months = {"Expense Name", "Jan", "Feb", "Mar", "Apr", "May",
"Jun", "Jul", "Aug", "Sept", "Oct", "Nov", "Dec",
			"Yearly Total" };

	private ExpenseLinkedList list;
	private String sheetName;

	/**
	 * Constructor
	 * Description: Constructs a spreadsheet with a specified name and stores data
in a
	 * custom linked list
	 * @param name, the name of the spreadsheet
	 * @param list, the ExpenseLinkedList where data will be stored
	 *
	 */
	public Spreadsheet(String name, ExpenseLinkedList list) {
		sheetName = name;
		this.list = list;
	}

	/**
	 * Accessor method to return the spreadsheet name
	 * @return sheetName, the name of the spreadsheet
	 */
	public String getSpreadsheetName() {
		return sheetName;
	}

	/**
	 * Mutator method to change the spreadsheet name
	 * @param name, the name of the spreadsheet
	 */
	public void setSpreadsheetName(String name) {
		sheetName = name;
```

```
	}

	/**
	 * Method to remove a row from the spreadsheet
	 * @param i, the index of the row
	 */
	public void removeExpense(int i) {
		// if the index of the chosen expense is the head of the linked list,
use method removeFront()
		if (i == 0) {
			list.removeFront();
		} else {
			list.deleteAt(i);
		}
		fireTableRowsDeleted(i, i);
		fireTableDataChanged();
	}


	/**
	 * Method to add a row to the spreadsheet
	 * @param expense, a valid Expense to be added
	 */
	public void addExpense(Expense expense) {
		int row = list.getSize();
		list.addBack(expense);
		fireTableRowsInserted(row, row);
	}

	/**
	 * Returns the number of columns in the spreadsheet
	 */
	public int getColumnCount() {
		return months.length;
	}

	/**
	 * Return the number of rows in the spreadsheet
	 */
	public int getRowCount() {
		return list.getSize();
	}

	/**
	 * Return the names of each column in the spreadsheet
	 *
	 */
	public String getColumnName(int col) {
		return months[col];
	}

	/**
	 * Change the value of a cell in an expense on the spreadsheet
	 */
	public void setValueAt(Object value, int rowIndex, int colIndex) {
```

```
        Expense expense = list.getExpense(rowIndex);

        String strValue = String.valueOf(value);

        // change this value to the original cell value
        double doubleValue = 0;

        if (colIndex == 0) {
              expense.setExpenseName(strValue);
        }

        try {
              doubleValue = Double.valueOf(strValue);
        } catch (NumberFormatException e) {
              e.getMessage();
        }

        switch (colIndex) {
        case 1:
                 expense.setJanuary(doubleValue);
        case 2:
                 expense.setFebruary(doubleValue);
        case 3:
                 expense.setMarch(doubleValue);
        case 4:
                 expense.setApril(doubleValue);
        case 5:
                 expense.setMay(doubleValue);
        case 6:
                 expense.setJune(doubleValue);
        case 7:
                 expense.setJuly(doubleValue);
        case 8:
                 expense.setAugust(doubleValue);
        case 9:
                 expense.setSeptember(doubleValue);
        case 10:
                 expense.setOctober(doubleValue);
        case 11:
                 expense.setNovember(doubleValue);
        case 12:
                 expense.setDecember(doubleValue);
        }
        fireTableRowsUpdated(rowIndex, colIndex);
}

/**
 * Return the object of a cell in the expense
 */
public Object getValueAt(int rowIndex, int colIndex) {
        Expense expense = list.getExpense(rowIndex);
        if (expense == null) {
              return null;
        }
```

```
                switch (colIndex) {
                case 0:
                        return expense.getExpenseName();
                case 1:
                        return expense.getJanuary();
                case 2:
                        return expense.getFebruary();
                case 3:
                        return expense.getMarch();
                case 4:
                        return expense.getApril();
                case 5:
                        return expense.getMay();
                case 6:
                        return expense.getJune();
                case 7:
                        return expense.getJuly();
                case 8:
                        return expense.getAugust();
                case 9:
                        return expense.getSeptember();
                case 10:
                        return expense.getOctober();
                case 11:
                        return expense.getNovember();
                case 12:
                        return expense.getDecember();
                case 13:
                        return expense.getYearlyTotal();
                default:
                        return null;
                }

        }

}
```

SpreadsheetSelect.java

```
package expenditureprogram;


import java.awt.BorderLayout;

import java.awt.Dimension;

import java.awt.EventQueue;

import java.awt.Font;

import java.awt.GridBagConstraints;

import java.awt.GridBagLayout;
```

```
import java.awt.GridLayout;
import java.awt.Insets;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.io.BufferedReader;
import java.io.File;
import java.io.FileReader;
import java.io.IOException;
import java.util.ArrayList;
import java.util.logging.Level;
import java.util.logging.Logger;

import javax.swing.BoxLayout;
import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JLabel;
import javax.swing.JLayeredPane;
import javax.swing.JPanel;
import javax.swing.JScrollPane;
import javax.swing.border.EmptyBorder;

/**
 * This class displays a frame where the user can select previously stored spreadsheets of expenses
 * @author Windows
 *
 */

public class SpreadsheetSelect extends JFrame {
```

```
	private JButton back;
	private JLabel existingLabel;
	private static JPanel mainPanel;

	private String [] array;

	/**
	 * Constructor that displays the layout of the JFrame and panel
	 */
	public SpreadsheetSelect() {
		// sets the title of the JFrame
		super("Existing Spreadsheets.");
		// sets the size of the window
		setSize(500, 500);
		// default close operation
		setDefaultCloseOperation(JFrame.DISPOSE_ON_CLOSE);
		// the window cannot be resized
		setResizable(false);
		mainPanel = new JPanel();
		mainPanel.setLayout(new GridBagLayout());

		back = new JButton ("Back to Menu.");
		//back.setBounds(350, 10, 125, 25);
		back.addActionListener(new ActionListener() {
			public void actionPerformed(ActionEvent arg0) {
				// if the back button is pressed, user directed back to the menu and this
frame closes
				dispose();
				new Menu();
```

```
                }
            });

            // adds the labels and buttons to the panel
            initJComponents();

            // adds the vertical scroll pane to the panel and window
            JScrollPane scrollPane = new JScrollPane(mainPanel,
JScrollPane.VERTICAL_SCROLLBAR_AS_NEEDED,
                JScrollPane.HORIZONTAL_SCROLLBAR_NEVER);
            this.add(scrollPane);



            // sets the JFrame to be visible
            setVisible(true);
        }

        /**
         * Method that initializes all buttons and their layout and adds them to the main panel
         */
        public void initJComponents() {
            // initializing the GridBagConstraints and adding components to it
            GridBagConstraints gbc = new GridBagConstraints();
            gbc.anchor = GridBagConstraints.NORTH;
            gbc.fill = GridBagConstraints.VERTICAL;

            gbc.gridx = 1;
            gbc.gridy = 0;
```

```
// adding the label to the GridBagConstraint and JPanel
existingLabel = new JLabel ("Existing Spreadsheets");
existingLabel.setFont(new Font("Verdana", 1, 20));
mainPanel.add(existingLabel, gbc);
gbc.insets = new Insets(10,10,10,10);
gbc.gridx--;

// adding the back button to the panel
mainPanel.add(back, gbc);

// calls the method that parses the text file where all spreadsheet names are stored
// and initializes a String array to contain the spreadsheet names
addButtonsSpreadsheets();
gbc.gridwidth = 2;

for(int i = 0; i < array.length; i++) {
	// add a new button for each spreadsheet name
	JButton button = new JButton (array[i]);
	int temp = i;
	button.addActionListener(new ActionListener() {
		public void actionPerformed(ActionEvent arg0) {
			// when button is clicked, load the spreadsheet and dispose the
window
			loadSpreadsheet(array[temp]);
			dispose();
		}
	});
gbc.gridy++;
// adds the buttons to the screen
```

```
            mainPanel.add(button, gbc);
            }
}

/**
 * Method that stores the spreadsheet names from the text file into a String array
 * The array should be initialized after this method call
 */
private void addButtonsSpreadsheets() {
            // local variable that counts the number of lines in the listOfSpreadsheets text file
            int counter = 0;
            File spreadsheetNames = new File ("listOfSpreadsheets.txt");
            try {
                        FileReader fr = new FileReader(spreadsheetNames);
                        BufferedReader br = new BufferedReader(fr);
                        String line = br.readLine();
                        while (line != null) {
                                    // determines the number of spreadsheet names in the text file
                                    counter++;
                                    line = br.readLine();
                        }
                        br.close();
            } catch (IOException e) {
                        e.printStackTrace();
            }

            // creates new array to store the spreadsheet names in the program
            array = new String[counter];
            // reset the counter to initialize the contents in the array
```

```
		counter = 0;
		// reads the file again
		File spreadsheetNames2 = new File ("listOfSpreadsheets.txt");
		try {
			FileReader fr = new FileReader(spreadsheetNames2);
			BufferedReader br = new BufferedReader(fr);
			String line = br.readLine();
			while (line != null) {
				// store the spreadsheet names into an array
				array[counter] = line;
				counter++;
				line = br.readLine();
			}
			br.close();
		} catch (IOException e) {
			e.printStackTrace();
		}
}

/**
 * Loads the spreadsheet that the user chooses to click
 * @param sheetName, the name of the spreadsheet
 * On button click, the saved spreadsheet will be displayed
 */
private void loadSpreadsheet(String sheetName) {
		// creates a new spreadsheet displaying the saved information
		Spreadsheet sheet = new Spreadsheet(sheetName, new ExpenseLinkedList());
		new DisplaySpreadsheet(sheet);
		String filePath = sheetName + ".txt";
```

```
File file = new File(filePath);

try {
	FileReader fr = new FileReader(file);
	BufferedReader br = new BufferedReader(fr);
	Object [] lines = br.lines().toArray();

	for (int i = 0; i < lines.length; i++) {
		String [] parts = lines[i].toString().split("\\*");
		Expense loadExpense = new Expense();
		loadExpense.setExpenseName(parts[0]);
		for (int j = 1; j < parts.length; j++) {
			switch (j) {
			case 1:
				loadExpense.setJanuary(Double.parseDouble(parts[j]));
			case 2:
loadExpense.setFebruary(Double.parseDouble(parts[j]));
			case 3:
				loadExpense.setMarch(Double.parseDouble(parts[j]));
			case 4:
				loadExpense.setApril(Double.parseDouble(parts[j]));
			case 5:
				loadExpense.setMay(Double.parseDouble(parts[j]));
			case 6:
				loadExpense.setJune(Double.parseDouble(parts[j]));
			case 7:
				loadExpense.setJuly(Double.parseDouble(parts[j]));
```

```
                                        case 8:
                                                loadExpense.setAugust(Double.parseDouble(parts[j]));
                                        case 9:
                loadExpense.setSeptember(Double.parseDouble(parts[j]));
                                        case 10:
                                                loadExpense.setOctober(Double.parseDouble(parts[j]));
                                        case 11:
                loadExpense.setNovember(Double.parseDouble(parts[j]));
                                        case 12:
                loadExpense.setDecember(Double.parseDouble(parts[j]));
                                        }
                                }
                                sheet.addExpense(loadExpense);
                        }
                        br.close();

                } catch (IOException ex) {
                        Logger.getLogger(DisplaySpreadsheet.class.getName()).log(Level.SEVERE, null,
ex);
                }
        }

        public static void main(String[] args) {
                // TODO Auto-generated method stub
                EventQueue.invokeLater(new Runnable() {
                        public void run() {
                                try {
```

```
                                        SpreadsheetSelect frame = new SpreadsheetSelect();
                                        frame.setVisible(true);
                                    } catch (Exception e) {
                                        e.printStackTrace();
                                    }
                                }
                            });

                    }

            }
```