```java
package
sample;


public class Cash {
    private int[][][] array;


    public int[][][] getArray() {
        return array;
    }


    public void setArray(int[][][] array) {
        this.array = array;
    }


    public void setArrayValue(int value, int page, int n, int m) {
        array[page][n][m] = value;
    }


    public int getArrayValue(int page, int n, int m) {
        return array[page][n][m];
    }


    public Cash(int page,int n, int m) {
        array = new int[page][n][m];
    }


}
```

```
package
sample;


        import java.io.FileNotFoundException;
        import java.io.FileReader;
        import java.io.FileWriter;
        import java.io.IOException;
        import java.util.Scanner;


        public class Memory {


            private String fileName;


            public Memory(String fileName) {
                this.fileName = fileName;
            }


            public void randomArray(int[][][] array) {
                for (int i = 0; i < array.length ; i++) {
                    for (int j = 0; j < array[i].length; j++) {
                        for (int k = 0; k < array[i][j].length; k++) {
                            array[i][j][k]= (int) (Math.random()*10000+1);
                        }
                    }
                }
            }


            public void writeArray(int[][][] array) {
                try {
                    FileWriter writer = new FileWriter(fileName);
                    for (int i = 0; i < array.length; i++) {
                        for (int j = 0; j < array[i].length; j++) {
                            for (int k = 0; k < array[i][j].length; k++) {
                                writer.write(array[i][j][k] + " ");
                            }
                            writer.write("\n");
                        }
                        writer.write("\n");
                    }
                    writer.flush();
                } catch (IOException e) {
                    e.printStackTrace();
```

```
        }
    }


    public String readArray() {
        String[] temp = new String[1];
        String result = new String();
        FileReader fr= null;
        try {
            fr = new FileReader(fileName);
        } catch (FileNotFoundException e) {
            e.printStackTrace();
        }
        Scanner scan = new Scanner(fr);
        while (scan.hasNextLine()) {
            temp[0] = scan.nextLine();
            result+=temp[0] +"\n";
        }
        return result;
    }


}
```

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sampl
e;

        import javafx.fxml.FXML;
        import javafx.scene.control.*;

        public class Controller {

            Memory memory;
            Cash cash;

            @FXML
            private TextArea areaMemory;

            @FXML
            private TextArea areaCash;

            @FXML
            private TextField strOne;

            @FXML
            private TextField strkOne;

            @FXML
            private TextField elemOne;

            @FXML
            private TextField value;

            @FXML
            private Button btnRead;

            @FXML
            private Button btnCreate;
```

```
    @FXML
    private TextField strTwo;


    @FXML
    private TextField strkTwo;


    @FXML
    private TextField elemTwo;


    @FXML
    private Button btnWrite;


    @FXML
    private Label labelTime;


    @FXML
    private Label labelElement;


    @FXML
    private Label labelStr;


    public void warning() {
        Alert alert = new Alert(Alert.AlertType.WARNING);
        alert.setTitle("Ошибка");
        alert.setHeaderText("Введите корректные данные!");
        alert.showAndWait();
    }


    @FXML
    public void createMemory() {
        if(strkOne.getText().equals("") || strOne.getText().equals("") ||
elemOne.getText().equals("")) {
            warning();
            return;
        }
        cash = new
Cash(Integer.parseInt(strOne.getText()),Integer.parseInt(strkOne.getText()),Integer
.parseInt(elemOne.getText()));
        memory.randomArray(cash.getArray());
```

```
        memory.writeArray(cash.getArray());
        areaMemory.setText(memory.readArray());
    }


    @FXML
    public void readMemory() {
        if(strkTwo.getText().equals("") || strTwo.getText().equals("") ||
elemTwo.getText().equals("")) {
            warning();
            return;
        }
        if(areaMemory.getText().equals("")) {
            Alert alert = new Alert(Alert.AlertType.WARNING);
            alert.setTitle("Ошибка");
            alert.setHeaderText("Создайте ОП");
            alert.showAndWait();
            return;
        }
        String text = "";
        String str = "";
        String element = "";
        int page = Integer.parseInt(strTwo.getText());
        int n = Integer.parseInt(strkTwo.getText());
        int m = Integer.parseInt(elemTwo.getText());
        for (int i = 0; i < cash.getArray()[page].length; i++) {
            for (int j = 0; j < cash.getArray()[page][i].length; j++) {
                text += String.valueOf(cash.getArrayValue(page,i,j)) + " ";
                if(i==n) {
                    str+=String.valueOf(cash.getArrayValue(page,i,j)) + " ";
                    if(j==m) {
                        element+=String.valueOf(cash.getArrayValue(page,i,j));
                    }
                }
            }
            text+="\n";
        }
        areaCash.setText(text);
        labelStr.setText(str);
        labelElement.setText(element);
    }


    @FXML
    public void changeCashValue() {
        if(strkTwo.getText().equals("") || strTwo.getText().equals("") ||
elemTwo.getText().equals("")) {
            warning();
```

```
            return;
        }
        if(value.getText().equals("")) {
            Alert alert = new Alert(Alert.AlertType.WARNING);
            alert.setTitle("Ошибка");
            alert.setHeaderText("Введите новое значение!");
            alert.showAndWait();
            return;
        }
        int page = Integer.parseInt(strTwo.getText());
        int n = Integer.parseInt(strkTwo.getText());
        int m = Integer.parseInt(elemTwo.getText());
        long startTime = System.nanoTime();
        cash.setArrayValue(Integer.parseInt(value.getText()),page,n,m);
        memory.writeArray(cash.getArray());
        memory.readArray();
        readMemory();
        long endTime = System.nanoTime();
        long timeSpent = endTime - startTime;
        String temp = String.valueOf(timeSpent/1000);
        labelTime.setText(temp + " мс");
    }




    public void initialize() {
        memory = new Memory("memory.txt");
    }




}
```

```
package
sample;

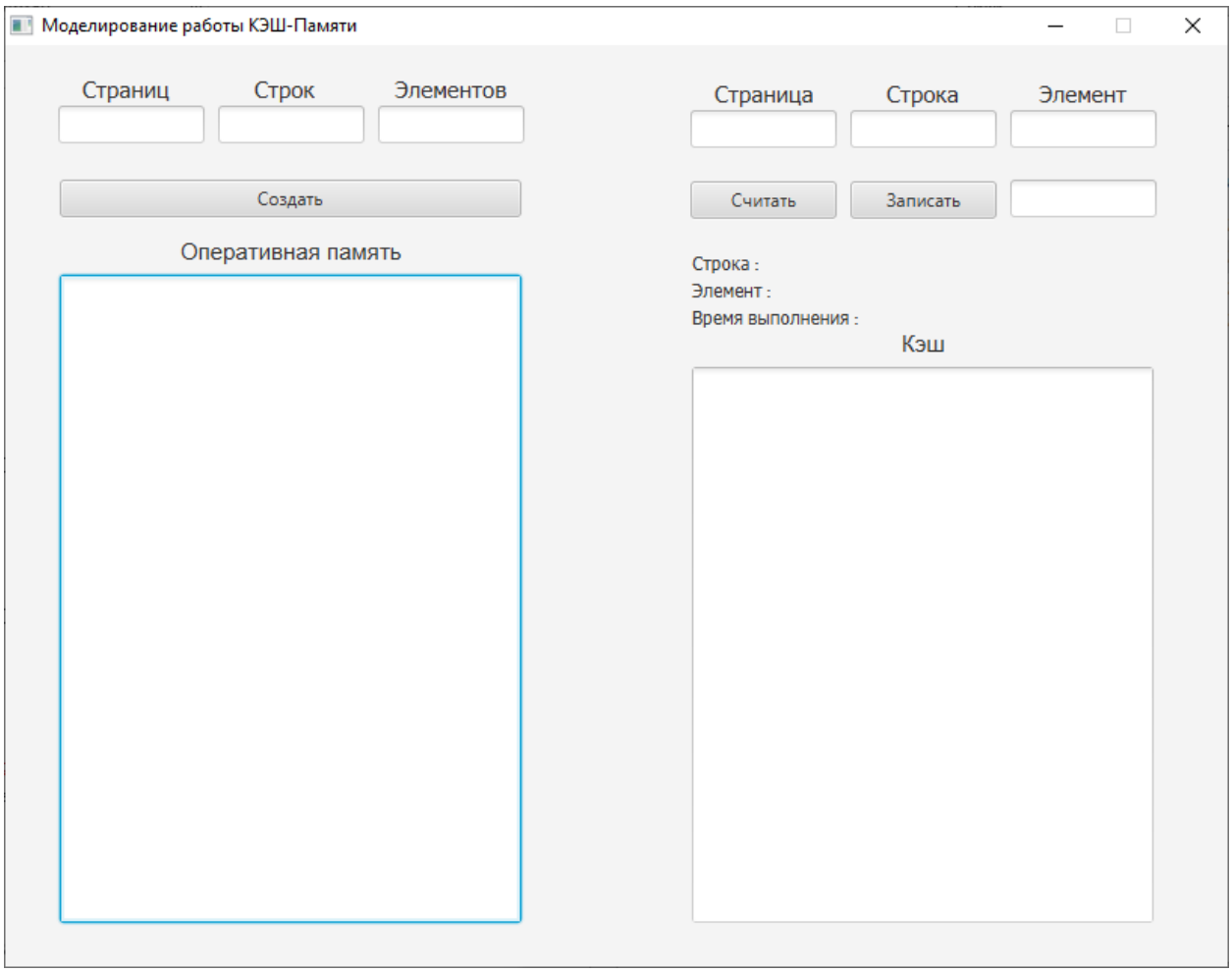

        import javafx.application.Application;
        import javafx.fxml.FXMLLoader;
        import javafx.scene.Parent;
        import javafx.scene.Scene;
        import javafx.stage.Stage;


        public class Main extends Application {


            @Override
            public void start(Stage primaryStage) throws Exception{
                Parent root = FXMLLoader.load(getClass().getResource("sample.fxml"));
                primaryStage.setTitle("Моделирование работы КЭШ-Памяти");
                primaryStage.setScene(new Scene(root, 800, 600));
                primaryStage.show();
                primaryStage.setResizable(false);
            }



            public static void main(String[] args) {
                launch(args);
            }
        }
```


Моделирование работы КЭШ-Памяти
Страниц
Строк
Элементов
Создать
Оперативная память
Страница
Строка
Элемент
Считать
Записать
Строка :
Элемент :
Время выполнения :
Кэш