"UNIT CONVERTER"

Team Name: Team JBK

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Project Description:

A java program that allows the user select a unit of measurement and then converts it into another unit of measurement. For example, a user can select in the terminal menu Area, which would then display the units of measurement of Area. The user would then be prompted to input a value then it would be converted to another unit of measurement they choose after doing so. The answer would be accurate as the answers would be displayed in a double data type which can display decimal points.

Features/Functionality:

- **Unit Selection** - Users can select the type of unit they want to convert (Area, Length, Temperature, Volume, or Mass) by entering a number from 0 to 5.
- **Area, Length, Temperature, Volume, or Mass Conversion** - When the user selects "Area" (option 1), they are prompted to choose the source and target area units. They can convert an area value between different units, including Hectares, Square Centimeters, Square Feet, Square Inches, and Square Meters. The user is asked to input the value they want to convert, and the program calculates and displays the converted value.
- **Exit Option** - Users have the option to exit the program by selecting 0.
- **Invalid Input Handling** - The program provides basic error handling by allowing the user to input values between 0 and 5. It also displays an error message if the input is not valid.
- **Looping and Reusability** - The program can be used repeatedly as it reverts to the main menu after each conversion or upon exiting.
- **Decimal Format** - The program provides the converted values in scientific notation (e.g., 1.22E9cm²) for large numbers to improve readability.
- **Thank You Message** - Upon exiting the program, a thank you message is displayed to acknowledge the user's interaction.
- **Conversion History** - After completing a conversion, you can view your conversion history by entering '6' in the main menu. To delete a specific entry, input 'D' and then provide the index of the conversion you want to remove. If you wish to clear the entire history, input 'C' to start afresh."

Scope and Limitation:

The program only allows the conversion of 5 units namely Area, Length, Temperature, Volume, and Mass. If the user would like to convert other units of conversion like amperes for sound or gauss then the user would not have an option to do so. The user

is limited to what is displayed on the terminal menu which has choices 0-5. The program however would display the answer to the conversions as accurate as possible as the program would display the answers in scientific notation.

Basic Classes:

- class midterm, class Area, class Length, class Temperature, class Volume, class Mass

Class Diagram (UML):
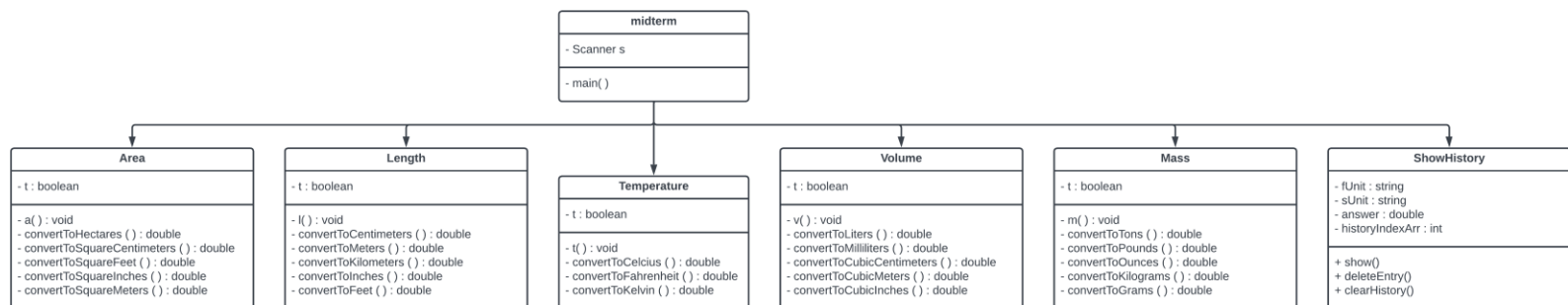
Source Code:

```java
import java.util.Scanner;

public class finals {
        private static String[] fUnit = new String[100];
    private static String[] sUnit = new String[100];
    private static double[] answer = new double[100];
    private static int[] historyIndexArr = new int[100];

        public static void main (String[] args) {

    Scanner s = new Scanner(System.in);
                Area area = new Area();
                Length length = new Length();
                Temperature temp = new Temperature();
```

```java
                Volume volume = new Volume();
                Mass mass = new Mass();
                ShowHistory showHistory = new ShowHistory();

                boolean l=true;

                while (l){

        System.out.println("================================================================
===");
                                System.out.println("=================== WELCOME TO UNIT CONVERTER
===================");

        System.out.println("================================================================
===");
        System.out.println("| | Select a Unit :                              | |");
        System.out.println("| |              [1] Area                        | |");
        System.out.println("| |              [2] Length                      | |");
        System.out.println("| |              [3] Temperature                 | |");
        System.out.println("| |              [4] Volume                      | |");
        System.out.println("| |              [5] Mass                        | |");
        System.out.println("| |              [6] Show history                | |");
        System.out.println("| |              [0] Exit                        | |");

System.out.println("==================================================================");


                System.out.print("Input your choice [0-6]: ");
                int choice1 = s.nextInt();

                switch (choice1) {
                        case 1 :
                                area.a(fUnit, sUnit, answer, historyIndexArr);
                                break;

                        case 2 :
                                length.l(fUnit, sUnit, answer, historyIndexArr);
                                break;

                        case 3 :
                                temp.t(fUnit, sUnit, answer, historyIndexArr);
                                break;

                        case 4 :
                                volume.v(fUnit, sUnit, answer, historyIndexArr);
                                break;

                        case 5 :
                                mass.m(fUnit, sUnit, answer, historyIndexArr);
                                break;

                        case 6:
                showHistory.show(fUnit, sUnit, answer, historyIndexArr);
                break;

                        case 0 :
                                l=false;
                                break;
```

```java
                                default:
                                        System.out.println ("INVALID INPUT!");
                                        break;
                                }
                        }
                        s.close();

        System.out.println("\n==============================================================
=====");
                        System.out.println("======================= T H A N K   Y O U
======================");

        System.out.println("==============================================================
===");
        }
}

class ShowHistory {
    public void show(String[] fUnit, String[] sUnit, double[] answer, int[] historyIndexArr) {
        if (historyIndexArr[0] == 0) {

        System.out.println("\n==============================================================
=====");
            System.out.println("  NO CONVERSION HISTORY AVAILABLE!");

        System.out.println("==============================================================
===\n");
            return;
        }

        Scanner s = new Scanner(System.in);
        boolean t = true;

        while (t) {

System.out.println("==================================================================");
            System.out.println("  CONVERSION HISTORY ");
            for (int i = 0; i < historyIndexArr[0]; i++) {
                System.out.println("     [" + i + "] " + fUnit[i] + " to " + sUnit[i] + " = " + answer[i]);
            }
            System.out.println("-------------------------------------------------------------------");
            System.out.println("        [D] Delete     [C] Clear History     [0] Back");

System.out.println("==================================================================");
            System.out.print("Select an option: ");
            String choice = s.next();

            switch (choice.toUpperCase()) {
                case "D":
                    deleteEntry(fUnit, sUnit, answer, historyIndexArr);
                    break;

                case "C":
                    clearHistory(fUnit, sUnit, answer, historyIndexArr);
                    break;

                case "0":
```

```java
                t = false;
            break;

        default:
            System.out.println("Invalid input. Please try again.");
        }
    }
}

private void deleteEntry(String[] fUnit, String[] sUnit, double[] answer, int[] historyIndexArr) {
    Scanner s = new Scanner(System.in);

    System.out.print("Enter the index to delete: ");
    int index = s.nextInt();

    if (index >= 0 && index < historyIndexArr[0]) {
        for (int i = index; i < historyIndexArr[0] - 1; i++) {
            fUnit[i] = fUnit[i + 1];
            sUnit[i] = sUnit[i + 1];
            answer[i] = answer[i + 1];
        }

        historyIndexArr[0]--;
        System.out.println("Entry deleted successfully!");
    } else {
        System.out.println("Invalid index. Please enter a valid index.");
    }
}

private void clearHistory(String[] fUnit, String[] sUnit, double[] answer, int[] historyIndexArr) {
    for (int i = 0; i < historyIndexArr[0]; i++) {
        fUnit[i] = null;
        sUnit[i] = null;
        answer[i] = 0;
    }
    historyIndexArr[0] = 0;

System.out.println("================================================================");
    System.out.println("  HISTORY CLEARED!");

System.out.println("================================================================");
    }
}

class Area {
    public void a(String[] fUnit, String[] sUnit, double[] answer, int[] historyIndexArr) {
                Scanner s = new Scanner(System.in);
                boolean t=true;

                while(t){
                        System.out.println("---------------------------------");
                        System.out.println("Select Area Unit:");
                        System.out.println("   [1] Hectares(ha)");
                        System.out.println("   [2] Square Centimeters(cm²)");
                        System.out.println("   [3] Square Feet(ft²)");
                        System.out.println("   [4] Square Inches(in²)");
                        System.out.println("   [5] Square Meters(m²)");
                        System.out.println("   [0] Exit");
```

```java
            System.out.println("--------------------------------");

            System.out.print("Input your choice [0-5]: ");
int choice2 = s.nextInt();

switch (choice2) {
    case 1:
        System.out.print("Input value of Hectares(ha): ");
        double hec = s.nextDouble();
        fUnit[historyIndexArr[0]] = hec + " ha";

        System.out.println("---------------------------------");
        System.out.println("Select Area Unit:");
        System.out.println("   [1] Square Centimeters(cm²)");
        System.out.println("   [2] Square Feet(ft²)");
        System.out.println("   [3] Square Inches(in²)");
        System.out.println("   [4] Square Meters(m²)");
        System.out.println("---------------------------------");

        boolean h = true;
        while (h) {
            System.out.print("Convert to: ");
            int unit = s.nextInt();

            if (unit == 1) {
                sUnit[historyIndexArr[0]] = "Square Centimeters(cm²)";
                answer[historyIndexArr[0]] = hec * 10000000;
                System.out.println("==================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + "cm²");
                System.out.println("==================================\n");

                h = false;
                t = false;
            } else if (unit == 2) {
                sUnit[historyIndexArr[0]] = "Square Feet(ft²)";
                answer[historyIndexArr[0]] = hec * 107639.104;
                System.out.println("==================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + "ft²");
                System.out.println("==================================\n");

                h = false;
                t = false;
            } else if (unit == 3) {
                sUnit[historyIndexArr[0]] = "Square Inches(in²)";
                answer[historyIndexArr[0]] = hec * 15500031;
                System.out.println("==================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + "in²");
                System.out.println("==================================\n");

                h = false;
                t = false;
            } else if (unit == 4) {
                sUnit[historyIndexArr[0]] = "Square Meters(m²)";
                answer[historyIndexArr[0]] = hec * 10000;
                System.out.println("==================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + "m²");
                System.out.println("==================================\n");
```

```java
                h = false;
            t = false;
        } else {
            System.out.println("INVALID INPUT!");
        }
    }
// Increment historyIndex after saving the conversion result
historyIndexArr[0]++;
break;

            case 2:

                    System.out.print("Input value of Square Centimeters(cm²): ");
                    double cen = s.nextDouble();
                    fUnit[historyIndexArr[0]] = cen + " cm²";

                    System.out.println("---------------------------------");
                    System.out.println("Select Area Unit:");
                    System.out.println("   [1] Hectares(ha)");
                    System.out.println("   [2] Square Feet(ft²)");
                    System.out.println("   [3] Square Inches(in²)");
                    System.out.println("   [4] Square Meters(m²)");
                    System.out.println("---------------------------------");

                    boolean c=true;
                    while (c) {
                            System.out.print("Convert to: ");
                            int unit = s.nextInt();

                            if (unit == 1){
                                    sUnit[historyIndexArr[0]] = "Hectares(ha)";
        answer[historyIndexArr[0]] = cen / 10000;
        System.out.println("====================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + "ha");
        System.out.println("====================================\n");

        c = false;
        t = false;

                            } else if (unit == 2){
                                    sUnit[historyIndexArr[0]] = "Square Feet(ft²)";
        answer[historyIndexArr[0]] = cen * 0.00107639;
        System.out.println("====================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + "ft²");
        System.out.println("====================================\n");

        c = false;
        t = false;

                            } else if (unit == 3){
                                    sUnit[historyIndexArr[0]] = "Square Inches(in²)";
        answer[historyIndexArr[0]] = cen * 0.1550;
        System.out.println("====================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + "in²");
        System.out.println("====================================\n");

        c = false;
        t = false;
```

```
                                } else if (unit == 4){
                                        sUnit[historyIndexArr[0]] = "Square Meters(m²)";
        answer[historyIndexArr[0]] = cen * 0.0001;
        System.out.println("===================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + "m²");
        System.out.println("===================================\n");

        c = false;
        t = false;

                                } else {
                                        System.out.println("INVALID INPUT!");
                                }
                        }

                        historyIndexArr[0]++;
        break;

                case 3:
                        System.out.print("Input value of Square Feet(ft²): ");
                        double feet = s.nextDouble();
                        fUnit[historyIndexArr[0]] = feet + " ft²";

                        System.out.println("--------------------------------");
                        System.out.println("Select Area Unit:");
                        System.out.println("   [1] Hectares(ha)");
                        System.out.println("   [2] Square Centimeters(cm²)");
                        System.out.println("   [3] Square Inches(in²)");
                        System.out.println("   [4] Square Meters(m²)");
                        System.out.println("--------------------------------");

                        boolean f = true;
                        while (f) {
                                System.out.print("Convert to: ");
                                int unit = s.nextInt();

                                if (unit == 1) {
                                        sUnit[historyIndexArr[0]] = "Hectares(ha)";
                                        answer[historyIndexArr[0]] = feet / 10763.9;

        System.out.println("===================================");
                                        System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + "ha");

        System.out.println("===================================\n");
                                        f = false;
                                        t = false;
                                } else if (unit == 2) {
                                        sUnit[historyIndexArr[0]] = "Square
Centimeters(cm²)";

                                        answer[historyIndexArr[0]] = feet * 929.0304;

        System.out.println("===================================");
                                        System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + "cm²");

        System.out.println("===================================\n");
```

```
                                                f = false;
                                                t = false;
                                        } else if (unit == 3) {
                                                sUnit[historyIndexArr[0]] = "Square Inches(in²)";
                                                answer[historyIndexArr[0]] = feet * 144;

            System.out.println("==================================");
                                                System.out.println(" ANSWER : " +
answer[historyIndexArr[0]] + "in²");

            System.out.println("==================================\n");
                                                f = false;
                                                t = false;
                                        } else if (unit == 4) {
                                                sUnit[historyIndexArr[0]] = "Square Meters(m²)";
                                                answer[historyIndexArr[0]] = feet * 0.092903;

            System.out.println("==================================");
                                                System.out.println(" ANSWER : " +
answer[historyIndexArr[0]] + "m²");

            System.out.println("==================================\n");
                                                f = false;
                                                t = false;
                                        } else {
                                                System.out.println("INVALID INPUT!");
                                        }
                                }

                                historyIndexArr[0]++;
                                break;

                        case 4:
                                System.out.print("Input value of Square Inches(in²): ");
                                double inc = s.nextDouble();
                                fUnit[historyIndexArr[0]] = inc + " in²";

                                System.out.println("---------------------------------");
                                System.out.println("Select Area Unit:");
                                System.out.println("   [1] Hectares(ha)");
                                System.out.println("   [2] Square Centimeters(cm²)");
                                System.out.println("   [3] Square Feet(ft²)");
                                System.out.println("   [4] Square Meters(m²)");
                                System.out.println("---------------------------------");

                                boolean i = true;
                                while (i) {
                                        System.out.print("Convert to: ");
                                        int unit = s.nextInt();

                                        if (unit == 1) {
                                                sUnit[historyIndexArr[0]] = "Hectares(ha)";
                                                answer[historyIndexArr[0]] = (inc * 0.00064516) /
10000;

            System.out.println("==================================");
                                                System.out.println(" ANSWER : " +
answer[historyIndexArr[0]] + "ha");
```

```java
        System.out.println("===================================\n");
                                i = false;
                                t = false;
                } else if (unit == 2) {
                                sUnit[historyIndexArr[0]] = "Square Centimeters(cm²)";

                                answer[historyIndexArr[0]] = inc * 6.4516;

        System.out.println("===================================");
                                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + "cm²");

        System.out.println("===================================\n");
                                i = false;
                                t = false;
                } else if (unit == 3) {
                                sUnit[historyIndexArr[0]] = "Square Feet(ft²)";
                                answer[historyIndexArr[0]] = inc * 0.00694444;

        System.out.println("===================================");
                                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + "ft²");

        System.out.println("===================================\n");
                                i = false;
                                t = false;
                } else if (unit == 4) {
                                sUnit[historyIndexArr[0]] = "Square Meters(m²)";
                                answer[historyIndexArr[0]] = inc * 0.00064516;

        System.out.println("===================================");
                                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + "m²");

        System.out.println("===================================\n");
                                i = false;
                                t = false;
                } else {
                                System.out.println("INVALID INPUT!");
                }
        }

                        historyIndexArr[0]++;
                        break;

        case 5:
                System.out.print("Input value of Square Meters(m²): ");
                double met = s.nextDouble();
                fUnit[historyIndexArr[0]] = met + " m²";

                System.out.println("---------------------------------");
                System.out.println("Select Area Unit:");
                System.out.println("   [1] Hectares(ha)");
                System.out.println("   [2] Square Centimeters(cm²)");
                System.out.println("   [3] Square Feet(ft²)");
                System.out.println("   [4] Square Inches(in²)");
                System.out.println("---------------------------------");
```

```java
boolean m = true;
while (m) {
        System.out.print("Convert to: ");
        int unit = s.nextInt();

        if (unit == 1) {
                sUnit[historyIndexArr[0]] = "Hectares(ha)";
                answer[historyIndexArr[0]] = met * 0.0001;

System.out.println("==================================");
                System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + "ha");

System.out.println("==================================\n");
                m = false;
                t = false;
        } else if (unit == 2) {
                sUnit[historyIndexArr[0]] = "Square Centimeters(cm²)";
                answer[historyIndexArr[0]] = met * 10000;

System.out.println("==================================");
                System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + "cm²");

System.out.println("==================================\n");
                m = false;
                t = false;
        } else if (unit == 3) {
                sUnit[historyIndexArr[0]] = "Square Feet(ft²)";
                answer[historyIndexArr[0]] = met * 10.7639;

System.out.println("==================================");
                System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + "ft²");

System.out.println("==================================\n");
                m = false;
                t = false;
        } else if (unit == 4) {
                sUnit[historyIndexArr[0]] = "Square Inches(in²)";
                answer[historyIndexArr[0]] = met * 1550.0031;

System.out.println("==================================");
                System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + "in²");

System.out.println("==================================\n");
                m = false;
                t = false;
        } else {
                System.out.println("INVALID INPUT!");
        }
}

historyIndexArr[0]++;
break;
```

```java
                    case 0:
                    t=false;
                    break;

            default:
                    System.out.println("INVALID INPUT!");
                    break;

            }
        }

    }
}

class Length {
    public void l(String[] fUnit, String[] sUnit, double[] answer, int[] historyIndexArr) {
        Scanner s = new Scanner(System.in);
        boolean t = true;

        while (t) {
            System.out.println("--------------------------------");
            System.out.println("Select Length Unit:");
            System.out.println("   [1] Centimeters(cm)");
            System.out.println("   [2] Meters(m)");
            System.out.println("   [3] Kilometers(km)");
            System.out.println("   [4] Inches(in)");
            System.out.println("   [5] Feet(ft)");
            System.out.println("   [0] Exit");
            System.out.println("--------------------------------");

            System.out.print("Input your choice [0-5]: ");
            int choice2 = s.nextInt();

            switch (choice2) {
                case 1:
                                        // Code for converting centimeters
                    System.out.print("Input value of Centimeters(cm): ");
                    double cen = s.nextDouble();
                    fUnit[historyIndexArr[0]] = cen + " cm";

                    System.out.println("--------------------------------");
                    System.out.println("Select Length Unit:");
                    System.out.println("   [1] Meters(m)");
                    System.out.println("   [2] Kilometers(km)");
                    System.out.println("   [3] Inches(in)");
                    System.out.println("   [4] Feet(ft)");
                    System.out.println("--------------------------------");

                    boolean h = true;
                    while (h) {
                        System.out.print("Convert to: ");
                        int unit = s.nextInt();

                        if (unit == 1) {
                            sUnit[historyIndexArr[0]] = "Meters(m)";
                            answer[historyIndexArr[0]] = cen / 100;
                            System.out.println("===================================");
                            System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " m");
```

```java
            System.out.println("===================================\n");
        h = false;
        t = false;
    } else if (unit == 2) {
        sUnit[historyIndexArr[0]] = "Kilometers(km)";
        answer[historyIndexArr[0]] = cen / 100000;
        System.out.println("===================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " km");
        System.out.println("===================================\n");
        h = false;
        t = false;
    } else if (unit == 3) {
        sUnit[historyIndexArr[0]] = "Inches(in)";
        answer[historyIndexArr[0]] = cen * 0.393701;
        System.out.println("===================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " in");
        System.out.println("===================================\n");
        h = false;
        t = false;
    } else if (unit == 4) {
        sUnit[historyIndexArr[0]] = "Feet(ft)";
        answer[historyIndexArr[0]] = cen * 0.0328084;
        System.out.println("===================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " ft");
        System.out.println("===================================\n");
        h = false;
        t = false;
    } else {
        System.out.println("INVALID INPUT!");
    }
}
historyIndexArr[0]++;
break;

                        case 2:
                                // Code for converting meters
                                System.out.print("Input value of Meters(m): ");
                                double met = s.nextDouble();
                                fUnit[historyIndexArr[0]] = met + " m";

                                System.out.println("---------------------------------");
                                System.out.println("Select Length Unit:");
                                System.out.println("   [1] Centimeters(cm)");
                                System.out.println("   [2] Kilometers(km)");
                                System.out.println("   [3] Inches(in)");
                                System.out.println("   [4] Feet(ft)");
                                System.out.println("---------------------------------");

                                boolean c = true;
                                while (c) {
                                        System.out.print("Convert to: ");
                                        int unit = s.nextInt();

                                        if (unit == 1) {
                                                sUnit[historyIndexArr[0]] = "Centimeters(cm)";
                                                answer[historyIndexArr[0]] = met * 100;

        System.out.println("===================================");
```

```java
                                        System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + " cm");

        System.out.println("==================================\n");
                                                c = false;
                                                t = false;
                                        } else if (unit == 2) {
                                                // Conversion from meters to kilometers
                                                sUnit[historyIndexArr[0]] = "Kilometers(km)";
                                                answer[historyIndexArr[0]] = met / 1000;

        System.out.println("==================================");
                                                System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + " km");

        System.out.println("==================================\n");
                                                c = false;
                                                t = false;
                                        } else if (unit == 3) {
                                                // Conversion from meters to inches
                                                sUnit[historyIndexArr[0]] = "Inches(in)";
                                                answer[historyIndexArr[0]] = met * 39.3701;

        System.out.println("==================================");
                                                System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + " in");

        System.out.println("==================================\n");
                                                c = false;
                                                t = false;
                                        } else if (unit == 4) {
                                                // Conversion from meters to feet
                                                sUnit[historyIndexArr[0]] = "Feet(ft)";
                                                answer[historyIndexArr[0]] = met * 3.28084;

        System.out.println("==================================");
                                                System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + " ft");

        System.out.println("==================================\n");
                                                c = false;
                                                t = false;
                                        } else {
                                                System.out.println("INVALID INPUT!");
                                        }
                                }
                                historyIndexArr[0]++;
                                break;

                        case 3:
                        // Code for converting kilometers
                                System.out.print("Input value of Kilometers(km): ");
                                double kil = s.nextDouble();
                                fUnit[historyIndexArr[0]] = kil + " km";

                                System.out.println("----------------------------------");
                                System.out.println("Select Length Unit:");
                                System.out.println("  [1] Centimeters(cm)");
```

```
                                System.out.println("   [2] Meters(m)");
                        System.out.println("   [3] Inches(in)");
                        System.out.println("   [4] Feet(ft)");
                        System.out.println("--------------------------------");

                        boolean f = true;
                        while (f) {
                                System.out.print("Convert to: ");
                                int unit = s.nextInt();

                                if (unit == 1) {
                                        sUnit[historyIndexArr[0]] = "Centimeters(cm)";
                                        answer[historyIndexArr[0]] = kil * 100000;

        System.out.println("=================================");
                                        System.out.println(" ANSWER : " +
answer[historyIndexArr[0]] + " cm");

        System.out.println("=================================\n");
                                        f = false;
                                        t = false;
                                } else if (unit == 2) {
                                        sUnit[historyIndexArr[0]] = "Meters(m)";
                                        answer[historyIndexArr[0]] = kil * 1000;

        System.out.println("=================================");
                                        System.out.println(" ANSWER : " +
answer[historyIndexArr[0]] + " m");

        System.out.println("=================================\n");
                                        f = false;
                                        t = false;
                                } else if (unit == 3) {
                                        sUnit[historyIndexArr[0]] = "Inches(in)";
                                        answer[historyIndexArr[0]] = kil * 39370.1;

        System.out.println("=================================");
                                        System.out.println(" ANSWER : " +
answer[historyIndexArr[0]] + " in");

        System.out.println("=================================\n");
                                        f = false;
                                        t = false;
                                } else if (unit == 4) {
                                        sUnit[historyIndexArr[0]] = "Feet(ft)";
                                        answer[historyIndexArr[0]] = kil * 3280.84;

        System.out.println("=================================");
                                        System.out.println(" ANSWER : " +
answer[historyIndexArr[0]] + " ft");

        System.out.println("=================================\n");
                                        f = false;
                                        t = false;
                                } else {
                                        System.out.println("INVALID INPUT!");
                                }
                        }
```

```java
                                historyIndexArr[0]++;
                        break;

                case 4:
                        // Code for converting inches
                        System.out.print("Input value of Inches(in): ");
                        double inc = s.nextDouble();
                        fUnit[historyIndexArr[0]] = inc + " in";

                        System.out.println("--------------------------------");
                        System.out.println("Select Length Unit:");
                        System.out.println("   [1] Centimeters(cm)");
                        System.out.println("   [2] Meters(m)");
                        System.out.println("   [3] Kilometers(km)");
                        System.out.println("   [4] Feet(ft)");
                        System.out.println("--------------------------------");

                        boolean i = true;
                        while (i) {
                                System.out.print("Convert to: ");
                                int unit = s.nextInt();

                                if (unit == 1) {
                                        sUnit[historyIndexArr[0]] = "Centimeters(cm)";
                                        answer[historyIndexArr[0]] = inc * 2.54;

        System.out.println("==================================");
                                        System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + " cm");

        System.out.println("==================================\n");
                                        i = false;
                                        t = false;
                                } else if (unit == 2) {
                                        sUnit[historyIndexArr[0]] = "Meters(m)";
                                        answer[historyIndexArr[0]] = inc * 0.0254;

        System.out.println("==================================");
                                        System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + " m");

        System.out.println("==================================\n");
                                        i = false;
                                        t = false;
                                } else if (unit == 3) {
                                        sUnit[historyIndexArr[0]] = "Kilometers(km)";
                                        answer[historyIndexArr[0]] = inc * 0.0000254;

        System.out.println("==================================");
                                        System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + " km");

        System.out.println("==================================\n");
                                        i = false;
                                        t = false;
                                } else if (unit == 4) {
                                        sUnit[historyIndexArr[0]] = "Feet(ft)";
                                        answer[historyIndexArr[0]] = inc / 12;
```

```java
        System.out.println("===================================");
                                        System.out.println(" ANSWER : " +
answer[historyIndexArr[0]] + " ft");

        System.out.println("===================================\n");
                                        i = false;
                                        t = false;
                                } else {
                                        System.out.println("INVALID INPUT!");
                                }
                        }
                        historyIndexArr[0]++;
                        break;

                case 5:
                        // Code for converting feet
                        System.out.print("Input value of Feet(ft): ");
                        double feet = s.nextDouble();
                        fUnit[historyIndexArr[0]] = feet + " ft";

                        System.out.println("--------------------------------");
                        System.out.println("Select Length Unit:");
                        System.out.println("   [1] Centimeters(cm)");
                        System.out.println("   [2] Meters(m)");
                        System.out.println("   [3] Kilometers(km)");
                        System.out.println("   [4] Inches(in)");
                        System.out.println("--------------------------------");

                        boolean m = true;
                        while (m) {
                                System.out.print("Convert to: ");
                                int unit = s.nextInt();

                                if (unit == 1) {
                                        sUnit[historyIndexArr[0]] = "Centimeters(cm)";
                                        answer[historyIndexArr[0]] = feet * 30.48;

        System.out.println("===================================");
                                        System.out.println(" ANSWER : " +
answer[historyIndexArr[0]] + " cm");

        System.out.println("===================================\n");
                                        m = false;
                                        t = false;
                                } else if (unit == 2) {
                                        sUnit[historyIndexArr[0]] = "Meters(m)";
                                        answer[historyIndexArr[0]] = feet * 0.3048;

        System.out.println("===================================");
                                        System.out.println(" ANSWER : " +
answer[historyIndexArr[0]] + " m");

        System.out.println("===================================\n");
                                        m = false;
                                        t = false;
                                } else if (unit == 3) {
                                        sUnit[historyIndexArr[0]] = "Kilometers(km)";
```

```java
                                                            answer[historyIndexArr[0]] = feet *
0.003048;

        System.out.println("===================================");
                                        System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + " km");

        System.out.println("===================================\n");
                                        m = false;
                                        t = false;
                            } else if (unit == 4) {
                                        sUnit[historyIndexArr[0]] = "Inches(in)";
                                        answer[historyIndexArr[0]] = feet * 12;

        System.out.println("===================================");
                                        System.out.println("  ANSWER : " +
answer[historyIndexArr[0]] + " in");

        System.out.println("===================================\n");
                                        m = false;
                                        t = false;
                            } else {
                                        System.out.println("INVALID INPUT!");
                            }
                }
                historyIndexArr[0]++;
                break;

        case 0:
            t = false;
            break;

        default:
            System.out.println("INVALID INPUT!");
            break;
    }
   }
  }
}

class Temperature {
    public void t(String[] fUnit, String[] sUnit, double[] answer, int[] historyIndexArr) {
        Scanner s = new Scanner(System.in);
        boolean t = true;

        while (t) {
            System.out.println("---------------------------------");
            System.out.println("Select area unit:");
            System.out.println("   [1] Celsius(°C)");
            System.out.println("   [2] Fahrenheit(°F)");
            System.out.println("   [3] Kelvin(K)");
            System.out.println("   [0] Exit");
            System.out.println("---------------------------------");

            System.out.print("Input your choice [0-3]: ");
            int choice2 = s.nextInt();

            switch (choice2) {
```

```java
        case 1:
System.out.print("Input value of Celsius(°C): ");
double cel = s.nextDouble();
fUnit[historyIndexArr[0]] = cel + " °C";

System.out.println("----------------------------------");
System.out.println("Select Temperature Unit:");
System.out.println("   [1] Fahrenheit(°F)");
System.out.println("   [2] Kelvin(K)");
System.out.println("----------------------------------");

boolean h = true;
while (h) {
   System.out.print("Convert to: ");
   int unit = s.nextInt();

   if (unit == 1) {
      sUnit[historyIndexArr[0]] = "Fahrenheit(°F)";
      answer[historyIndexArr[0]] = cel * 9 / 5 + 32;
      System.out.println("==================================");
      System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " °F");
      System.out.println("==================================\n");
      h = false;
      t = false;
   } else if (unit == 2) {
      sUnit[historyIndexArr[0]] = "Kelvin(K)";
      answer[historyIndexArr[0]] = cel + 273.15;
      System.out.println("==================================");
      System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " K");
      System.out.println("==================================\n");
      h = false;
      t = false;
   } else {
      System.out.println("INVALID INPUT!");
   }
}

   break;

case 2:
   // Code for Fahrenheit
   System.out.print("Input value of Fahrenheit(°F): ");
   double fah = s.nextDouble();
   fUnit[historyIndexArr[0]] = fah + " °F";

   System.out.println("---------------------------------");
   System.out.println("Select Temperature Unit:");
   System.out.println("   [1] Celsius(°C)");
   System.out.println("   [2] Kelvin(K)");
   System.out.println("---------------------------------");

   boolean c = true;
   while (c) {
      System.out.print("Convert to: ");
      int unit = s.nextInt();

      if (unit == 1) {
         sUnit[historyIndexArr[0]] = "Celsius(°C)";
```

```java
            answer[historyIndexArr[0]] = (fah - 32) * 5 / 9;
        System.out.println("===================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " °C");
        System.out.println("===================================\n");
        c = false;
        t = false;
      } else if (unit == 2) {
        sUnit[historyIndexArr[0]] = "Kelvin(K)";
        answer[historyIndexArr[0]] = (fah - 32) * 5 / 9 + 273.15;
        System.out.println("===================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " K");
        System.out.println("===================================\n");
        c = false;
        t = false;
      } else {
        System.out.println("INVALID INPUT!");
      }
    }

  break;

case 3:
  // Code for Kelvin
  System.out.print("Input value of Kelvin(K): ");
  double kel = s.nextDouble();
  fUnit[historyIndexArr[0]] = kel + " K";

  System.out.println("----------------------------------");
  System.out.println("Select Temperature Unit:");
  System.out.println("   [1] Celsius(°C)");
  System.out.println("   [2] Fahrenheit(°F)");
  System.out.println("----------------------------------");

  boolean k = true;
  while (k) {
    System.out.print("Convert to: ");
    int unit = s.nextInt();

    if (unit == 1) {
      sUnit[historyIndexArr[0]] = "Celsius(°C)";
      answer[historyIndexArr[0]] = kel - 273.15;
      System.out.println("===================================");
      System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " °C");
      System.out.println("===================================\n");
      k = false;
      t = false;
    } else if (unit == 2) {
      sUnit[historyIndexArr[0]] = "Fahrenheit(°F)";
      answer[historyIndexArr[0]] = (kel - 273.15) * 9 / 5 + 32;
      System.out.println("===================================");
      System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " °F");
      System.out.println("===================================\n");
      k = false;
      t = false;
    } else {
      System.out.println("INVALID INPUT!");
    }
  }
```

```java
                break;

            case 0:
                t = false;
                break;

            default:
                System.out.println("INVALID INPUT!");
                break;
            }
        }

        historyIndexArr[0]++;
    }
}

class Volume {
    public void v(String[] fUnit, String[] sUnit, double[] answer, int[] historyIndexArr) {
        Scanner s = new Scanner(System.in);
        boolean t = true;

        while (t) {
            System.out.println("----------------------------------");
            System.out.println("Select Volume Unit:");
            System.out.println("   [1] Liters(L)");
            System.out.println("   [2] Milliliters(mL)");
            System.out.println("   [3] Cubic Centimeters(cm³)");
            System.out.println("   [4] Cubic Meters(m³)");
            System.out.println("   [5] Cubic Inches(in³)");
            System.out.println("   [0] Exit");
            System.out.println("----------------------------------");

            System.out.print("Input your choice [0-5]: ");
            int choice2 = s.nextInt();

            switch (choice2) {
                case 1:
                    System.out.print("Input value of Liters(L): ");
                    double liters = s.nextDouble();
                    fUnit[historyIndexArr[0]] = liters + " L";

                    System.out.println("----------------------------------");
                    System.out.println("Select Volume Unit:");
                    System.out.println("   [1] Milliliters(mL)");
                    System.out.println("   [2] Cubic Centimeters(cm³)");
                    System.out.println("   [3] Cubic Meters(m³)");
                    System.out.println("   [4] Cubic Inches(in³)");
                    System.out.println("----------------------------------");

                    boolean h = true;
                    while (h) {
                        System.out.print("Convert to: ");
                        int unit = s.nextInt();

                        if (unit == 1) {
                            sUnit[historyIndexArr[0]] = "Milliliters(mL)";
                            answer[historyIndexArr[0]] = liters * 1000;
```

```java
            System.out.println("==================================");
            System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " mL");
            System.out.println("==================================\n");
            h = false;
            t = false;
        } else if (unit == 2) {
            sUnit[historyIndexArr[0]] = "Cubic Centimeters(cm³)";
            answer[historyIndexArr[0]] = liters * 1000;
            System.out.println("==================================");
            System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " cm³");
            System.out.println("==================================\n");
            h = false;
            t = false;
        } else if (unit == 3) {
            sUnit[historyIndexArr[0]] = "Cubic Meters(m³)";
            answer[historyIndexArr[0]] = liters * 0.001;
            System.out.println("==================================");
            System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " m³");
            System.out.println("==================================\n");
            h = false;
            t = false;
        } else if (unit == 4) {
            sUnit[historyIndexArr[0]] = "Cubic Inches(in³)";
            answer[historyIndexArr[0]] = liters * 61.0237;
            System.out.println("==================================");
            System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " in³");
            System.out.println("==================================\n");
            h = false;
            t = false;
        } else {
            System.out.println("INVALID INPUT!");
        }
    }
}

    break;

case 2:
    // Code for Milliliters
    System.out.print("Input value of Milliliters(mL): ");
    double milliliters = s.nextDouble();
    fUnit[historyIndexArr[0]] = milliliters + " mL";

    System.out.println("---------------------------------");
    System.out.println("Select Volume Unit:");
    System.out.println("   [1] Liters(L)");
    System.out.println("   [2] Cubic Centimeters(cm³)");
    System.out.println("   [3] Cubic Meters(m³)");
    System.out.println("   [4] Cubic Inches(in³)");
    System.out.println("---------------------------------");

    boolean c = true;
    while (c) {
        System.out.print("Convert to: ");
        int unit = s.nextInt();

        if (unit == 1) {
            sUnit[historyIndexArr[0]] = "Liters(L)";
            answer[historyIndexArr[0]] = milliliters * 0.001;
```

```java
                System.out.println("==================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " L");
                System.out.println("==================================\n");
                c = false;
                t = false;
            } else if (unit == 2) {
                sUnit[historyIndexArr[0]] = "Cubic Centimeters(cm³)";
                answer[historyIndexArr[0]] = milliliters * 1;
                System.out.println("==================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " cm³");
                System.out.println("==================================\n");
                c = false;
                t = false;
            } else if (unit == 3) {
                sUnit[historyIndexArr[0]] = "Cubic Meters(m³)";
                answer[historyIndexArr[0]] = milliliters * 0.000001;
                System.out.println("==================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " m³");
                System.out.println("==================================\n");
                c = false;
                t = false;
            } else if (unit == 4) {
                sUnit[historyIndexArr[0]] = "Cubic Inches(in³)";
                answer[historyIndexArr[0]] = milliliters * 0.0610237;
                System.out.println("==================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " in³");
                System.out.println("==================================\n");
                c = false;
                t = false;
            } else {
                System.out.println("INVALID INPUT!");
            }
        }

    break;

case 3:
    // Code for Cubic Centimeters
    System.out.print("Input value of Cubic Centimeters(cm³): ");
    double cubicCentimeters = s.nextDouble();
    fUnit[historyIndexArr[0]] = cubicCentimeters + " cm³";

    System.out.println("---------------------------------");
    System.out.println("Select Volume Unit:");
    System.out.println("   [1] Liters(L)");
    System.out.println("   [2] Milliliters(mL)");
    System.out.println("   [3] Cubic Meters(m³)");
    System.out.println("   [4] Cubic Inches(in³)");
    System.out.println("---------------------------------");

    boolean f = true;
    while (f) {
        System.out.print("Convert to: ");
        int unit = s.nextInt();

        if (unit == 1) {
            sUnit[historyIndexArr[0]] = "Liters(L)";
            answer[historyIndexArr[0]] = cubicCentimeters * 0.001;
```

```java
            System.out.println("================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " L");
        System.out.println("================================\n");
        f = false;
        t = false;
      } else if (unit == 2) {
        sUnit[historyIndexArr[0]] = "Milliliters(mL)";
        answer[historyIndexArr[0]] = cubicCentimeters * 1;
        System.out.println("================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " mL");
        System.out.println("================================\n");
        f = false;
        t = false;
      } else if (unit == 3) {
        sUnit[historyIndexArr[0]] = "Cubic Meters(m³)";
        answer[historyIndexArr[0]] = cubicCentimeters * 0.000001;
        System.out.println("================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " m³");
        System.out.println("================================\n");
        f = false;
        t = false;
      } else if (unit == 4) {
        sUnit[historyIndexArr[0]] = "Cubic Inches(in³)";
        answer[historyIndexArr[0]] = cubicCentimeters * 0.0610237;
        System.out.println("================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " in³");
        System.out.println("================================\n");
        f = false;
        t = false;
      } else {
        System.out.println("INVALID INPUT!");
      }
    }
  }

  break;

case 4:
  // Code for Cubic Meters
  System.out.print("Input value of Cubic Meters(m³): ");
  double cubicMeters = s.nextDouble();
  fUnit[historyIndexArr[0]] = cubicMeters + " m³";

  System.out.println("--------------------------------");
  System.out.println("Select Volume Unit:");
  System.out.println("   [1] Liters(L)");
  System.out.println("   [2] Milliliters(mL)");
  System.out.println("   [3] Cubic Centimeters(cm³)");
  System.out.println("   [4] Cubic Inches(in³)");
  System.out.println("--------------------------------");

  boolean i = true;
  while (i) {
    System.out.print("Convert to: ");
    int unit = s.nextInt();

    if (unit == 1) {
      sUnit[historyIndexArr[0]] = "Liters(L)";
      answer[historyIndexArr[0]] = cubicMeters * 1000;
```

```java
            System.out.println("=================================");
            System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " L");
            System.out.println("=================================\n");
            i = false;
            t = false;
        } else if (unit == 2) {
            sUnit[historyIndexArr[0]] = "Milliliters(mL)";
            answer[historyIndexArr[0]] = cubicMeters * 1000000;
            System.out.println("=================================");
            System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " mL");
            System.out.println("=================================\n");
            i = false;
            t = false;
        } else if (unit == 3) {
            sUnit[historyIndexArr[0]] = "Cubic Centimeters(cm³)";
            answer[historyIndexArr[0]] = cubicMeters * 1000000;
            System.out.println("=================================");
            System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " cm³");
            System.out.println("=================================\n");
            i = false;
            t = false;
        } else if (unit == 4) {
            sUnit[historyIndexArr[0]] = "Cubic Inches(in³)";
            answer[historyIndexArr[0]] = cubicMeters * 61023.7;
            System.out.println("=================================");
            System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " in³");
            System.out.println("=================================\n");
            i = false;
            t = false;
        } else {
            System.out.println("INVALID INPUT!");
        }
    }
}

    break;

case 5:
    // Code for Cubic Inches
    System.out.print("Input value of Cubic Inches(in³): ");
    double cubicInches = s.nextDouble();
    fUnit[historyIndexArr[0]] = cubicInches + " in³";

    System.out.println("----------------------------------");
    System.out.println("Select Volume Unit:");
    System.out.println("   [1] Liters(L)");
    System.out.println("   [2] Milliliters(mL)");
    System.out.println("   [3] Cubic Centimeters(cm³)");
    System.out.println("   [4] Cubic Meters(m³)");
    System.out.println("----------------------------------");

    boolean m = true;
    while (m) {
        System.out.print("Convert to: ");
        int unit = s.nextInt();

        if (unit == 1) {
            sUnit[historyIndexArr[0]] = "Liters(L)";
            answer[historyIndexArr[0]] = (cubicInches * 0.0163871) / 1000;
```

```java
        System.out.println("   [3] Ounces(oz)");
System.out.println("   [4] Kilograms(kg)");
System.out.println("   [5] Grams(g)");
System.out.println("   [0] Exit");
System.out.println("--------------------------------");

System.out.print("Input your choice [0-5]: ");
int choice2 = s.nextInt();

switch (choice2) {
    case 1:
        System.out.print("Input value of Tons (t): ");
        double tons = s.nextDouble();
        fUnit[historyIndexArr[0]] = tons + " t";

        System.out.println("--------------------------------");
        System.out.println("Select Mass Unit:");
        System.out.println("   [1] Pounds(lb)");
        System.out.println("   [2] Ounces(oz)");
        System.out.println("   [3] Kilograms(kg)");
        System.out.println("   [4] Grams(g)");
        System.out.println("--------------------------------");

        boolean h = true;
        while (h) {
            System.out.print("Convert to: ");
            int unit = s.nextInt();

            if (unit == 1) {
                sUnit[historyIndexArr[0]] = "Pounds(lb)";
                answer[historyIndexArr[0]] = tons * 2204.62;
                System.out.println("===================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " lb");
                System.out.println("===================================\n");
                h = false;
                t = false;
            } else if (unit == 2) {
                sUnit[historyIndexArr[0]] = "Ounces(oz)";
                answer[historyIndexArr[0]] = tons * 35274;
                System.out.println("===================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " oz");
                System.out.println("===================================\n");
                h = false;
                t = false;
            } else if (unit == 3) {
                sUnit[historyIndexArr[0]] = "Kilograms(kg)";
                answer[historyIndexArr[0]] = tons * 1000;
                System.out.println("===================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " kg");
                System.out.println("===================================\n");
                h = false;
                t = false;
            } else if (unit == 4) {
                sUnit[historyIndexArr[0]] = "Grams(g)";
                answer[historyIndexArr[0]] = tons * 1000000;
                System.out.println("===================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " g");
                System.out.println("===================================\n");
```

```java
                        h = false;
                t = false;
            } else {
                System.out.println("INVALID INPUT!");
            }
        }

        break;

    case 2:
        // Code for Pounds(lb)
        System.out.print("Input value of Pounds(lb): ");
        double pounds = s.nextDouble();
        fUnit[historyIndexArr[0]] = pounds + " lb";

        System.out.println("--------------------------------");
        System.out.println("Select Mass Unit:");
        System.out.println("   [1] Tons(t)");
        System.out.println("   [2] Ounces(oz)");
        System.out.println("   [3] Kilograms(kg)");
        System.out.println("   [4] Grams(g)");
        System.out.println("--------------------------------");

        boolean c = true;
        while (c) {
            System.out.print("Convert to: ");
            int unit = s.nextInt();

            if (unit == 1) {
                sUnit[historyIndexArr[0]] = "Tons(t)";
                answer[historyIndexArr[0]] = pounds * 0.000453592;
                System.out.println("===================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " t");
                System.out.println("===================================\n");
                c = false;
                t = false;
            } else if (unit == 2) {
                sUnit[historyIndexArr[0]] = "Ounces(oz)";
                answer[historyIndexArr[0]] = pounds * 16;
                System.out.println("===================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " oz");
                System.out.println("===================================\n");
                c = false;
                t = false;
            } else if (unit == 3) {
                sUnit[historyIndexArr[0]] = "Kilograms(kg)";
                answer[historyIndexArr[0]] = pounds * 0.453592;
                System.out.println("===================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " kg");
                System.out.println("===================================\n");
                c = false;
                t = false;
            } else if (unit == 4) {
                sUnit[historyIndexArr[0]] = "Grams(g)";
                answer[historyIndexArr[0]] = pounds * 453.592;
                System.out.println("===================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " g");
                System.out.println("===================================\n");
```

```
                                    c = false;
                        t = false;
                    } else {
                        System.out.println("INVALID INPUT!");
                    }
                }

                break;

            case 3:
                // Code for Ounces(oz)
                System.out.print("Input value of Ounces(oz): ");
                double ounces = s.nextDouble();
                fUnit[historyIndexArr[0]] = ounces + " oz";

                System.out.println("--------------------------------");
                System.out.println("Select Mass Unit:");
                System.out.println("   [1] Tons(t)");
                System.out.println("   [2] Pounds(lb)");
                System.out.println("   [3] Kilograms(kg)");
                System.out.println("   [4] Grams(g)");
                System.out.println("--------------------------------");

                boolean f = true;
                while (f) {
                    System.out.print("Convert to: ");
                    int unit = s.nextInt();

                    if (unit == 1) {
                        sUnit[historyIndexArr[0]] = "Tons(t)";
                        answer[historyIndexArr[0]] = ounces * 0.0000283495;
                        System.out.println("===================================");
                        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " t");
                        System.out.println("===================================\n");
                        f = false;
                        t = false;
                    } else if (unit == 2) {
                        sUnit[historyIndexArr[0]] = "Pounds(lb)";
                        answer[historyIndexArr[0]] = ounces * 0.0625;
                        System.out.println("===================================");
                        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " lb");
                        System.out.println("===================================\n");
                        f = false;
                        t = false;
                    } else if (unit == 3) {
                        sUnit[historyIndexArr[0]] = "Kilograms(kg)";
                        answer[historyIndexArr[0]] = ounces * 0.0283495;
                        System.out.println("===================================");
                        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " kg");
                        System.out.println("===================================\n");
                        f = false;
                        t = false;
                    } else if (unit == 4) {
                        sUnit[historyIndexArr[0]] = "Grams(g)";
                        answer[historyIndexArr[0]] = ounces * 28.3495;
                        System.out.println("===================================");
                        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " g");
                        System.out.println("===================================\n");
```

```java
                    f = false;
                t = false;
            } else {
                System.out.println("INVALID INPUT!");
            }
        }

        break;

    case 4:
        // Code for Kilograms(kg)
        System.out.print("Input value of Kilograms(kg): ");
        double kilograms = s.nextDouble();
        fUnit[historyIndexArr[0]] = kilograms + " kg";

        System.out.println("----------------------------------");
        System.out.println("Select Mass Unit:");
        System.out.println("   [1] Tons(t)");
        System.out.println("   [2] Pounds(lb)");
        System.out.println("   [3] Ounces(oz)");
        System.out.println("   [4] Grams(g)");
        System.out.println("----------------------------------");

        boolean k = true;
        while (k) {
            System.out.print("Convert to: ");
            int unit = s.nextInt();

            if (unit == 1) {
                sUnit[historyIndexArr[0]] = "Tons(t)";
                answer[historyIndexArr[0]] = kilograms * 0.001;
                System.out.println("===================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " t");
                System.out.println("===================================\n");
                k = false;
                t = false;
            } else if (unit == 2) {
                sUnit[historyIndexArr[0]] = "Pounds(lb)";
                answer[historyIndexArr[0]] = kilograms * 2.20462;
                System.out.println("===================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " lb");
                System.out.println("===================================\n");
                k = false;
                t = false;
            } else if (unit == 3) {
                sUnit[historyIndexArr[0]] = "Ounces(oz)";
                answer[historyIndexArr[0]] = kilograms * 35.274;
                System.out.println("===================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " oz");
                System.out.println("===================================\n");
                k = false;
                t = false;
            } else if (unit == 4) {
                sUnit[historyIndexArr[0]] = "Grams(g)";
                answer[historyIndexArr[0]] = kilograms * 1000;
                System.out.println("===================================");
                System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " g");
                System.out.println("===================================\n");
```

```java
                        k = false;
                t = false;
            } else {
                System.out.println("INVALID INPUT!");
            }
        }

break;

                        case 5:

System.out.print("Input value of Grams(g): ");
double grams = s.nextDouble();
fUnit[historyIndexArr[0]] = grams + " g";

System.out.println("----------------------------------");
System.out.println("Select Mass Unit:");
System.out.println("   [1] Tons(t)");
System.out.println("   [2] Pounds(lb)");
System.out.println("   [3] Ounces(oz)");
System.out.println("   [4] Kilograms(kg)");
System.out.println("--------------------------------");

boolean m = true;
while (m) {
    System.out.print("Convert to: ");
    int unit = s.nextInt();

    if (unit == 1) {
        sUnit[historyIndexArr[0]] = "Tons(t)";
        answer[historyIndexArr[0]] = grams * 0.000001;
        System.out.println("===================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " t");
        System.out.println("===================================\n");
        m = false;
        t = false;
    } else if (unit == 2) {
        sUnit[historyIndexArr[0]] = "Pounds(lb)";
        answer[historyIndexArr[0]] = grams * 0.00220462;
        System.out.println("===================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " lb");
        System.out.println("===================================\n");
        m = false;
        t = false;
    } else if (unit == 3) {
        sUnit[historyIndexArr[0]] = "Ounces(oz)";
        answer[historyIndexArr[0]] = grams * 0.035274;
        System.out.println("===================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " oz");
        System.out.println("===================================\n");
        m = false;
        t = false;
    } else if (unit == 4) {
        sUnit[historyIndexArr[0]] = "Kilograms(kg)";
        answer[historyIndexArr[0]] = grams * 0.001;
        System.out.println("===================================");
        System.out.println("  ANSWER : " + answer[historyIndexArr[0]] + " kg");
        System.out.println("===================================\n");
```

```
                    m = false;
                t = false;
            } else {
                System.out.println("INVALID INPUT!");
            }
        }

        break;

    case 0:
        t = false;
        break;

    default:
        System.out.println("INVALID INPUT!");
        break;

        }
    }

    historyIndexArr[0]++;
    }
}
```

Documentation of the program's output:

```
D:\SCHOOL\Object-Oriented Programming\MIDTERM PROJECT>javac midterm.java

D:\SCHOOL\Object-Oriented Programming\MIDTERM PROJECT>java midterm.java
+=================== WELCOME TO UNIT CONVERTER ====================
|| Select a Unit :                                               ||
||                    [1] Area                                   ||
||                    [2] Length                                 ||
||                    [3] Temperature                            ||
||                    [4] Volume                                 ||
||                    [5] Mass                                   ||
||                    [0] Exit                                   ||
=================================================================
Input your choice [0-5]: 1
-------------------------------------
Select Area Unit:
   [1] Hectares(ha)
   [2] Square Centimeters(cm²)
   [3] Square Feet(ft²)
   [4] Square Inches(in²)
   [5] Square Meters(m²)
   [0] Exit
-------------------------------------
Input your choice [0-5]: 1
Input value of Hectares(ha): 100
-------------------------------------
Select Area Unit:
   [1] Square Centimeters(cm²)
   [2] Square Feet(ft²)
   [3] Square Inches(in²)
   [4] Square Meters(m²)
-------------------------------------
Convert to: 2
=================================
  ANSWER : 1.07639104E7ft²
=================================


+=================== WELCOME TO UNIT CONVERTER ====================
|| Select a Unit :                                               ||
||                    [1] Area                                   ||
||                    [2] Length                                 ||
||                    [3] Temperature                            ||
||                    [4] Volume                                 ||
||                    [5] Mass                                   ||
||                    [0] Exit                                   ||
=================================================================
Input your choice [0-5]: 2
-------------------------------------
Select Length Unit:
   [1] Centimeters(cm)
   [2] Meters(m)
   [3] Kilometers(km)
   [4] Inches(in)
   [5] Feet(ft)
   [0] Exit
-------------------------------------
Input your choice [0-5]: 2
Input value of Meters(m): 10
-------------------------------------
Select Length Unit:
   [1] Centimeters(cm)
   [2] Kilometers(km)
   [3] Inches(in)
   [4] Feet(ft)
-------------------------------------
Convert to: 1
=================================
  ANSWER : 1000.0cm
=================================

+=================== WELCOME TO UNIT CONVERTER ====================
|| Select a Unit :                                               ||
```

```
+================== WELCOME TO UNIT CONVERTER ====================
|| Select a Unit :                                              ||
||                    [1] Area                                  ||
||                    [2] Length                                ||
||                    [3] Temperature                           ||
||                    [4] Volume                                ||
||                    [5] Mass                                  ||
||                    [0] Exit                                  ||
================================================================
Input your choice [0-5]: 5
------------------------------------
Select Mass Unit:
   [1] Tons(t)
   [2] Pounds(lb)
   [3] Ounces(oz)
   [4] Kilograms(kg)
   [5] Grams(g)
   [0] Exit
------------------------------------
Input your choice [0-5]: 5
Input value of Grams(g): 10000
------------------------------------
Select Mass Unit:
   [1] Tons(t)
   [2] Pounds(lb)
   [3] Ounces(oz)
   [4] Kilograms(kg)
------------------------------------
Convert to: 4
==================================
  ANSWER : 10.0kg
==================================

+================== WELCOME TO UNIT CONVERTER ====================
|| Select a Unit :                                              ||
||                    [1] Area                                  ||
||                    [2] Length                                ||
||                    [3] Temperature                           ||
||                    [4] Volume                                ||
||                    [5] Mass                                  ||
||                    [0] Exit                                  ||
================================================================
Input your choice [0-5]: 1
------------------------------------
Select Area Unit:
   [1] Hectares(ha)
   [2] Square Centimeters(cm²)
   [3] Square Feet(ft²)
   [4] Square Inches(in²)
   [5] Square Meters(m²)
   [0] Exit
------------------------------------
Input your choice [0-5]: 12
INVALID INPUT!
------------------------------------
Select Area Unit:
   [1] Hectares(ha)
   [2] Square Centimeters(cm²)
   [3] Square Feet(ft²)
   [4] Square Inches(in²)
   [5] Square Meters(m²)
   [0] Exit
------------------------------------
Input your choice [0-5]: 0
+================== WELCOME TO UNIT CONVERTER ====================
|| Select a Unit :                                              ||
||                    [1] Area                                  ||
||                    [2] Length                                ||
||                    [3] Temperature                           ||
||                    [4] Volume                                ||
||                    [5] Mass                                  ||
```

```
--------------------------------
Convert to: 1
================================
  ANSWER : 1000.0cm
================================


+================= WELCOME TO UNIT CONVERTER ====================
|| Select a Unit :                                             ||
||               [1] Area                                      ||
||               [2] Length                                    ||
||               [3] Temperature                               ||
||               [4] Volume                                    ||
||               [5] Mass                                      ||
||               [0] Exit                                      ||
================================================================
Input your choice [0-5]: 3
------------------------------------
Select area unit:
   [1] Celcius(°C)
   [2] Fahrenheit(°F)
   [3] Kelvin(K)
   [0] Exit
------------------------------------
Input your choice [0-3]: 1
Input value of Celcius(°C): 49
------------------------------------
Select Temperature Unit:
   [1] Fahrenheit(°F)
   [2] Kelvin(K)
------------------------------------
Convert to: 1
================================
  ANSWER : 120.2°F
================================


+================= WELCOME TO UNIT CONVERTER ====================
|| Select a Unit :                                             ||
||               [1] Area                                      ||
||               [2] Length                                    ||
||               [3] Temperature                               ||
||               [4] Volume                                    ||
||               [5] Mass                                      ||
||               [0] Exit                                      ||
================================================================
Input your choice [0-5]: 4
------------------------------------
Select Volume Unit:
   [1] Liters(L)
   [2] Milliliters(mL)
   [3] Cubic Centimeters(cm?)
   [4] Cubic Meters(m?)
   [5] Cubic Inches(in?)
   [0] Exit
------------------------------------
Input your choice [0-5]: 1
Input value of Liters(L): 10
------------------------------------
Select Volume Unit:
   [1] Milliliters(mL)
   [2] Cubic Centimeters(cm?)
   [3] Cubic Meters(m?)
   [4] Cubic Inches(in?)
------------------------------------
Convert to: 1
================================
  ANSWER : 10000.0mL
================================


+================= WELCOME TO UNIT CONVERTER ====================
|| Select a Unit :                                             ||
||               [1] Area                                      ||
||               [2] Length                                    ||
```

```
=======================================================
================== WELCOME TO UNIT CONVERTER ==================
=======================================================
|| Select a Unit :                                          ||
||                  [1] Area                                ||
||                  [2] Length                              ||
||                  [3] Temperature                         ||
||                  [4] Volume                              ||
||                  [5] Mass                                ||
||                  [6] Show history                        ||
||                  [0] Exit                                ||
=======================================================
Input your choice [0-6]: 6
=======================================================
  CONVERSION HISTORY
      [0] 12.0 ha to Square Centimeters(cm²) = 1.2E8
      [1] 232.0 cm to Kilometers(km) = 0.00232
      [2] 221.0 °C to Kelvin(K) = 494.15
      [3] 1.0 L to Milliliters(mL) = 1000.0
      [4] 1.0 t to Pounds(lb) = 2204.62
  -----------------------------------------------------
          [D] Delete      [C] Clear History      [0] Back
=======================================================
Select an option: D
Enter the index to delete: 2
Entry deleted successfully!
=======================================================
  CONVERSION HISTORY
      [0] 12.0 ha to Square Centimeters(cm²) = 1.2E8
      [1] 232.0 cm to Kilometers(km) = 0.00232
      [2] 1.0 L to Milliliters(mL) = 1000.0
      [3] 1.0 t to Pounds(lb) = 2204.62
  -----------------------------------------------------
          [D] Delete      [C] Clear History      [0] Back
=======================================================
Select an option: C
=======================================================
  HISTORY CLEARED!
=======================================================

=======================================================
  CONVERSION HISTORY
  -----------------------------------------------------
          [D] Delete      [C] Clear History      [0] Back
=======================================================
Select an option: 0
=======================================================
================== WELCOME TO UNIT CONVERTER ==================
=======================================================
|| Select a Unit :                                          ||
||                  [1] Area                                ||
||                  [2] Length                              ||
||                  [3] Temperature                         ||
||                  [4] Volume                              ||
||                  [5] Mass                                ||
```

```
-------------------------------------
Input your choice [0-5]: 12
INVALID INPUT!
-------------------------------------
Select Area Unit:
   [1] Hectares(ha)
   [2] Square Centimeters(cm²)
   [3] Square Feet(ft²)
   [4] Square Inches(in²)
   [5] Square Meters(m²)
   [0] Exit
-------------------------------------
Input your choice [0-5]: 0
+==================== WELCOME TO UNIT CONVERTER ====================
|| Select a Unit :                                               ||
||                    [1] Area                                   ||
||                    [2] Length                                 ||
||                    [3] Temperature                            ||
||                    [4] Volume                                 ||
||                    [5] Mass                                   ||
||                    [0] Exit                                   ||
===================================================================
Input your choice [0-5]: 0

===================================================================
==================== T H A N K   Y O U  ===========================
===================================================================

D:\SCHOOL\Object-Oriented Programming\MIDTERM PROJECT>_
```