

Java Journal Template

Directions: Follow the directions for each part of the journal template. Include in your response all the elements listed under the Requirements section. Prompts in the Inspiration section are not required; however, they may help you to fully think through your response.

Remember to review the Touchstone page for entry requirements, examples, and grading specifics.

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Final Replit Program Join Link: <https://replit.com/join/ronggnohgt-sarahg21>

Complete the following template. Fill out all entries using complete sentences.

PART 1: Defining Your Problem

Students are learning about temperature conversion between degrees in Celsius, Fahrenheit, and Kelvin. The problem to solve is I want to help students be able to more quickly and efficiently do these temperature conversions using a program coded in the Java language. When executed, the program will ask the user how they are converting (Celsius to Fahrenheit, Celsius to Kelvin, Fahrenheit to Kelvin, etc.). Next, the program will output what the temperature is in the new selected units. To solve the problem, the program will perform the calculations, for example to convert 225° Kelvin to Celsius, the program will subtract 273.15 from 225, resulting in -48.15°C.

PART 2: Working Through Specific Examples

Scenario 1: A student wants to convert 225K to degrees Celsius.

- Input: Starting temperature is 225K and student wants that converted to °C.
- Solve: Solve for °C by subtracting 273.15 from 225, getting -48.15.
- Result: Output “The converted temperature is: -48.15°C.”

Scenario 2: A student wants to convert 50°C to degrees Fahrenheit.

- Input: Starting temperature is 50°C and student wants that converted to °F.
- Solve: Solve for °F by multiplying 50 x (9/5) then adding 32, resulting in 122.
- Result: Output “The converted temperature is: 122°F.”

Scenario 3: A student wants to convert 113°F to degrees Kelvin.

- Input: Starting temperature is 113°F and student wants that converted to Kelvin temperature.
- Solve: Solve for Kelvin temperature by multiplying (113-32) by (5/9) then adding 273.15, getting 318.15.
- Result: Output “The converted temperature is: 318.15K.”

Scenario 4: A student wants to convert 68°F to degrees Celsius.

- Input: Starting temperature is 68°F and student wants that converted to degrees Celsius.
- Solve: Solve for Celsius temperature by subtracting 32 from the Fahrenheit temperature and then multiplying that value by 5/9, resulting in 20.
- Result: Output “The converted temperature is: 20°C.”

PART 3: Generalizing Into Pseudocode

Main Program

```
Print user menu displaying temperature conversion options
Set current temperature to double value input by user
Set the initial value of starting unit to the temperature input by the user
  If the user wants to convert a Celsius value to degrees Fahrenheit
    Multiply initial value by  $(9/5)$  then add 32
    Output converted temperature
  Else if the user wants to convert a Celsius value to degrees Kelvin
    Add 273.15 to initial value
    Output converted temperature
  Else if the user wants to convert a Fahrenheit value to degrees Celsius
    Subtract the initial value from 32 then multiply that value by  $(5/9)$ 
    Output converted temperature
  Else if the user wants to convert a Fahrenheit value to degrees Kelvin
    Subtract the initial value from 32 then multiply that value by  $(5/9)$ , then add
    273.15
    Output converted temperature
  Else if the user wants to convert a Kelvin value to degrees Celsius
    Subtract 273.15 from initial value
    Output converted temperature
  Else if the user wants to convert a Kelvin value to degrees Fahrenheit
    Subtract 273.15 from initial value then multiply the difference by  $(9/5)$  and
    then add 32
    Output converted temperature
Else prompt user to selection valid option
```

PART 4: Testing Your Program

While checking each case in the switch statement for the Temperature Converter, one case was producing a value of 0.0 for any input value. One of my test cases was to convert 68 degrees Fahrenheit to 20 degrees Celsius. I originally wrote the code in IntelliJ, so I went back there and it was producing the same error. I assumed something was wrong with the formula for converting Fahrenheit to Celsius. I moved the parentheses around until the output produced the correct value of 20.

Originally, case 3 looked like this:

case 3:

```
    System.out.println("Enter Fahrenheit temperature: ");
    fahrenheitTemperature = selectionInput.nextDouble();
    celsiusTemperature = (fahrenheitTemperature - 32) * (5/9);
    System.out.println("The converted temperature is: " + celsiusTemperature +
    "°C");
    Break;
```

While the parentheses were around 5/9, the output was “The converted temperature is: 0.0°C.” After removing the parentheses around the 5/9, the output was “The converted temperature is: 20.0°C.” This is the correct output for case 3 with a starting Fahrenheit temperature of 68.

The code for case 3 now looks like this:

case 3:

```
    System.out.println("Enter Fahrenheit temperature: ");
    fahrenheitTemperature = selectionInput.nextDouble();
    celsiusTemperature = (fahrenheitTemperature - 32) * 5/9;
    System.out.println("The converted temperature is: " + celsiusTemperature +
    "°C");
    break;
```

PART 5: Commenting Your Program

```
import java.util.Scanner;
public class Main {
    public static void main(String[] args) {
        //declare variables for 3 temperature types we are working with
        double celsiusTemperature;
        double fahrenheitTemperature;
        double kelvinTemperature;
        //initialize Scanner class for user input
        Scanner selectionInput = new Scanner(System.in);
        //present options to user for how they wish to convert (starting unit to desired unit)
        System.out.println("Hello! How are you converting? \n 1. Celsius to Fahrenheit \n 2.
        Celsius to Kelvin \n 3. Fahrenheit to Celsius \n 4. Fahrenheit to Kelvin \n 5. Kelvin to
        Celsius \n 6. Kelvin to Fahrenheit");
        //selection is the integer value the user selects that corresponds with their desired
        conversion type (if user selects 3, they want to convert Fahrenheit to Celsius, so we go
        to case 3 in the switch statement)
        int selection = selectionInput.nextInt();
        //switch statement evaluates the operation to perform based on the selection the user
        inputs (example- if user inputs a 5, we start at case 5)
        switch (selection) {
            //if user selected 1, program asks for the temperature in degrees Celsius
            case 1:
                System.out.println("Enter Celsius temperature: ");
                //celsiusTemperature is given the value of the number the user inputs and it is
                read as a double(decimal)
                celsiusTemperature = selectionInput.nextDouble();
                //conversion is performed using the formula below and the value the user input
                and this is set to be the value of the fahrenheitTemperature
                fahrenheitTemperature = (celsiusTemperature * 1.8) + 32.00;
                //program outputs the converted temperature
                System.out.println("The converted temperature is: " + fahrenheitTemperature
                + "°F");
                //break statement exits the switch statement
                break;
            case 2:
                //if user selected 2, program asks for the temperature in degrees Celsius
                System.out.println("Enter Celsius temperature: ");
                //celsiusTemperature is given the value of the number the user inputs and it is
                read as a double(decimal)
```

```

        celsiusTemperature = selectionInput.nextDouble();
        //conversion is performed using the formula below with the value the user input
        and this is set to be the value of the kelvinTemperature
        kelvinTemperature = celsiusTemperature + 273.15;
        //program outputs the converted temperature
        System.out.println("The converted temperature is: " + kelvinTemperature
+"K");
        //break statement exits the switch statement
        break;
case 3:
        //if user selected 3, program asks for the temperature in degrees Fahrenheit
        System.out.println("Enter Fahrenheit temperature: ");
        //fahrenheitTemperature is given the value of the number the use inputs and it is
        read as a double(decimal)
        fahrenheitTemperature = selectionInput.nextDouble();
        //conversion is performed using the formula below and the value the user input
        and this is set to be the value of the celsiusTemperature
        celsiusTemperature = (fahrenheitTemperature - 32) * 5/9;
        //program outputs the converted temperature
        System.out.println("The converted temperature is: " + celsiusTemperature +
"°C");
        //break statement exits the switch statement
        break;
case 4:
        //if user selected 4, program asks for the temperature in degrees Fahrenheit
        System.out.println("Enter Fahrenheit temperature: ");
        //fahrenheitTemperature is given the value of the number the use inputs and it is
        read as a double(decimal)
        fahrenheitTemperature = selectionInput.nextDouble();
        //conversion is performed using the formula below and the value the user input
        and this is set to be the value of the kelvinTemperature
        kelvinTemperature = (fahrenheitTemperature - 32) * 5/9 + 273.15;
        //program outputs the converted temperature
        System.out.println("The converted temperature is: " + kelvinTemperature +
"K");
        //break statement exits the switch statement
        break;
case 5:
        //if user selected 5, program asks for the temperature in Kelvin
        System.out.println("Enter Kelvin temperature: ");

```

```

        //kelvinTemperature is given the value of the number the use inputs and it is
        read as a double(decimal)
        kelvinTemperature = selectionInput.nextDouble();
        //conversion is performed using the formula below and the value the user input
        and this is set to be the value of the celsiusTemperature
        celsiusTemperature = kelvinTemperature - 273.15;
        //program outputs the converted temperature
        System.out.println("The converted temperature is: " + celsiusTemperature +
        "°C");
        //break statement exits the switch statement
        break;
case 6:
        //if user selected 6, program asks for the temperature in Kelvin
        System.out.println("Enter Kelvin temperature: ");
        //kelvinTemperature is given the value of the number the use inputs and it is
        read as a double(decimal)
        kelvinTemperature = selectionInput.nextDouble();
        //conversion is performed using the formula below and the value the user input
        and this is set to be the value of the fahrenheitTemperature
        fahrenheitTemperature = (kelvinTemperature - 273.15) * 9/5 + 32;
        //program outputs the converted temperature
        System.out.println("The converted temperature is: " + fahrenheitTemperature
        + "°F");
        //break statement exits the switch statement
        break;
default:
        //if user does not input a valid selection (1, 2, 3, 4, 5, or 5), the program instructs
        them to select a valid option
        System.out.println("Please select a valid option.");
    }
}
}

```


PART 6: Your Completed Program

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