

# Table of Contents

- [1. Fahrenheit to Celsius conversion \(9 Feb\)](#)
- [2. Sample solution \(19 Feb\)](#)
  - [2.1. Problem](#)
  - [2.2. Plan](#)
  - [2.3. Pseudocode \(algorithm\)](#)
  - [2.4. Process](#)
    - [2.4.1. BPMN = Business Process Model and Notation](#)
    - [2.4.2. UML = Unified Modeling Language \(sequence diagram\)](#)
  - [2.5. Program](#)

Time-stamp: <2024-02-19 Mon 09:41>

## 1. Fahrenheit to Celsius conversion (9 Feb)

- Compute the temperature in degrees Celsius for a given temperature in degrees Fahrenheit.
- A complete solution includes:
  1. Plan (10 pt)
  2. Pseudocode (10 pt)
  3. Process (10 pt)
  4. Program (10 pt)
- Sample output:

72 degrees Fahrenheit = 22.22 degrees Celsius

- Submit an Emacs Org-mode file with some or all of these aspects. Use the [Hello World sample file](#) as a template if you like (e.g. to include images).
- For this bonus exercise, independence and diligence of execution is required and rewarded.
- You'll get my sample solution when you submit your solution.

## 2. Sample solution (19 Feb)

### 2.1. Problem

Compute the temperature in degrees Celsius for a given temperature in degrees Fahrenheit. The two temperature scales are related by the relationship  $(32^{\circ}\text{F} - 32) \frac{5}{9} = 0^{\circ}\text{C}$ , or  $f(x) = (x - 32) \frac{5}{9}$  where  $x$  is the Fahrenheit value.

### 2.2. Plan

Design an algorithm to convert a Fahrenheit input value  $x$  into a Celsius output value using the formula  $f(x) = (x - 32) \frac{5}{9}$ .

### 2.3. Pseudocode (algorithm)

```
Algorithm: convert x Fahrenheit to Celsius using f(x)=(x-32) * 5/9
Input: float value `fahrenheit`
Output: float value `celsius`
```

```

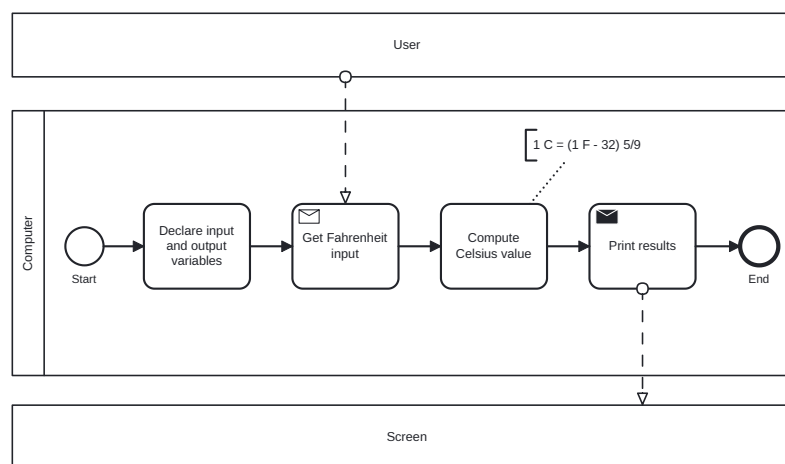
Begin
  // declare input and output variables
  // get fahrenheit input
  // compute celsius value
  // print fahrenheit and celsius value
End

```

## 2.4. Process

### 2.4.1. BPMN = Business Process Model and Notation

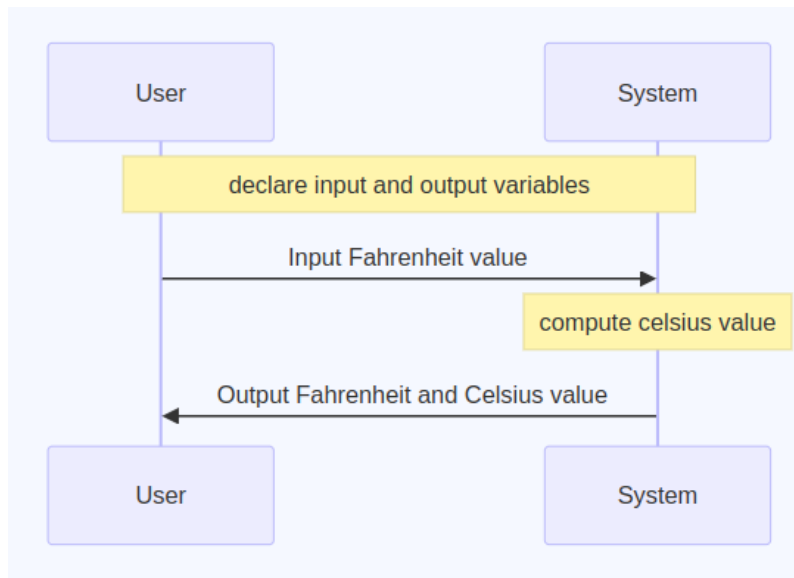
[This BPMN process diagram](#) (view as "Raw" file) was created with the free online editor bpmn.io. It shows the different steps as a so-called "happy path" (without decisions or gateways) from start to end:



[Here is the .bpmn file](#) that you can load into bpmn.io to edit the diagram.

### 2.4.2. UML = Unified Modeling Language (sequence diagram)

[This UML sequence diagram](#) was created with the free online editor mermaid.live. It shows the interaction between the User and the System (though in this case, we don't feed input to the computer):



Here is the code used to created the sequence diagram (using the sample provided at mermaid.live):

```

sequenceDiagram
    participant User
    participant System

    Note over User, System: declare input and output variables
    User->>System: Input Fahrenheit value
    Note over System: compute celsius value
    System-->>User: Output Fahrenheit and Celsius value
  
```

## 2.5. Program

The code is a straightforward translation of the pseudocode into C.

```

// declare input and output variables
float fahrenheit, celsius;

// get fahrenheit input
fahrenheit = 72.f;

// compute celsius value
celsius = (fahrenheit - 32.f) * 5.f/9.f;

// print fahrenheit and celsius value
printf("%.2f°F = %.2f°C\n", fahrenheit, celsius);
  
```

```
72.00°F = 22.22°C
```

Author: Marcus Birkenkrahe

Created: 2024-02-19 Mon 11:26

[Validate](#)