

Documentation of Day 7

Exercise 1-15

Question:

Rewrite the temperature conversion program of Section 1.2 to use a function for conversion.

I have written a program that uses a function to convert temperature from both Fahrenheit and Celsius to Celsius and Fahrenheit respectively. Below is the driver code for this program:

Source Code:

```
#include <stdio.h>

void temp_converter() {
    int c;
    printf("Press 1 for Fahrenheit to Celsius Conversion Table....!\n");
    printf("Press 2 for Celsius to Fahrenheit Conversion Table....!\n");
    scanf("%d", &c);
    float i;
    switch(c) {
        case 1:
            printf("Fahrenheit\tCelsius\n");
            for(i=0; i<=300; i+=20){
                printf("%3.0f \t\t%6.1f\n", i, (5.0/9.0) * (i-32.0));
            }
            break;
        case 2:
            printf("Celsius\t\tFahrenheit\n");
            for(i=0; i<=300; i+=20){
                printf("%3.0f \t\t%6.1f\n", i, ((9.0/5.0)*i) + 32.0);
            }
            break;
        default:
            break;
    }
}

main() {
    temp_converter();
}
```

Explanation:

Let's break down the above program to understand its functionalities:

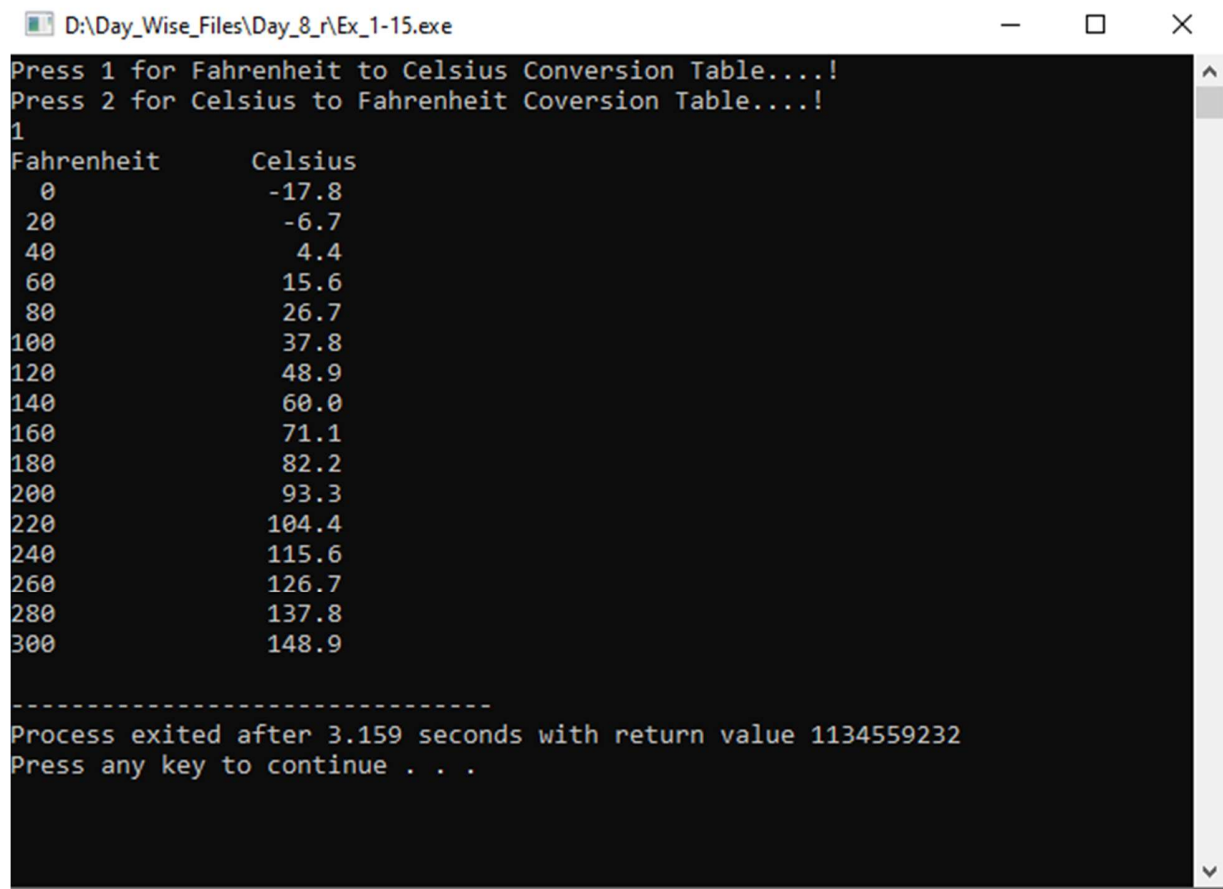
1. The program starts with an `#include` directive, which includes the standard input-output library (`stdio.h`) to enable input/output operations.
2. The program defines a function `temp_converter()` that performs the temperature conversions. It takes no arguments and returns void.
3. Inside the `temp_converter()` function, an integer variable `c` is declared to store the user's choice for the conversion table.
4. Two `printf` statements are used to display a menu of options to the user: Fahrenheit to Celsius conversion table or Celsius to Fahrenheit conversion table.
5. The `scanf` function is used to read the user's choice (`c`) from the console.
6. A float variable `i` is declared to store the temperature values during iteration.
7. A switch statement is used to perform different actions based on the user's choice (`c`).
8. For case 1 (Fahrenheit to Celsius conversion), the program prints a table header "Fahrenheit\tCelsius".
9. Inside the for loop, temperatures in Fahrenheit are iterated from 0 to 300, incrementing by 20 in each iteration. For each value of `i`, the corresponding Celsius temperature is calculated using the formula $(5.0/9.0) * (i-32.0)$ and displayed using `printf` with specific formatting.
10. For case 2 (Celsius to Fahrenheit conversion), the program prints a table header "Celsius\tFahrenheit".
11. Inside the for loop, temperatures in Celsius are iterated from 0 to 300, incrementing by 20 in each iteration. For each value of `i`, the corresponding Fahrenheit temperature is calculated using the formula $((9.0/5.0)*i) + 32.0$ and displayed using `printf` with specific formatting.
12. The `break` statement is used to exit the switch statement once the respective conversion table is printed.
13. A default case is included in the switch statement to handle any invalid choice entered by the user. In this case, the program simply breaks without performing any conversion.

14. Finally, the main() function is defined. It calls the temp_converter() function to start the temperature conversion process.

15. The main() function returns 0, indicating successful program execution.

Output:

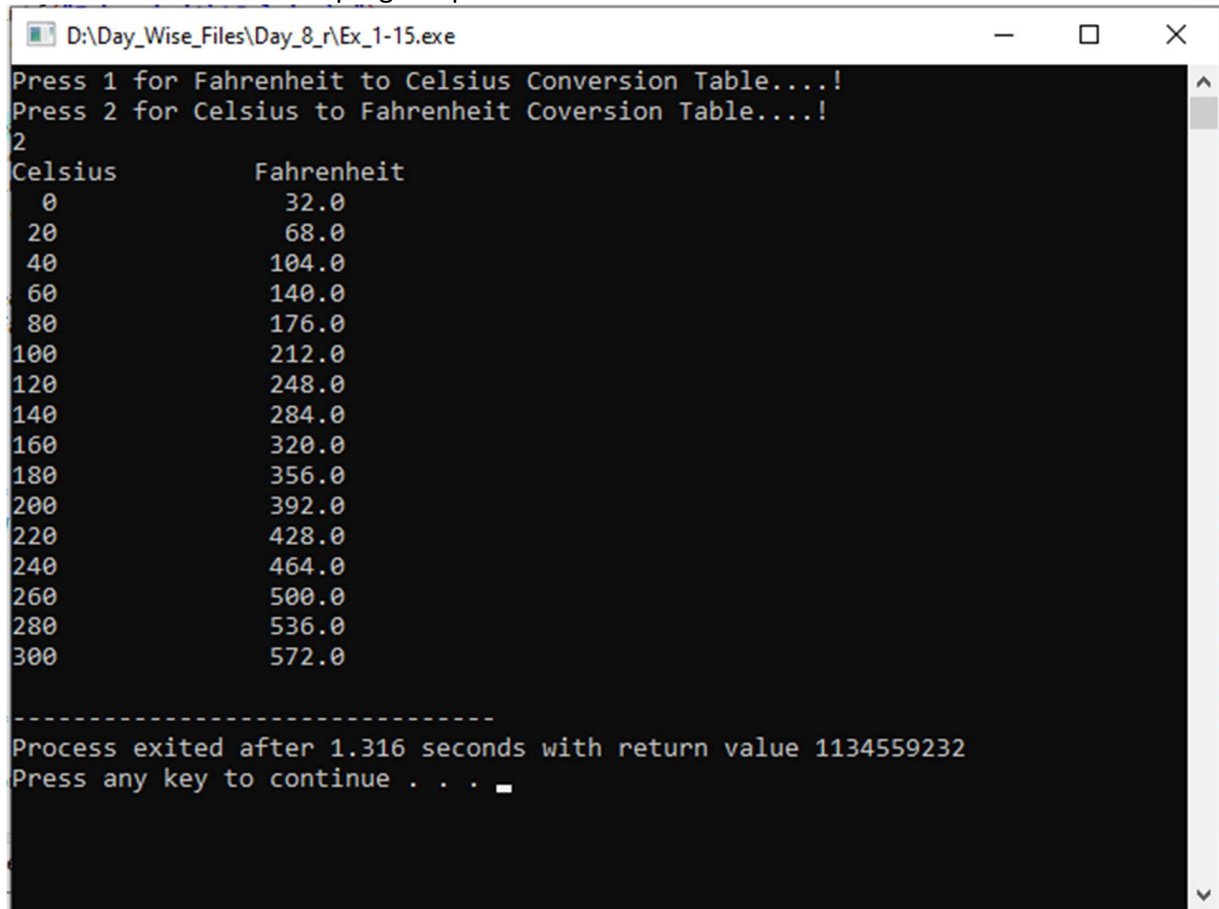
As the user entered 1 the program prints the Fahrenheit to Celsius Conversion table as follows:



```
D:\Day_Wise_Files\Day_8\Ex_1-15.exe
Press 1 for Fahrenheit to Celsius Conversion Table....!
Press 2 for Celsius to Fahrenheit Conversion Table....!
1
Fahrenheit      Celsius
0               -17.8
20              -6.7
40               4.4
60              15.6
80              26.7
100             37.8
120             48.9
140             60.0
160             71.1
180             82.2
200             93.3
220            104.4
240            115.6
260            126.7
280            137.8
300            148.9

-----
Process exited after 3.159 seconds with return value 1134559232
Press any key to continue . . .
```

As the user entered 1 the program prints the Celsius to Fahrenheit Conversion table as follows:



The screenshot shows a Windows command prompt window titled "D:\Day_Wise_Files\Day_8_r\Ex_1-15.exe". The window contains the following text:

```
Press 1 for Fahrenheit to Celsius Conversion Table....!  
Press 2 for Celsius to Fahrenheit Conversion Table....!  
2  
Celsius      Fahrenheit  
0            32.0  
20           68.0  
40           104.0  
60           140.0  
80           176.0  
100          212.0  
120          248.0  
140          284.0  
160          320.0  
180          356.0  
200          392.0  
220          428.0  
240          464.0  
260          500.0  
280          536.0  
300          572.0  
  
-----  
Process exited after 1.316 seconds with return value 1134559232  
Press any key to continue . . .
```

Celsius	Fahrenheit
0	32.0
20	68.0
40	104.0
60	140.0
80	176.0
100	212.0
120	248.0
140	284.0
160	320.0
180	356.0
200	392.0
220	428.0
240	464.0
260	500.0
280	536.0
300	572.0