Assignment 4: Functions

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ELEC2850 Microcontrollers Using C Programming

October 17, 2024

1 Q1 Output

```
Enter feet and inches as num num: 3 8
3' 8"
Enter oz of popcorn: 15
Too large
Try again: 2
Too small
Try again: 7
42 seconds to cook.
Enter base length, base width, and pyramid height as num num num: 5 5 5
The volume of the pyramid is: 41.67
```

Figure 1: Test cases for the program

2 Code

```c
#include <stdio.h>

void PrintFeetInchShort(int numFeet, int numInch);
void PrintPopcornTime(float bagOunces);
float PyramidVolume(float baseLength, float baseWidth, float pyramidHeight); // returns float

void PrintFeetInchShort(int numFeet, int numInch)
{
    printf("%d' %d\"\n", numFeet, numInch);
    return;
}

void PrintPopcornTime(float bagOunces)
{
    if (bagOunces > 10)
    {
        printf("Too large\n");
        printf("Try again: ");
        scanf("%f", &bagOunces);
        PrintPopcornTime(bagOunces);
    }
    else if (bagOunces < 3)
    {
        printf("Too small\n");
        printf("Try again: ");
        scanf("%f", &bagOunces);
        PrintPopcornTime(bagOunces);
    }
    else
    {
        int seconds = 6 * bagOunces;
        printf("%d seconds to cook.\n", seconds);
    }
    return;
}

float PyramidVolume(float baseLength, float baseWidth, float pyramidHeight)
{
    float volume = (baseLength * baseWidth * pyramidHeight) / 3;
    return volume;
}

int main()
{
    int feet, inch = 0;
    float oz = 0;
    float length, width, height = 0;
    printf("Enter feet and inches as num num: ");
    scanf("%d %d", &feet, &inch);
    PrintFeetInchShort(feet, inch);
    printf("Enter oz of popcorn: ");
    scanf("%f", &oz);
    PrintPopcornTime(oz);
    printf("Enter base length, base width, and pyramid height as num num num: ");
    scanf("%f %f %f", &length, &width, &height);
    printf("The volume of the pyramid is: %.2f\n", PyramidVolume(length, width, height));
    return 0;
}
```

3 Q2 Problem Statement

Create a program that wil calculate the temperature at a given depth in km. The program should prompt the user to enter the depth in km, then calculate the temperature at that depth using the formula $T = 10 \times depth + 20$, for celsius, and $T = 1.8 \times depth + 32$, for fahrenheit. The program should then display the temperature in both celsius and fahrenheit.

4 Analysis

4.1 Inputs

depth (float)

4.2 Outputs

Celsius, fahrenheit (floats)

4.3 Formulas

Equation for celsius: $T = 10 \times depth + 20$
Equation for fahrenheit: $T = 1.8 \times depth + 32$

5 Flowchart

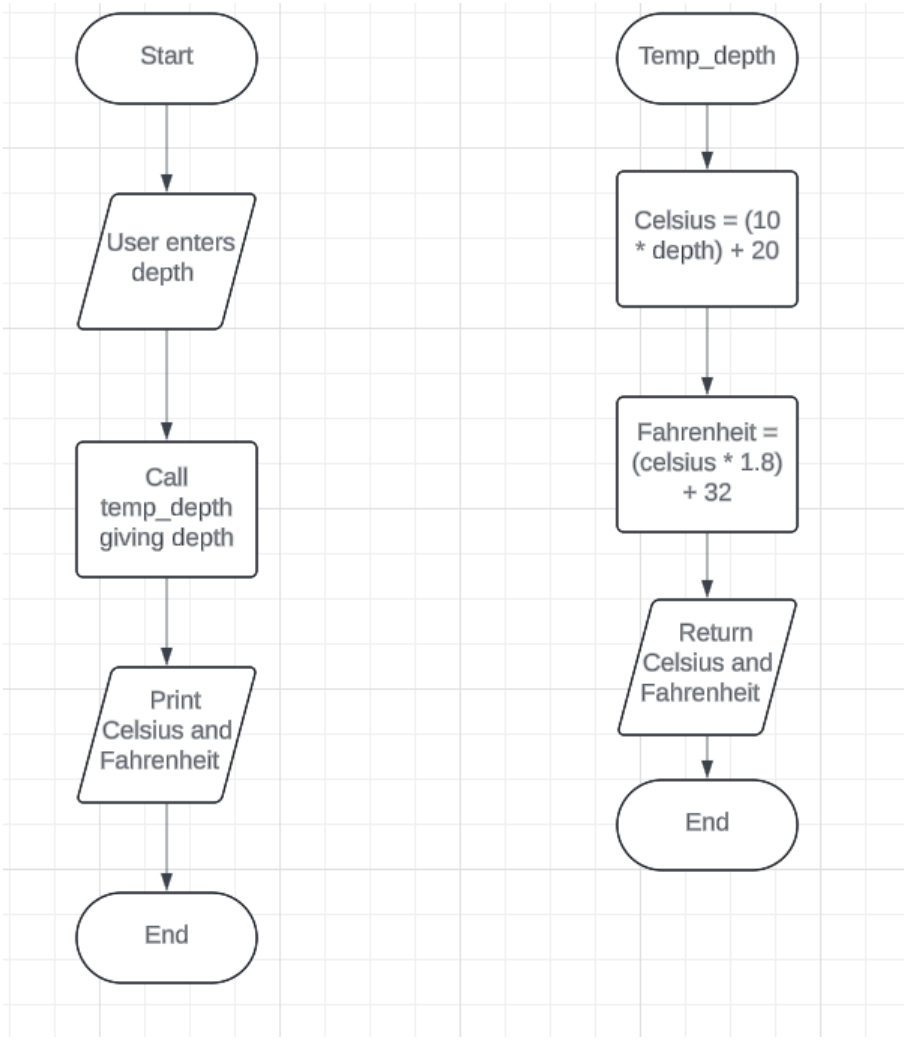

Figure 2: Flowchart for Q2

6 Output

```
Enter the depth of the water (km): 3
The temperature in Celsius is: 50.00
The temperature in Fahrenheit is: 122.00
```

Figure 3: A test case for the program

```
Enter the depth of the water (km): 17
The temperature in Celsius is: 190.00
The temperature in Fahrenheit is: 374.00
```

Figure 4: Another test case for the program

7 Code

```c
#include <stdio.h>

float temp_depth_celsius(float depth);
float temp_depth_fahrenheit(float depth);

float temp_depth_celsius(float depth)
{
    float celsius = (10 * depth) + 20;
    return celsius;
}

float temp_depth_fahrenheit(float depth)
{
    float fahrenheit = (1.8 * temp_depth_celsius(depth)) + 32;
    return fahrenheit;
}

int main()
{
    float depth = 0;
    printf("Enter the depth of the water (km): ");
    scanf("%f", &depth);
    printf("The temperature in Celsius is: %.2f\n", temp_depth_celsius(depth));
    printf("The temperature in Fahrenheit is: %.2f\n", temp_depth_fahrenheit(depth));
    return 0;
}
```