Hands-on Activity 6.1	
Functions	
Course Code: CPE 007	**Program:** Computer Engineering
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6. Output	
CODE	

```cpp
1    #include <iostream>
2    #include <iomanip>
3    using namespace std;
4
5    int add(int a, int b);
6    int subtract(int a, int b);
7    int multiply(int a, int b);
8    float divide(int a, int b);
9    float fahrenheitToCelsius(float f);
10   float celsiusToFahrenheit(float c);
11   float dollarToPeso(float dollars);
12   float pesoToDollar(float pesos);
13
14   int main() {
15       int choice;
16
17       cout << "Choose Function\n";
18       cout << "1. Add, subtract, divide, multiply\n";
19       cout << "2. Fahrenheit <-> Celsius \n";
20       cout << "3. Dollars <-> Pesos\n";
21       cout << "Enter choice: ";
22       cin >> choice;
23
24       if (choice == 1) {
25           int num1, num2;
26           cout << "\nEnter 1st number: ";
27           cin >> num1;
28           cout << "Enter 2nd number: ";
29           cin >> num2;
30
31           cout << "\nSum: " << add(num1, num2);
32           cout << "\nDifference: " << subtract(num1, num2);
33           cout << "\nProduct: " << multiply(num1, num2);
34
35           if (num2 != 0)
36               cout << "\nQuotient: " << divide(num1, num2) << endl;
37           else
38               cout << "\nQuotient: Cannot divide by zero.\n";
39       }
```

```cpp
    else if (choice == 2) {
        int tempChoice;
        float temp;
        cout << "\n1. Fahrenheit to Celsius\n";
        cout << "2. Celsius to Fahrenheit\n";
        cout << "Enter choice: ";
        cin >> tempChoice;

        if (tempChoice == 1) {
            cout << "Enter temperature in Fahrenheit: ";
            cin >> temp;
            cout << "In Celsius: " << fahrenheitToCelsius(temp) << "C\n";
        } else {
            cout << "Enter temperature in Celsius: ";
            cin >> temp;
            cout << "In Fahrenheit: " << celsiusToFahrenheit(temp) << "F\n";
        }
    }
    else if (choice == 3) {
        int moneyChoice;
        float amount;
        cout << "\n1. Dollars -> Pesos\n";
        cout << "2. Pesos -> Dollars\n";
        cout << "Enter choice: ";
        cin >> moneyChoice;

        if (moneyChoice == 1) {
            cout << "Enter Dollars: ";
            cin >> amount;
            cout << "In Pesos: P" << dollarToPeso(amount) << endl;
        } else {
            cout << "Enter Pesos: ";
            cin >> amount;
            cout << "In Dollars: $" << pesoToDollar(amount) << endl;
        }
    }
    else {
        cout << "Invalid choice.\n";
    }

    return 0;
```

```
81     }
82
83   int add(int a, int b) {
84         return a + b;
85         }
86   int subtract(int a, int b) {
87         return a - b;
88         }
89   int multiply(int a, int b) {
90         return a * b;
91         }
92   float divide(int a, int b) {
93         return (float)a / b;
94         }
95   float fahrenheitToCelsius(float f) {
96         return (f - 32) * 5 / 9;
97         }
98   float celsiusToFahrenheit(float c) {
99         return (c * 9 / 5) + 32;
100        }
101  float dollarToPeso(float dollars) {
102        return dollars * 58.19;
103        }
104  float pesoToDollar(float pesos) {
105        return pesos / 58.19;
106        }
```

OUTPUT

```
Choose Function
1. Add, subtract, divide, multiply
2. Fahrenheit <-> Celsius
3. Dollars <-> Pesos
Enter choice: 0
Invalid choice.

----------------------------------
Process exited after 1.378 seconds with return value 0
Press any key to continue . . . |
```

```
Choose Function
1. Add, subtract, divide, multiply
2. Fahrenheit <-> Celsius
3. Dollars <-> Pesos
Enter choice: 1

Enter 1st number: 2048
Enter 2nd number: 1556

Sum: 3604
Difference: 492
Product: 3186688
Quotient: 1.3162


--------------------------------
Process exited after 9.196 seconds with return value 0
Press any key to continue . . . |
```

```
Choose Function
1. Add, subtract, divide, multiply
2. Fahrenheit <-> Celsius
3. Dollars <-> Pesos
Enter choice: 2

1. Fahrenheit to Celsius
2. Celsius to Fahrenheit
Enter choice: 1
Enter temperature in Fahrenheit: 100
In Celsius: 37.7778C

------------------------------------
Process exited after 17.02 seconds with return value 0
Press any key to continue . . .
```

```
Choose Function
1. Add, subtract, divide, multiply
2. Fahrenheit <-> Celsius
3. Dollars <-> Pesos
Enter choice: 2

1. Fahrenheit to Celsius
2. Celsius to Fahrenheit
Enter choice: 2
Enter temperature in Celsius: 40
In Fahrenheit: 104F

------------------------------------
Process exited after 7.278 seconds with return value 0
Press any key to continue . . .
```

```
Choose Function
1. Add, subtract, divide, multiply
2. Fahrenheit <-> Celsius
3. Dollars <-> Pesos
Enter choice: 3

1. Dollars -> Pesos
2. Pesos -> Dollars
Enter choice: 1
Enter Dollars: 27
In Pesos: P1571.13

----------------------------------
Process exited after 9.342 seconds with return value 0
Press any key to continue . . .
```

```
Choose Function
1. Add, subtract, divide, multiply
2. Fahrenheit <-> Celsius
3. Dollars <-> Pesos
Enter choice: 3

1. Dollars -> Pesos
2. Pesos -> Dollars
Enter choice: 2
Enter Pesos: 5000
In Dollars: $85.9254

----------------------------------
Process exited after 12.92 seconds with return value 0
Press any key to continue . . . |
```

7. Supplementary Activity

Inside the int main function, the interface menu starting at line 15 waits for the user input to choose a function category with the given number choices: 1,2,3. Values outside the given choices will give an invalid response from an else statement at line 76.

Choice 1 is the add, subtract, divide, multiply menu for the following functions using int add, subtract, divide, and float divide. The menu prompts the user to input two integer values assigning the variables num1 and num2. After input, it calls the functions add(num1, num2), subtract(num1, num2), multiply(num1, num2), and divide(num1, num2) to perform the declared computations. The division function uses float and the if statement at int main prints a "cannot divide by zero" error when division by zero occurs. The functions receive two integers and return integers and floats (for division).

Choice 2 is a conversion for fahrenheit and celsius. Its menu waits for user input choices of Fahrenheit to Celsius or Celsius to Fahrenheit. The temperature values use float datatypes. It calls the functions fahrenheitToCelsius and celsiusToFahrenheit containing the appropriate formulas for the conversion. Line 51 and 55 outputs the converted values.

Choice 3 is a conversion for pesos and dollars. Its menu waits for user input of choices Dollars to Pesos and Pesos to Dollars. The datatype used is float to account for decimals used in currencies. It calls for the functions dollarToPeso(float dollars) and pesoToDollar(float pesos). Line 69 and 73 then prints out the converted values.

Moving over to the functions, starting from line 5 to 12, these define the functions for the add, subtract, multiply, and divide operations, temperature conversion for fahrenheit and celsius, and currency conversion for dollars and pesos. For function add(int a, int b), this adds the two integer variables a and b with +. For function subtract(int a, int b), this subtracts the two integer variables a and b with - and returns the difference. Function multiply(int a, int b) multiplies the two integers and returns the product. divide(int a, int b) divides two input integers a and b to return the quotient. If divided by zero, an invalid value will be caught by the if statement with != 0 and output "cannot divide by zero". fahrenheitToCelsius(float f) uses the formula (f - 32) * 5 / 9 to convert and return the input variable temperature f to celsius values, A similar process happens with celsiusToFahrenheit(float c) but with a different formula (c * 9 / 5) + 32. For function dollarToPeso(float dollars), the input float variable dollars is used then goes to a calculation by multiplying it by 58.19 and returning the value for the function calls at int main. A similar process also happens for pesoToDollar(float pesos) but instead goes the other way around with pesos / 58.19.

8. Conclusion

Concluding this activity, the use of functions allow me to create an overall more modular form of code, dividing parts that were once in int main into separate processes or functions. For example, in the currency conversion for dollars and pesos, I used two functions that apply the division and multiplication operations for the respective currencies, allowing me to calculate and return the values of that function to the main function. This allows me to create cleaner code at the main function and reduce the chances of errors and other undefined outputs that can affect the accuracy and performance of the program. The use of functions is similar to structures but instead it allows me to input code operations from basic arithmetic operations, printing messages, to using arrays to form organized and sorted data. In order for functions to work properly, there should be definitions and initializations that a computer can understand to do the appropriate computations and outputs. Overall. this activity expanded my understanding of separating components of one function int main into modular functions containing the appropriate names, functions, and blocks of code needed to compute and solve a certain problem.