Hands-on Activity 6.1	
Functions	
Course Code: CPE007	**Program:** Computer Engineering
Course Title: Programming Logic and Design	**Date Performed:10/17/25**
Section:CPE11S1	**Date Submitted:10/21/25**
Name(s): Niel Vincent B. Condino	**Instructor: Engr. Jimlord M. Quejado**

6. Output

```cpp
#include <iostream>

using namespace std;

struct arithAns{
    string answerName;
    int answer;
    int remainder;
};

void numChecker(string dialogue, int &input , int minVal, int maxVal);//Error Checking
void printLine();//Formatting purpose

//ILOS
arithAns compArith(int mode,int num1,int num2);
double convTemp(int mode,double startTemp);
float convCur(int mode,float startCur);

//For cleaner switch case
void compArithMain();
void convTempMain();
void convCurMain();

int main(){
    int chosenFunc;

    cout << "================================Welcome To Multipurpose Program================================\n";
    cout << "Choose a function(Input corresponding number):\n (1)Perform arithmetic\n (2)Convert Farenheight To Celsius Or Celsius To Farenheight\n (3)Convert Dollars To Peso Or Peso To Dollars\n (4)Exit Program\n";
    numChecker("Chosen Function: ",chosenFunc,1,4);

    printLine();

    switch (chosenFunc){
        case 1:{
            compArithMain();
            break;
        }
        case 2:{
            convTempMain();
            break;
        }
        case 3:{
            convCurMain();
            break;
        }
        case 4:{
            //safely exit the program
            break;
        }
        default:{
        break;
        }
    }

    printLine();

    cout << "Thank you for using the Multipurpose Program, Rerun me if you need other functions!\n";

    printLine();
    return 0;
}

void numChecker(string dialogue, int &input , int minVal, int maxVal){
    bool invalid = true;
    do {
        cout << dialogue;
        cin >> input;
        invalid = (input > maxVal || input < minVal);
        if (invalid){
        cout << "Error, Number Out of Range\n";
        }
    }while (invalid);
}

void printLine(){
    cout << "================================================================================================\n";
}

arithAns compArith(int mode,int num1,int num2){
    arithAns answer;

    //modes: 1 = add, 2= subtract, 3= multiplication,4=division
    switch (mode){
    case 1:{
        answer.answerName = "sum";
        answer.answer = num1+num2;
        break;
    }
    case 2:{
        answer.answerName = "difference";
        answer.answer = num1-num2;
        break;
    }
    case 3:{
        answer.answerName = "product";
        answer.answer = num1*num2;
        break;
    }
    case 4:{
        answer.answerName = "quotient";
        answer.answer = num1/num2;
        answer.remainder = num1%num2;
        break;
        }
    }
    return answer;
}

void compArithMain(){
    int chosenOperation;
    int input1,input2;

    cout << "You have chosen to perform arithmetic\n";
    cout << "Choose operation:\n (1)Addition\n (2)Subtraction\n (3)Multiplication\n (4)Division\n";
    numChecker("Chosen operation: ",chosenOperation,1,4);

    cout << "Input first integer: ";
    cin >> input1;

    cout << "Input second integer: ";
```

```
    cin >> input2;

    arithAns output = compArith(chosenOperation,input1,input2);

    cout << "The " << output.answerName << " of " << input1 << " and " << input2 << " is " << output.answer;

    if (chosenOperation == 4 && output.remainder > 0){
        cout << " with a remainder of " << output.remainder;
    }

    cout << endl;
}
double convTemp(int mode,double startTemp){
    //used floats because integer division they become 0
    double convertedTemp;
    if (mode == 1){
    convertedTemp = (startTemp - 32) * 5.0/9.0;
    }
    else {
    convertedTemp = (startTemp * (9.0/5.0)) + 32;
    }
    return convertedTemp;
}

void convTempMain(){
    int mode;
    int startTemp;
    const char degSymbol = char(248);
    string fTemp = string(1, degSymbol) + "F";
    string cTemp = string(1, degSymbol) + "C";

    cout << "You used temperature converter\n";
    cout << "Input 1 if you want to convert " << fTemp <<" to " << cTemp <<" or 2 if you want the reverse\n";
    numChecker("Chosen mode: ",mode,1,2);

    cout << "Input Temperature Value:";
    cin >> startTemp;

    double outputTemp = convTemp(mode,startTemp);
    string initialUnit = (mode == 1) ? fTemp: cTemp;
    string outputUnit = (mode == 1) ? cTemp:fTemp;

    cout << startTemp << initialUnit << " is equal to " << outputTemp << outputUnit << endl;
}
float convCur(int mode,float startCur){
    const float pesoDollarRate = 0.017;
    const float dollarPesoRate = 58.16;

    float convertedCur;

    if (mode == 1){
        convertedCur = startCur * dollarPesoRate;
    }
    else {
        convertedCur = startCur * pesoDollarRate;
    }
  return convertedCur;
}
```

```
void convCurMain(){
    int mode;
    float startCur;

    cout << "You used the currency converter\n";
    cout << "Input 1 to convert dollar to peso and 2 if you want the reverse\n";

    numChecker("Chosen mode: ",mode,1,2);

    cout << "Input currency value: ";
    cin >> startCur;

    float outputCur = convCur(mode,startCur);

    string inputUnit = (mode == 1) ? "$" : "Php";
    string outputUnit = (mode == 1) ? "Php" : "$";

    cout << startCur << inputUnit << " is equal to " << outputCur << outputUnit << endl;
}
```

```
==============================Welcome To Multipurpose Program==============================
Choose a function(Input corresponding number):
 (1)Perform arithmetic
 (2)Convert Farenheight To Celsius Or Celsius To Farenheight
 (3)Convert Dollars To Peso Or Peso To Dollars
 (4)Exit Program
Chosen Function: 1
===========================================================================================
You have chosen to perform arithmetic
Choose operation:
 (1)Addition
 (2)Subtraction
 (3)Multiplication
 (4)Division
Chosen operation: 1
Input first integer: 5
Input second integer: 2
The sum of 5 and 2 is 7
===========================================================================================
Thank you for using the Multipurpose Program, Rerun me if you need other functions!
===========================================================================================


--------------------------------
Process exited after 8.582 seconds with return value 0
Press any key to continue . . .
```

```
================================Welcome To Multipurpose Program================================
Choose a function(Input corresponding number):
 (1)Perform arithmetic
 (2)Convert Farenheight To Celsius Or Celsius To Farenheight
 (3)Convert Dollars To Peso Or Peso To Dollars
 (4)Exit Program
Chosen Function: 1
===============================================================================================
You have chosen to perform arithmetic
Choose operation:
 (1)Addition
 (2)Subtraction
 (3)Multiplication
 (4)Division
Chosen operation: 2
Input first integer: 20
Input second integer: 45
The difference of 20 and 45 is -25
===============================================================================================
Thank you for using the Multipurpose Program, Rerun me if you need other functions!
===============================================================================================

--------------------------------
Process exited after 7.034 seconds with return value 0
Press any key to continue . . .
```

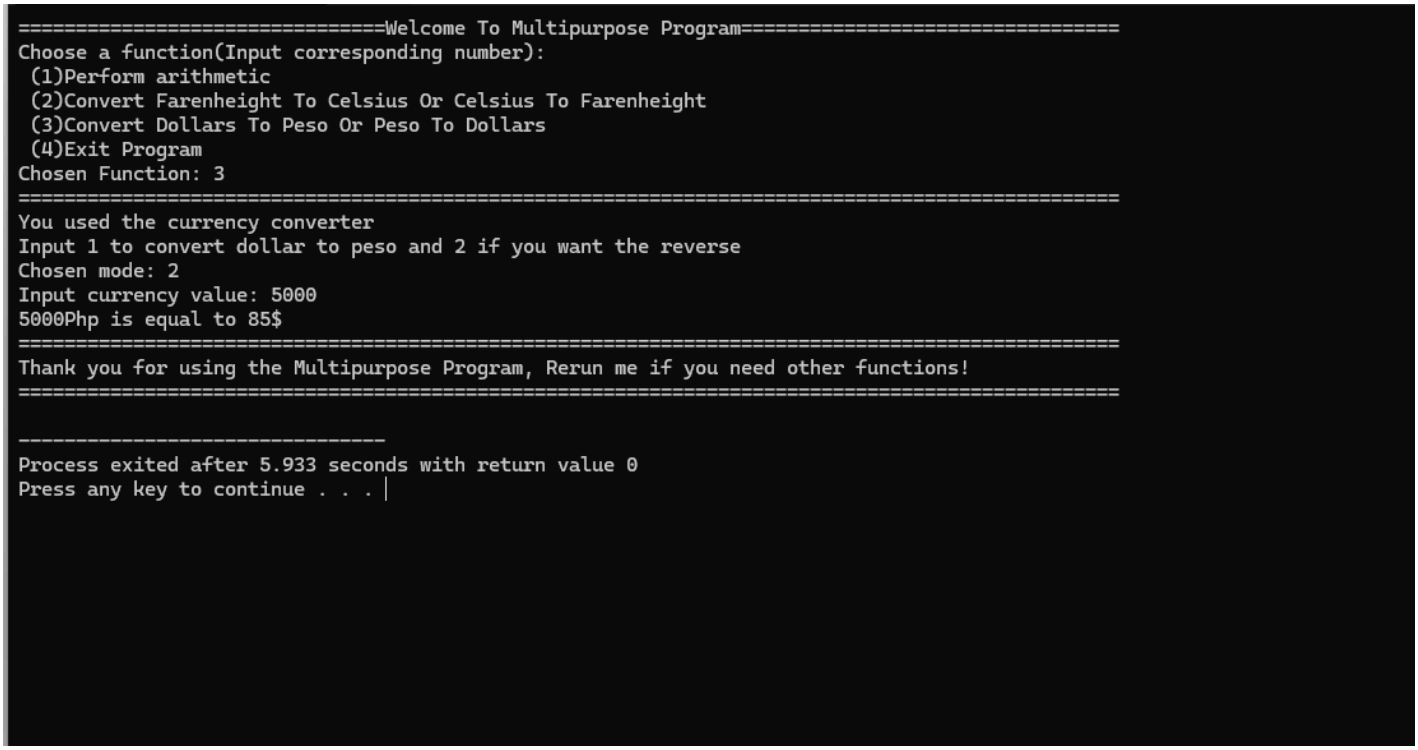
```
================================Welcome To Multipurpose Program================================
Choose a function(Input corresponding number):
 (1)Perform arithmetic
 (2)Convert Farenheight To Celsius Or Celsius To Farenheight
 (3)Convert Dollars To Peso Or Peso To Dollars
 (4)Exit Program
Chosen Function: 1
===============================================================================================
You have chosen to perform arithmetic
Choose operation:
 (1)Addition
 (2)Subtraction
 (3)Multiplication
 (4)Division
Chosen operation: 3
Input first integer: 6
Input second integer: 7
The product of 6 and 7 is 42
===============================================================================================
Thank you for using the Multipurpose Program, Rerun me if you need other functions!
===============================================================================================

--------------------------------
Process exited after 17.35 seconds with return value 0
Press any key to continue . . .
```

```
==============================Welcome To Multipurpose Program==============================
Choose a function(Input corresponding number):
 (1)Perform arithmetic
 (2)Convert Farenheight To Celsius Or Celsius To Farenheight
 (3)Convert Dollars To Peso Or Peso To Dollars
 (4)Exit Program
Chosen Function: 1
===========================================================================================
You have chosen to perform arithmetic
Choose operation:
 (1)Addition
 (2)Subtraction
 (3)Multiplication
 (4)Division
Chosen operation: 4
Input first integer: 9
Input second integer: 2
The quotient of 9 and 2 is 4 with a remainder of 1
===========================================================================================
Thank you for using the Multipurpose Program, Rerun me if you need other functions!
===========================================================================================

--------------------------------
Process exited after 5.762 seconds with return value 0
Press any key to continue . . .
```

```
==============================Welcome To Multipurpose Program==============================
Choose a function(Input corresponding number):
 (1)Perform arithmetic
 (2)Convert Farenheight To Celsius Or Celsius To Farenheight
 (3)Convert Dollars To Peso Or Peso To Dollars
 (4)Exit Program
Chosen Function: 2
===========================================================================================
You used temperature converter
Input 1 if you want to convert °F to °C or 2 if you want the reverse
Chosen mode: 1
Input Temperature Value:20
20°F is equal to -6.66667°C
===========================================================================================
Thank you for using the Multipurpose Program, Rerun me if you need other functions!
===========================================================================================

--------------------------------
Process exited after 5.223 seconds with return value 0
Press any key to continue . . .
```

```
==============================Welcome To Multipurpose Program==============================
Choose a function(Input corresponding number):
 (1)Perform arithmetic
 (2)Convert Farenheight To Celsius Or Celsius To Farenheight
 (3)Convert Dollars To Peso Or Peso To Dollars
 (4)Exit Program
Chosen Function: 2
===========================================================================================
You used temperature converter
Input 1 if you want to convert °F to °C or 2 if you want the reverse
Chosen mode: 2
Input Temperature Value:50
50°C is equal to 122°F
===========================================================================================
Thank you for using the Multipurpose Program, Rerun me if you need other functions!
===========================================================================================

--------------------------------
Process exited after 4.738 seconds with return value 0
Press any key to continue . . .
```

```
==============================Welcome To Multipurpose Program==============================
Choose a function(Input corresponding number):
 (1)Perform arithmetic
 (2)Convert Farenheight To Celsius Or Celsius To Farenheight
 (3)Convert Dollars To Peso Or Peso To Dollars
 (4)Exit Program
Chosen Function: 3
===========================================================================================
You used the currency converter
Input 1 to convert dollar to peso and 2 if you want the reverse
Chosen mode: 1
Input currency value: 500
500$ is equal to 29080Php
===========================================================================================
Thank you for using the Multipurpose Program, Rerun me if you need other functions!
===========================================================================================

--------------------------------
Process exited after 7.241 seconds with return value 0
Press any key to continue . . .
```



7. Supplementary Activity

main()

The program first includes the iostream library. After this it uses the namespace std. Below this, it creates a structure named arithAns that aims to store answers for the arithmetic function that will be used later. It has members of a string named answerName, int value named answer, and an int named remainder. After this it prototypes the functions named numChecker,printLine,compArith,convTemp,convCur,compArithMain,convTempMain, and convCurMain. After these lines is the main function. It first initializes an int named chosenFunction that will be used later. Then, it prints out greetings and what corresponding numbers are used to use a function of the program. 1 is used for performing arithmetic, 2 is used for temperature conversion, 3 is used to convert currency, and 4 is used to just exit the program. It then uses the numChecker function to check if the input number is valid. After this it uses the print line function for formatting. It then uses a switch case using the expression the chosenFunc. If the input is 1 then it goes in the compArithMain() function. If the input is 2 then convTempMain function, if 3 then it goes to the convCurMain function and 4 it exits the program. It then calls the printLine function for formatting and then prints a farewell line.

Now the declarations of the functions.

numChecker()

The first function other than the main function is the void function named numChecker. It takes a string named dialogue, memory address of an int named input, and 2 more int values,minValue and maxValue. It initializes first a bool named invalid which is set to true. It then loops the printing of a value of a string from the parameter dialogue, uses cin in the second parameter named input, then sets the value of the “invalid” variable as equal to if input is greater than maxvalue or less than minvalue. All of these logic inside a do while loop with a condition of invalid being true. This function is mainly used for checking if the number inputted is within range.

printLine()

After this function is the printLine function with a void return type. All this function does is that it prints out a long line.

compArith()

After this is a function that returns a arithAns structure named compArith with all of its parameters as int values. These values are named mode, num1, and num2. it first initializes an arithAns variable named answer. It then uses a switch case to the expression of the mode. If the mode is 1, then it sets the member of the answer variable named answerName as sum and the member answer as num1+num2. If 2, then the answerName is difference and the answer is num1-num2. If 3, then the answerName is product and answer is num1*num2. If 4, then the answer name is quotient and the answer is num1/num2. But the last one uses the remainder member and it stores the remainder of the values. Lastly it returns the value of the variable named answer

compArithMain()

Next is its main function which is called inside the main function, compArithMain. It initializes an int named chosenOperation and input1 and input 2. It then prints out a message asking for the user to input a number corresponding to the chosen operation. It then checks the input using the numChecker function. After it is valid. It asks the user for 2 numbers. After this, it initializes an arithAns variable named output which has a value of the function compArith with the parameters chosenOperation as mode, input1 as num1, and input2 as num2. The name of the answer and the value of the answer. If it has a remainder and the chosenOperation is equal to 4. Then it prints out a text saying its remainder. Lastly it prints out an end line.

convTemp()

The next function is convTemp which has a return type of a double. This has a parameter of int named mode and a double named startTemp. It first initializes a double data type named convertedTemp. If mode is equal to 1 then it converts the startTemp, which is fahrenheit to celsius using its formula. It uses 5.0 / 9.0 because if I used just an int like 5/9 then it returns 0 instead of a decimal. If it is not equal to one then it converts the startTemp, now celsius, to fahrenheit. The converted values are stored inside the convertedTemp variable.It then returns the value of the convertedTemp.

convTempMain()

The next function is the convTempMain function. This is the one that is called inside the main function. It first initializes int values named mode and startTemp. It then declares a constant character value named degSymbol which has a value of char(248), the degrees symbol. It then creates a string value named fTemp and cTemp which both use the string() function to convert the char degSymbol into a string. It then concatenates this to each respective letter, F and C. It then asks the user for an input to the choice of converting F to C or vice versa. Then use the numChecker function to check if the value is valid. It then asks for the starting temp input from the user. It calls the function convTemp with the parameters mode and startTemp then stores its value to a variable named outputTemp. It then gets the initial and output unit based on the input of the user. Lastly it prints out the value of the converted temperature with its units.

convCur()

Second to the last function is the convCur function. This function has a return type of float and takes an int named mode and a float named startCur as its parameters. It then declares 2 constant floats named pesoDollarRate and dollarPesoRate. Then it declares a float named convertedCur. It checks the mode using an if statement. If mode is equal to one then it uses the dollarPesoRate and multiplies the startedConv in it. If not, it uses the pesoDollarRate and multiplies it to the startCur. It then stores all the converted value to the variable named convertedCur which also the function returns the value of.

convCurMain()

Lastly, the convCurMain function. This is what is called inside the main function if the user wants to convert currencies. It first initializes an int named mode and a float named startCur. Next, it asks the user if they want to convert dollars to peso or vice versa then stores it inside the mode variable. It then checks the input using numChecker. After this it asks for the value of the currency to be converted. It then calls the convCur with the parameters mode and startCur. It then prints out the initial and converted currency with its units.

8. Conclusion

From the lesson, I gained more knowledge on how to use a function outside of the main. Functions are used for modularity of code and for better formatting of the code. It avoids repeated lines of code by just storing that block of code inside a function. This benefits the format of the code and to avoid the programmer from copying and pasting these repeated lines of codes by just calling their function name. It also makes it easier to debug because you can easily comment out a function if you saw that it causes buggy behaviour. From the lesson, I learned that I can prototype each function first for a better formatting. At first, I thought that it is pretty confusing to look at but knowing the reason of it making the main function much easier to see made me look at it differently and also got encouraged to prototype my functions. In the activity, Aside from functions, I also applied some of the past lessons topics like structures to reach the desired output. I also used google to see how to use cin inside a parameter and saw that I can use the reference operator to store the value inside the variable in the parameter. I also checked online how to put the degrees symbol in-order to achieve a better formatting for the temperature conversion function. Overall, I think I learned more about functions and learned some miscellaneous things when doing this activity. I also think that there are much more to functions that have not been discussed which can be useful like using another function as a parameter and hopefully it will be discussed in the future

9. Assessment Rubric