THIS WORK IS FOR INDIVIDUAL STUDENT

(Informal Part One of Assignment 2)

(Informal Part 1 of Quiz two will be in Next Class on Tue April 15)

DUE, HANDWRITTEN ONLY, IN CLASS Tue April 15, 2025

CONCEPT TOPICS: C++ Functions:

- READ FROM PF TEXTBOOK
- USE CHATGPT TO GENERATE TUTORIALS

Task 1: Please write, in your own words, the answer to the following questions (read pages from textbook, use ChatGPT and internet): DON'T WRITE ANY CODE, JUST EXPLAIN IN PLAIN ENGLISH

1. What are C++ Functions?
2. What is the main benefit of C++ functions?
3. What is the return type of a function?
4. Why some functions have return type **void?**
5. How to use nested functions calls?
6. How to write functions from given main function code and sample output?
7. How to pass arrays as parameters to functions?
8. How to return arrays from functions?
9. What is parameter **passed** by **value** to functions?
10. What is parameter **passed** by **reference** to functions?
11. What is the purpose of "const" in this function: void display(const int v)?
12. What is the purpose of "const" in this function: void display(const int & v)?

Task 2: Write codes as indicated by each problem below:

1. Write codes of all functions from the following main function and sample output:

Main Code 1:

```
int main()
{
  char x = read();
  char y = read();
  char z = read();
  char X = changeCase(x);
  char Y = changeCase(y);
  char Z = changeCase(z);
```

```
  info(x);
  display(X);

  info(y);
  display(Y);

  info(z);
  display(Z);

  return 0;
}
```

Sample Output 1:

```
Enter a Character: q
Enter a Character: W
Enter a Character: z
Character q after Change of Case is: Q
Character W after Change of Case is: w
Character z after Change of Case is: Z
```

Main Code 2:

```
int main()
{
  double values[5] = {0.0};
  double max = 0.0;
  double min = 0.0;
  double sum = 0.0;

  for(int i = 0; i < 5; i++)
    {
      promptD(i + 1);
      values[i] = readValue();
    }
  max = min = values[0];
  for(int i = 0; i < 5; i++)
    {
      max = larger(max, values[i]);
      min = smaller(min, values[i]);
      sum = add(sum, values[i]);
    }
  double avg = average(sum, 5);
  display(sum, avg, max, min);
  return 0;
}
```

Sample Output 2:

```
Enter value 1: 2.5
Enter value 2: 4.5
Enter value 3: 1.9
Enter value 4: 42.34
Enter value: 5 -32.12
Sum is 19.12 and average is 3.824
Maximum is 42.34 and minimum is -32.12
```

Main Code 3:

```
int main()
{
  char sentence[80] = "";
  char word[30] = "";
  char filePath[80] = "";
  promptPath();
  cin >> filePath;
  ifstream R("para.txt");
  int cn = 0;
  while(R >> word)
    {
      int len = 0;
      while(!isNullChar(word[len++]));
      for(int i = 0; i < len  - 1; i++)
            {
              sentence[cn++] = toUppercase(word[i]);
            }
      sentence[cn++]= ' ';
    }
   R.close();
  sentence[--cn] = '\0';
  cout << sentence << endl;

  return 0;
}
```

Sample Output 3:

```
Enter a file path: para.txt
THIS IS GOOD EXAMPLE. THIS EXAMPLE SHOULD BE USED. THE CODE WILL BE
EDUCATIONAL.
```

2. Write complete C++ program under these constraints:
    - main must not contain any cin, cout and math
    - Must use at least 3 functions

    1. Reads an integer from a user and display its factorial

Sample Output:

```
Enter an integer: 4
Factorial of 4 is 24
Enter an Integer: 6
Factorial of 6 is 720
```

Must use these functions: (you may add more function as you like)

- **read**: to read an integer from the user
- **factorial:** returns factorial of an integer
- **display:** that display an integer on screen

2. Reads 2 integer x and p and display x^p on screen (**don't use ^)**

Sample Output:

```
Enter an integer and its power: 4 3
4 power 3 is 8
```

Must use these functions: (you may add more function as you like)

- **read**: to read an integer from the user
- **power:** returns an integer raised to the given power
- **display:** that display an integer on screen

3. Reads an integer from a user and display if that integer is a **prime** or not

Sample Output:

```
Enter an integer: 45
45 is not a prime, divisible by 5 & 9
Enter an Integer: 29
29 is a prime
```

Must use these functions: (you may add more function as you like)

- **read**: to read an integer from the user
- **isPrime:** return true or false based on if an integer is prime or not
- **display:** that display an integer on screen

4. Reads an integer from a user and display if that integer is a perfect square or not

Sample Output:

```
Enter an integer: 45
45 is not a perfect square
Enter an Integer: 144
144 is a perfect square of 12
```

Must use these functions: (you may add more function as you like)

- **read**: to read an integer from the user
- **isPerfectSquare:** return true or false based on if an integer is prime or not
- **display:** that display an integer on screen

5. Reads an integer from a user and display individual digits from right and then from left

Sample Output:

```
Enter an integer: 45876
Digits from left: 4 5 8 7 6
Digits from right: 6 7 8 5 4
```

Must use these functions: (you may add more function as you like)

- **read**: to read an integer from the user
- **getDigit:** that gets the digit of an integer from a given index, where the right most digit has index 1 e.g. 3rd digit of 496785 is 7 and 5th digit is 9
- **countDigits:** that returns the count the digits in an integer e.g. 487345 has 6 digits
- **display:** that display an integer on screen

6. Reads an integer from a user and display if that integer is a **palindrome** or not

Sample Output:

```
Enter an integer: 4541
4541 is not a palindrome
Enter an Integer: 1349431
1349431 is a palindrome
```

Must use these functions: (you may add more function as you like)

- **read**: to read an integer from the user
- **isPerfectSquare:** return true or false based on if an integer is prime or not
- **display:** that display an integer on screen

7. Reads an integer from a user and display individual digits from right and then from left

Sample Output:

```
Enter an integer: 45876
Digits from left: 4 5 8 7 6
Digits from right: 6 7 8 5 4
```

Must use these functions: (you may add more function as you like)

- **read**: to read an integer from the user
- **getDigit:** that gets the digit of an integer from a given index, where the right most digit has index 1 e.g. 3rd digit of 496785 is 7 and 5th digit is 9
- **countDigits:** that returns the count the digits in an integer e.g. 487345 has 6 digits
- **display:** that display an integer on screen

8. Reads a decimal from a user and display mantissa and fraction part separately, from left and right

Sample Output:

```
Enter a decimal value: 45876.9325
Mantissa from left: 4 5 8 7 6
Mantissa from right: 6 7 8 5 4
Fraction from left: 9325
Fraction  from right: 5 2 3 9
```

Must use these functions(some are already defined for above): (you may add more function as you like)

- **read**: to read a decimal as a Cstring from the user
- **char2Digit:** that converts a given character digit in a numeric digit e.g. '0' is 0, '1' is 1 and '9' is 9
- **insertDigit:** that inserts a digit at the right most position of an integer e.g. 9 inserted in integer 56734 is 956734 (**hint: 56734 + 900000 = 95634)**
- **getDigit:** that gets the digit of an integer from a given index, where the right most digit has index 1 e.g. 3rd digit of 496785 is 7 and 5th digit is 9
- **countDigits:** that returns the count the digits in an integer e.g. 487345 has 6 digits
- **display:** that display an integer on screen