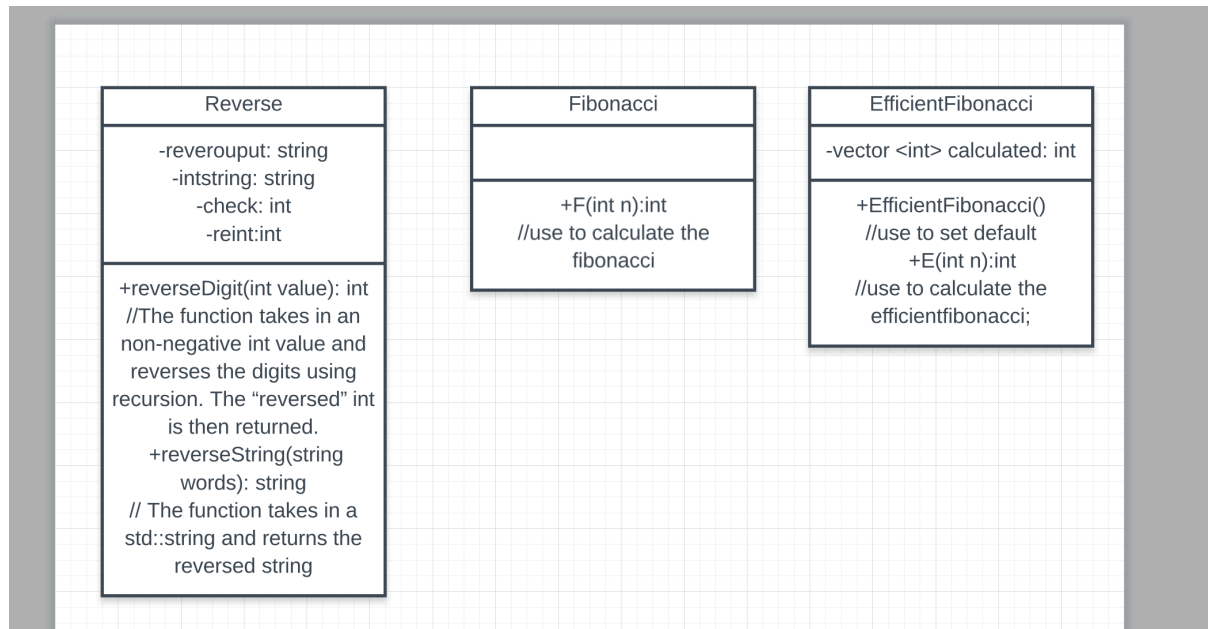


Practical 4: Recursion

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Description:

Reverse class: there have two functions in this class reverseDigit and reverseString.
int reverseDigit(int value) : The function takes in an non-negative int value and reverses the digits using recursion. The “reversed” int is then returned.
string reverseString(string letters) : The function takes in a std::string and returns the reversed string.

Fibonacci class: In mathematical terms, the sequence of Fibonacci numbers is defined by the recurrence relation

Int F(int n); this function is used to calculate the number n of Fibonacci numbers when F(0)=0, F(1)=1.

EfficientFibonacci class: Reproduce your Fibonacci class in another class called EfficientFibonacci. Make this class efficient by storing calculated numbers. The recursive function should not be called for a number that has already been calculated. Int E(int n); this function is used to calculate the number n of Fibonacci numbers when F(0)=0, F(1)=1. And also each F(n-1), F(n-2), F(n-3) will only be calculated once.

Test:

Test for Reverse class:

Input: abcd 1234

Expect output: dcba 4321

Output: dcba 4321

Input: asdfghjk 87657

Expect output: lkjhgfdsa 75678

Output: lkjhgfdsa 75678

Input:aaabbb 65400

Expect output: bbbaaa 456

Output: bbbaaa 456

Input:ab12 -65400

Expect output: 21ba ERROR

Output: 21ba ERROR

Test for Fibonacci class:

Input: 3

Expect output: 1

Output: 1

Input:6

Expect output: 8

Output: 8

Input: abc

Expect output: ERROR

Output: ERROR

Test for EfficientFibonacci class:

Input: 3

Expect output: 1

Output: 1

Input:10

Expect output:55

Output:55

Input:a

Expect output:ERROR

Output:ERROR

Test for all:

Input: 123 aval 18 18

Expect output: 321 lava 2584 2584

Output : 321 lava 2584 2584

Input:

Expect output: Error Error Error Error

Output: Error Error Error Error

Input: -14 apla 20 3

Expect output: Error alpa 6765 2

Output: Error alpa 6765 2

Input: -14 apla a 3

Expect output: Error alpa ERROR 2

Output: Error alpa ERROR 2

Input: -14 apla a a

Expect output: Error alpa ERROR ERROR

Output: Error alpa ERROR ERROR