POO (10:00-11:00)

Write the class **Function** so that the following code

```
#include "Function.h"

int main()
{
    std::vector<Function> functions = {
        Function("5"),
        Function("3 + 2 - 6 +    15"),
        Function("a + 2"),
        Function("3 * 2"),
        Function("3 +"),
    };
    for (auto function : functions)
    {
        try {
            function.validate();
            std::cout << function.eval() << std::endl;
        }
        catch (const std::exception& e) {
            std::cout << e.what() << std::endl;
        }
    }
    try {
        std::cout << "4th value of f1 is " << functions[0].value(4) << std::endl;
    }
    catch (const std::exception& e) {
        std::cout << e.what() << std::endl;
    }
    try {
        std::cout << "4th value of f2 is " << functions[1].value(4) << std::endl;
    }
    catch (const std::exception& e) {
        std::cout << e.what() << std::endl;
    }
    auto count = 0;
    auto func = ... {
        if (val > 5) count++;
    };
    functions[1].iterate_values(func);
    std::cout << "Found " << count << " values over 5";
}
```

compiles and upon execution prints the following to the screen:

```
5
14
invalid stoi argument
Invalid expression, wrong operator
Invalid expression, incorrect number of tokens
Invalid value position
4th value of f2 is 15
Found 2 values over 5
```

Carefully read the main function to deduce what methods/operators should be included in Function class.

Observations:

- Use STL to solve this problem
- Function supports only addition and subtraction
- Exception messages can be different as long the error can clearly be understood and matches the idea in the example

Grading (informative):

G1	Organize your project in 3 files: **main.cpp**, **Function.h** and **Function.cpp**	2p
G2	Function to split the given argument into an array of tokens	3p
G3	Constructor that splits the text into tokens	1p
G4	Method validate using exceptions	5p
G5	Method eval	4p
G6	Method value	2p
G7	Exception for method value	2p
G8	Method iterate_values	3p
G9	Fill the blank space in order for func to be properly defined	5p
G10	Code compiles and upon execution prints the correct output	3p