Functional decomposition →
Decompose a math function

Medium 7 minutes

Here is a math function that Kate wants to use in her program:

$$f(x) = \begin{cases} x^2 + 1 & \text{if } x \leq 0 \\ 1/x^2 & \text{if } 0 < x < 1 \\ x^2 - 1 & \text{if } x \geq 1 \end{cases}$$

The template for this function is defined below. Let's decompose it!

Your task is to create three additional methods `f1`, `f2`, and `f3` for each case and complete the method `f`. Each method should accept `x` as an argument with `double` type.

Report a typo

Sample Input 1:

```
0.5
```

Sample Output 1:

```
4.0
```

Sample Input 2:

```
-4
```

Sample Output 2:

```
17.0
```

Write a program

Code Editor IDE

Java

```
import java.util.Scanner;

class MultipleFunction {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        double x = scanner.nextDouble();
        System.out.println(f(x));
    }

    public static double f(double x) {
        //call your implemented methods here.
        double result;
        if (x <= 0) {
            result = f1(x);
        } else if (x > 0 && x < 1) {
            result = f2(x);
        } else if (x >= 1) {
            result = f3(x);
        }
        return result;
    }

    //implement your methods here
    public static double f1(double x) {
        return x * x + 1;
    }

    public static double f2(double x) {
        return 1 / (x * x);
    }

    public static double f3(double x) {
        return x * x - 1;
```

```
35        }
36    }
37
```

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