Programming Tutorial (Advanced)
Placement Test

Bauhaus-Universität Weimar

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Task 1
Implement a class `Complex` that represents complex numbers. A complex number $z = (a; b)$ consists of two real numbers a and b. You can perform addition and multiplication on complex numbers.

- Addition: $(a; b) + (c; d) = (a + c; b + d)$
- Multiplication: $(a; b) * (c; d) = (a * c - b * d; a * d + b * c)$

1. Create another class `ComplexTest`. Perform the following operations in this class:
   (a) $(1; 2) + (3; 4)$
   (b) $(12.3; 1.01) + (23; 42)$
   (c) $(1; 2) * (3; 4)$
   (d) $(12.3; 1.01) * (23; 42)$

   Print the complex numbers and the results.
2. Add a method `public boolean isEqual(Complex c)` to compare two complex numbers with each other. Test your program with the following values:
   - $(1; 2)$ und $(1; 2)$
   - $(1; 2)$ und $(3; 4)$

   Print your results.

Task 2
Implement the UML class Diagram given in *Shapes.pdf*. Think about good constructors for your classes.