

Assignment 1

1. (1) Write a Java program that prints all the perfect numbers less than n . In number theory, a perfect number is a positive integer that is equal to the sum of its positive proper divisors, that is, divisors excluding the number itself. For instance, 6 has proper divisors 1, 2 and 3, and $1 + 2 + 3 = 6$, so 6 is a perfect number. The next perfect number is 28, since $1 + 2 + 4 + 7 + 14 = 28$.
2. (1) Write a Java program that prints the number of words in a string that start with the specific letter (it is not important if the letter is lowercase or uppercase). The string and the letter are entered from the standard input.
3. (2) Create an abstract class **Shape** with abstract methods `getPerimeter()`, `getArea()`, `printNameShape()` and `print()`. Next create two classes **Square** and **Circle**, that extend the class **Shape**. Create a class **Cone** that extends **Circle**. The class **Square** has one private attribute `side`, a constructor with arguments and no-arguments constructor with default value of 1 for the attribute, set and get methods for the attribute, and it implements all the abstract methods from the **Shape** class, where the `print()` method prints the following:
"Square with a side __, has a perimeter $L=$ __ and an area $P=$ __."
The class **Circle** one private attribute `radius`; constructor with arguments and no-arguments constructor with default value of 1 for the attribute, set and get methods for the attribute, and it implements all the abstract methods from the **Shape** class, where the `print()` method prints the following:
"Circle with a radius __, has a perimeter $L=$ __ and an area $P=$ __."
The class **Cone** has one more private attribute `height`; constructor with arguments and no-arguments constructor with default value of 1 for the attributes; set and get methods for the additional attribute; methods `getArea()` and `getVolume()` that return area and volume of the **Cone**, method `printNameShape()`, and method `print()` that prints info about the cone in the following way:
"Cone with a radius __ and a height __, has an area $P=$ __ and a volume $V=$ __."
 - a) Create a class **Test** for testing classes **Square**, **Circle** and **Cone**.
 - b) Create a class **Test2** in which an array of 5 cones is created, and the cone with the smallest volume is printed.