

SE-1106 HOMEWORK-1

Write a **Factor** class to represent exponential numbers a^b where a is called base and b is called exponent. The class should at least have the following methods:

- toString() : converts the object to the String as **(base^exponent)**.
- Constructor taking base and exponent
- Getters and Setters
- Copy Constructor
- clone(): copies the content of the object to another object and returns.
- equals(Factor other): compares the object with other Factor object return true if their content is equal
- hasEqualValue(Factor other): compares the object with other Factor object return true if their value is equal

Let us call a factor as *prime factor* if its base is a prime number

Write a **Number** class that represents a positive integer by storing its **prime factor's** as **Factor** objects in an ArrayList. (i.e. ArrayList<Factor>). The class should at least have the following methods:

- Constructor taking a single integer parameter which is the integer to be represented.
- Copy constructor
- toString(): converts the object as String as sequence of factors separated by "."
- toInteger(): converts the object the integer that it represents.
- multiplyBy(Number other): multiply the object with other Number object. (Note that factors of a Number should always remain prime.)
- add(Number other): add other Number object to the object. (Note that factors of a Number should always remain prime.)

Write another class (give any name) that has only main() function. In main function you should create two number object. You should also test each method above in the main function,(i.e call those function from an object)

Example: Let Factor(**a**,**b**) denote a Factor object with base **a** and exponent **b**.

Factor(3,4) represents 81.

Factor(3,4) is a prime factor but Factor(4,2) is not a prime factor.

The Number object which has 2 Factor objects : Factor(2,2) and Factor(3,1) represent the integer 12.

Let n1 is the number representing 12 and n2 is the number representing 6. If we multiply n1 with n2 then n1 should be the list of 2 Factor objects as: Factor(2,3) and Factor(3,2).

