Instructions

You can either enter your answers in this document or make a new document using the word processor of your choice. If you include your answers in this document insert them immediately after the blue > symbols next to each question. Upload the document with your answers via Blackboard.

Reading

Science of Computing, Chapter 3.

Lecture notes: Iteration, Sieve of Eratosthenes

Problems

1. What does IRB print for each of the following expressions?

   (a) 12 % 5 >

   (b) 12 % 4 >

   (c) 97 % 7 >

2. What is in the variable a after Ruby evaluates the following two expressions?

   >> a = []
   >> 10.times { |i| a << i * 2 }

     >

3. Suppose we define an array with this expression:

   >> names = ["fred", "frodo", "fanny", "fonzie", "phil"]

   What would Ruby print for the following two expressions?

   (a) names.each { |x| puts x.length }

     >

   (b) names.delete_if { |x| x.length % 2 == 0 }

     >
4. Explain, in one or two sentences, what Ruby did to evaluate that last expression (the one that contains a call to `delete_if`).

> 

5. The improved `sieve` method shown at the end of Chapter 3 stops removing numbers from `worklist` as soon as it finds a prime number larger than a certain cutoff value. Suppose we call the method to make a list of primes less than 1000.

   (a) what is the cutoff value? i.e. what is the value of the number \( n \) such that after the method makes a prime larger than \( n \) it can stop filtering?

> 

   (b) below is a list of primes; which of these numbers is the last one used to filter numbers from `worklist`?


> 

6. What is the largest prime number less than 1000? (Use IRB to answer this question).

> 

7. Can you think of a Ruby expression that will answer the previous question for you? What would you put on the right side of the assignment statement below so that Ruby sets a variable \( x \) to the largest prime number less than 1000?

   ```ruby
   > x = ?
   ```