Topics: 1-D Array and loops

1. Given an integer input *n*
    a. Print all integers from 1 to n. Try different formattings (left aligned, right aligned etc.
    b. Print only even integers in that range.
    c. Print only odd integers in that range.
2. Keep reading integers from the console until you get a 0 input. For all the integers you have read (except for the final one, which is 0), echo it to the console.
3. Given a list of integers as input, find the maximum and minimum values in the list.
4. Given an input integer *n*, compute *n*!
5. Given 2 input integers *n* and *r*, compute $\binom{n}{r}$[*n* choose *r*], and *n* permutation *r.* Be careful about boundary conditions, invalid inputs etc.
6. Given a non-negative integer as input, detect whether it is a prime or not. (What if your input contains negative integers as well?)
    a. [Brain teaser:] When checking for primality, why does it suffice to look for factors up to the square root of the query integer? Can you prove it?
    b. [Brain teaser:] Can you prove that there are an infinite number of prime numbers?
7. Given an integer *n* (1 <= *n* <= 1e10), provide its prime factorization.
8. Using Sieve of Eratosthenes method, find and print all the prime numbers up to 1e6.
9. Given an integer *n,* find the *n*-th Fibonacci number.
10. Sum of squares, cubes etc.
11. Sin, cos, tan, exp, power
12. Given *n* numbers, sort them in ascending or descending order.
    a. Can you do the same only for a portion of the array? (e.g. from index *p* to index *q*)
13. Given a sorted array of numbers, find a query number efficiently.
14. Bracket matching
15. Sum of various series.
16. Binary search tree
17. 3n+1 problem
18. Josepha's problem
19. Simulation of a robot based on commands.