

1. Write a Ruby demo program that illustrates the use of all main Ruby conditional statements

2. Write a Ruby demo program that illustrates the use of all main Ruby loops and iterators

3. Write a function `mean_sigma(v)` that returns two values: the mean value and the standard deviation of numbers stored in the array `v`.

4. Write a function `sort(v)` that returns the sorted array `v`. Do not use Ruby sort methods; write your own sort. Array `v` must remain unchanged.

5. Create a Ruby class `triangle` with initializer, accessors, and member functions for computing the perimeter and the area of arbitrary triangles. Make also a member function `test` that checks sides `a`, `b`, and `c` and classifies the triangle as (1) equilateral, (2) isosceles, (3) scalene, (4) right, and (5) not a triangle. Right triangle can be either isosceles or scalene. Compute the perimeter and area only for valid triangles (verified by test). Show examples of the use of this class.

6. Write Ruby recognizer methods `limited?` and `sorted?` that expand the Ruby class `Array`. The expression `array.limited?(amin,amax)` should return true if $a_{min} \leq a[i] \leq a_{max}$ for all values of `i`. The expression `array.sorted?` should return

- 0
- +1
- -1

if the array is not sorted

if $a[0] \leq a[1] \leq a[2] \leq \dots$ (increasing sequence) if $a[0] \geq a[1] \geq a[2] \geq \dots$ (decreasing sequence)

Show examples of the use of this method.