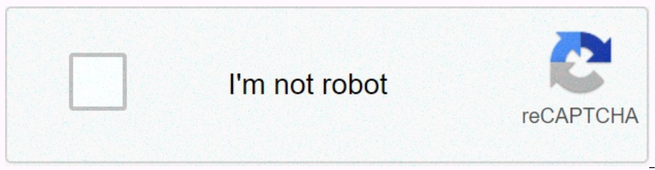

Continue

For loop ruby array

Ruby's C-shaped for-loop is not in use. Instead people usually iterate about the elements of an array using each method. examples/names ruby/iterating_on_array.rb = ['Foo', 'Bar', 'Baz'] puts names.each { |item| gives the item names } gives names.each makes |item| puts an end to the element In this example we have an array with 3 elements. At first we just printed the matrix as it is. We have the values on each line. This can be useful for debugging, but we want to walk around the items we need some kind of loop. Each method allows us to iterate on the elements of the matrix. In each iteration the variable between the pipes (element in our case) will receive the current value. Here are 2 examples. The first uses curly keys to mark the beginning and end of the block, the other uses the final pair do - . $ examples of ruby /ruby/iterating_on_array.rb Foo Bar Baz Foo Bar Baz Foo Bar Baz A 'for' loop that is not recommended There is another way to iterate over the elements, but it can have an unpleasant side effect and therefore not recommended. examples/ruby/for_loop_on_array.rb names = ['Foo', 'Bar', 'Baz'] for the item in the names puts the final element the code looks good, the result is correct $ ruby examples /ruby/for_loop_on_array.rb Foo Bar Baz But if we have used the element variable before, then this for loop will overwrite this other element variable with the last value seen in the loop examples/ruby/for_loop_on_array_global.rb names = ['Foo', 'Bar', 'Baz'] element = 'Moose' for the item in the names puts the end of the element sets the note element as, once the loop is finished, the variable element holds 'Baz'. $ examples of ruby / ruby / for_loop_on_array_global.rb Foo Bar Baz Baz Some operations in computer programming are best served with a loop. A loop is the repetitive execution of a piece of code for a certain amount of repetitions or until a certain condition is met. We will cover while there are loops, loops and loops. A simple loop The easiest way to create a loop in Ruby is using the loop method. loop takes a block, which is denoted by { ... } or do ... End. A loop will run any code within the block (again, that's right between the {} or doing... end) until you manually intervene with Ctrl + c or insert a breakout statement inside the block, which will force the loop to stop and the execution will continue after the loop. Let's try an example of a loop by creating a file called loop_example.rb #loop_example.rb loop do puts This will continue to print until you hit Ctrl + c end Now we can run ruby loop_example.rb in the terminal and see what happens. You will notice that the same statement continues to be printed in the terminal. You'll need to interrupt with a Ctrl + c to stop it. will continue printing until you hit Ctrl + c It will continue to print until you hit Ctrl + c It will continue to print until you hit Ctrl + c It will continue to print until you hit Ctrl + c It will continue to print until you hit Ctrl + c It will continue to print until you do not Ctrl + cInterrupt: from (pry):2:in 'puts' [2] pry(main)> Controlling Loop Execution You'll barely do something like this in a real program as it's not very useful and will lead to an infinite loop. Eventually your system will crash. We looked at a more useful example with the breaking keyword creating a file called useful_loop.rb: # useful_loop.rb i = 0 loop do i += 1 puts i break # this will cause the execution to exit the end of the loop When you run useful_loop.rb on your terminal, output should be: $ ruby useful_loop.rb 1 The breaking keyword allows us to exit a loop at any time, so any code after a break will not be executed. Note that the jump will not exit the program, but will only exit the loop and run from after the loop. Then we go to add conditions within a loop by printing all even numbers from 0 to 10. We create a file called conditional_loop.rb # conditional_loop.rb i = 0 loop do i += 2 puts and if i == 10 break # this will cause the execution to exit the end of the loop Here is the output when we run the File: $ ruby conditional_loop.rb 2 4 6 8 10 You can see from the above this break did not run during the first 4 iterations through the loop, but in the 5th iteration, if the sentence is evaluated to true and, therefore, the code within the ruling if it has been executed, which is just breaking, and the execution came out of the loop. We will talk explicitly about the use of conditionals within a loop later. Similar to how we use the jump to get out of a loop, we can use the keyword next to it to skip the rest of the current iteration and start running the next iteration. We will use the same example as before to prove it. This time we'll skip 4. # next_loop.rb i = 0 loop do i += 2 if i == 4 next # skip rest of the code in this iteration ending puts and if i == 10 end of break And here is the output when we run the file. $ruby next_loop.rb 2 6 8 10 Notice that the above code did not print 4, because this skipped. The execution continued until the next iteration of the loop. break and next are important concepts of loop control that can be used with loop or any other construction loop in Ruby, which we will cover one by one below. When combined with conditional, you can start building simple programs with interesting behavior. While loops A while loop is given a parameter that evaluates a Boolean (remember, this is true or false). Once the Boolean expression becomes false, the time loop does not run again, and the program continues after the time loop. Code within the time loop can contain any type of logic you would like to perform. Let's try an example of a time loop creating a file called countdown.rb. We want this program to count down from any number given by the user and print on the screen each number as it counts. Here we go! # countdown.rb x = gets.chomp.to_i while x > = 0 puts x = x - 1 ending puts Done! Now go to your terminal and run run program with ruby countdown.rb. You will notice that the program initially expects you to put in a number then runs the loop. Initially the program evaluates the line x >= 0. This is evaluated in true (unless you enter a negative number) and therefore the program enters the loop, the execution puts x and the line after that, x = x - 1. Then the program returns to the top, now with the recently updated value of x and evaluates the x > = 0 again. This process is repeated until the value of x is no longer greater than or equal to 0. Then it comes out of the loop and continues with the rest of the program. You can see why it's called a loop. He turns on logic within himself repeatedly. We would also like to take this opportunity to show you a little trick to refactor this loop. # countdown.rb x = gets.chomp.to_i while x >= 0 puts x -= 1 # <- refactored this line puts Done! We change the line x = x - 1 to x -= 1. This is common to many programming languages and is a good succinct way of saying the same thing with less typing. You can also use it with any other operator (+, *, /, etc.). You should also be aware that because we are using the expression x >= 0 as proof to see if we should run the loop, the code inside the loop must modify the variable x somehow. If it doesn't, then x > = 0 will always evaluate true and cause an infinite loop. If you ever find your program unanswered, it may be stuck in an infinite loop. Until Loops We do not use the loop until the introductory paragraph. However, we should briefly mention them for you to know about them. The loop up is simply the opposite of the loop. You can override it to resolve the problem differently. Let's briefly look at how it works. # countdown.rb x = gets.chomp.to_i up to x < 0 puts x -= 1 ending puts Done! There are cases where it is used until it allows you to write more readable and logical code. Ruby has many features to make its code more expressive. The loop up to is one of those characteristics. Do/While Loops A do/while loop works in a similar way to a time loop; an important difference is that the code inside the loop runs once, before the conditional check to see if the code should be executed. In a do/while loop, the conditional check is placed at the end of the loop instead of the beginning. We write some code that asks if the user wants to perform an action again, but we keep asking if the user enters 'Y'. This is a classic use case for a do/time, because we want to repeatedly perform an action based on some condition, but we want the action to run at least once no matter what. # perform_again.rb loop puts Do you want to do it again? answer = gets.chomp if answer != 'Y' break end Notice we are a simple loop, except the condition to exit the loop loop at the end, thus ensuring that the loop runs at least once. Try copying and pasting the previous code into the irb and playing with it itself. Compare this to a normal while loop. Side note: there is also another build in Ruby that supports do/while loops as well: start putting Do you want to do it again? answer = gets.chomp end while answer == 'Y' While the above works, it is not recommended by Matz, the creator of Ruby. For loops in Ruby, loops are used to travel over a collection of elements. Unlike a time loop where if we are not careful we can cause an infinite loop, because the loops have a definitive ending as it is scouring a finite number of elements. It starts with the reserved word, followed by a variable, then that of the reserved word, and then a collection of items. Let's show this using an array and a range. A range is a special type in Ruby that captures a range of items. For example 1..3 is a range that captures integers 1, 2, and 3. # countdown3.rb x = gets.chomp.to_i for and on 1..x make put and end puts Done! The funny thing about the for loop is that the loop returns the collection of items after running it, while the above loop examples return nil. Let's see another example using an array instead of a range. # countdown4.rb x = [1, 2, 3, 4, 5] for and in x puts and end puts Done! You can see that there are a lot of loop modes through a collection of items using Ruby. Let's talk about some more interesting ways you can use the conditions to modify the behavior of your loops. Most rubyistas are demented by loops and prefer to use iterators instead. We'll cover ourselves later. Conditional within loops To make loops more effective and accurate, we can add conditional flow control within them to alter their behavior. Let's use an if statement in a time loop to prove it. # conditional_while_loop.rb x = 0 while x < = 10 if x.odd? put x end x += 1 final This loop uses the odd one? to decide if the current variable in the loop is strange. If so, it is printed on the screen. Then x is increased by one, and then the loop proceeds to the next iteration. The words reserved below and breaking can be useful when looping too. If you place the next reserved word in a loop, it will jump from that line to the iteration of the next loop without running the code below iteration. If you place the reserved word pause in a loop, it will exit the loop immediately without running more code in the loop. # conditional_while_loop_with_next.rb x = 0 while x < = 10 if x == 3 x += 1 next elsif x.odd? put x end x += 1 end We use the next word reserved here to avoid printing the number 3 on our loop. Let's try to break it # conditional_while_loop_with_break.rb x = 0 while x <= 10 if x == 7 break elsif x.odd? puts x end x += 1 end When you run this program you can see the whole loop comes out when the value of x reaches 7 in the That's why printing only goes to 5. Loops are basic constructions in any programming language, but most rubyistas, if possible, prefer iterators over loops. We'll talk about iterators below. Iterators iterators are methods that naturally run through a certain set of data and allow operating on each element of the collection. We said before that arrays are sorted lists. Let's say you had a number of names and wanted to print them on the screen. How can you do that? You can use each method for matrices as follows: # practice_each.rb names = ['Bob', 'Joe', 'Steve', 'Janice', 'Susan', 'Helen'] names.each { |name| name } Not so concise! We have a lot to do with this one. We called each method using the dot operator (.) in our matrix. What this method does is loop through each element of our matrix, in order, from 'Bob'. Then start running the code inside the blog. The start and end points of the block are defined by the curly keys {}. Each time we iter over the array, we must assign the value of the element to a variable. In this example we named the variable name and placed it between two tubes |. After that, we write the logic we want to use to operate on the variable, which represents the current matrix element. In this case it is simply being printed on the screen using puts. Run this program to see the output. A blog is just a few lines of code ready to be executed. When working with blocks there are two styles to consider. By convention, we use curly keys ({}) when everything can be contained in one line. We use the words do and finish when we are performing multi-line operations. We will add some functionality to our previous program to try this make/finish things. # practice_each.rb names = ['Bob', 'Joe', 'Steve', 'Janice', 'Susan', 'Helen'] x = 1 name.each makes |name| puts #{x}. #{name} x += 1 end We added the x counter to add a number before each name, creating a numbered list output. The number x is increased every time we go through iteration. Memorizing these small differences in syntax is one of the necessary tasks for which a Ruby programmer must go through. Ruby is a very expressive language. Part of what makes it possible is the ability to do things in more ways than one. There are many other iteration methods in Ruby, and over time, you get to use many of them. At the moment, they know that most rubyistas prefer to use iterators, like each method, to resort to a collection of items. Recursive recursion is another way to create a loop in Ruby. Recursion is the act of calling a method from within it. That probably sounds confusing so to look at some present code to get a better idea. A simple example suppose you wanted to know which was twice a number, then double that number, etc. Let's say you wanted to duplicate the until the pre-duplicate number is 10 or higher. You can create the following method: def doubler(start) start * 2 end and then you can use it like this: irb(main):001:0 > def doubler(start) irb(main):002:1> launches * 2 irb (main):003:1> end => :d oubler irb((main):004:0> doubler(2) 4 => nil irb(main):005:0 > doubler(4) 8 => nil irb(main):006:0> doubler(8) 16 => nil You can do it much more simply by using recursion. Check out < this version of the method: def doubler(start) launches if you start a 10 doubler(start * 2) This version of the method calls the doubler method again, passing it the dubbed version of the stored value to the start variable. here is the declaration and use of the method using irb: irb(main):001:0> def doubler(start) irb(main):002:1> launch irb(main):003:1 > if they start < 10 irb(main):004:2> doubler(start *2) irb(main):005:2> end irb(main):006:1> end => :d oubler irb(main):007:0> doubler(2) 2 4 8 16 => nil Another example We are using a method that uses recursion to calculate the number in the fibonacci sequence. You can learn more about the fibonacci sequence here. Basically, it is a sequence of numbers in which each number is the sum of the two numbers above in the sequence. Note: This example may take some readings to really understand what is happening at all points in the program. This is normal. Take your time, and you'll be fine. Also, be excited! We are getting closer to reading more examples of the real world! Do the following file: # fibonacci.rb def fibonacci(number) if the number < 2 most fibonacci number (number - 1) + fibonacci (number - 2) final puts fibonacci(6) If you are panicking, don't be scared. Soon this will be easy for you. We just need to take it slow and understand everything that's going on, line by line. Recursion is a difficult topic for all programmers, so don't let this frustrate you more than a healthy amount. By learning recursion, drawing diagrams can help. We can use a tree as the structure to see what is happening. (We used f for abbreviated fibonacci to save space.) Every time the code branches back you are calling the fibonacci function from within itself twice. If you take all of these and zeros and add them together, get the same answer you get when you run the code. You can see why computer programs are manageable now. Think about whether you should draw this diagram every time you wanted to know the fibonacci representation of a number. Yikes! The key concept with recursion is that there is some base condition that returns a value, which then disconnects recursive calls. One can think of successive recursive calls, until some value is returned, and recursive calls can then be evaluated. Summary Loops and iterators are a great way to perform repeated operations on a data set. Often, in Ruby, you will find yourself reaching out to iterator before a loop, but not all the time. Recursion, the ability to name a method within itself, can also do some powerful operations when solving problems. Let's try these with some exercises! Exercises!

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