Subject: log(n) vs sqrt(n), and question 51 (and 52)
Posted by daweil on Mon, 23 Jan 2017 20:39:01 GMT

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Question 51 states the following:

What is the time complexity of this function? Assume the initial value of i is one and j is zero.

```java
function f(i,j,n) {
    if (i < n) {
        if (j < n) f(i,j+1,n);       
        else f(i*2,0,n);           
    }
    println(i,j);               
}
```

I've boiled the question down to be either n*\log(n) or n*\sqrt(n). I am unsure how i*2 would result in, but I feel it would result in a \sqrt(n) amount of runtime.

What would make code result in \log(n) and what would make it result in \sqrt(n)?

Subject: Re: log(n) vs sqrt(n), and question 51 (and 52)
Posted by Witherspoon on Tue, 24 Jan 2017 02:54:59 GMT

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When I was working through this problem I came to the conclusion that it would run in n*\log(n) with a base of 2. Please correct me if I am incorrect though.

Subject: Re: log(n) vs sqrt(n), and question 51 (and 52)
Posted by jarobinson3 on Tue, 24 Jan 2017 04:22:36 GMT

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When I look at this problem I see two loops, one inside the other

```java
for(i = 1; i < n; i *= 2) {
    for(j = 0; j < n; j++) {
        /* print correctly */
    }
}
```
Subject: Re: log(n) vs sqrt(n), and question 51 (and 52)
Posted by sbcarp on Tue, 24 Jan 2017 06:30:36 GMT

Testing Result:
n: 100
log(n): 6.643856
n*log(n): 664.385619
n^2: 10000
n^n: 999999999999999969733122212510361659474503275455023626482417
     509503468484355540755341963384047062518680275124159738824081
     821357343682784846393850410472398778710235910667899818111818
     13306167128854888448.000000
Total time: 708 (Matches n*log(n))

Subject: Re: log(n) vs sqrt(n), and question 51 (and 52)
Posted by sbcarp on Tue, 24 Jan 2017 06:33:07 GMT

100*sqrt(100)=1000