

What properties does the program executed by thread t have?

```
AtomicInteger x = new AtomicInteger(0);
```

thread t

```
int v;  
1 do {  
2   v = x.get();  
3   v = v + 1;  
4 } while (x.compareAndSet(v - 1, v));
```

1. it is starvation free
2. it is lock free
3. it is lock free, and hence also wait free
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What properties does the program executed by thread `t` have?

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```
int v;  
1 for (int i = 0; i < 10_000; i++) {  
2   v = x.get();  
3   v = v + 1;  
4   if (x.compareAndSet(v - 1, v))  
5     break;  
6 }
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Note that the increment may fail after trying 10'000 times.

What does function `pm(L)` compute?

```
pm([X|[]]) -> X;  
pm([X|[Y|[]]]) -> if X > Y -> X; true -> Y end;  
pm(L) -> M = length(L) div 2, {A, Z} = lists:split(M, L),  
    Me = self(),  
    spawn(fun () -> Me ! pm(A) end),  
    spawn(fun () -> Me ! pm(Z) end),  
    receive B -> B end, receive Y -> Y end, pm([B, Y]).
```

1. the sum of elements in L
2. the maximum of elements in L
3. the minimum of elements in L
4. a sorted copy of L

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How many tasks may execute in parallel when computing the factorial of n ?

```
class Factorial extends RecursiveTask<Integer> {  
    int n; // number to compute factorial of  
    protected Integer compute() {  
        if (n <= 1) return 1;  
        Factorial f = new Factorial(n - 1);  
        f.fork();  
        return n * f.join();  
    }  
}
```

1. $n!$ (the factorial of n)
2. n
3. it depends on the number of available cores
4. there is practically no parallelism

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How many processes may execute in parallel when computing the factorial of n ?

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fact(1) -> 1;  
fact(N) ->  
    Me = self(),  
    spawn(fun () -> Me ! fact(N-1) end),  
    receive F -> N*F end.
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```
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How many tasks may execute in parallel when computing the sum of integers from 1 to n ?

```
class Sum extends RecursiveTask<Integer> {  
    int m, n; // sum integers from m to n  
    protected Integer compute() {  
        if (m > n) return 0;  
        if (m == n) return m;  
        int mid = m + (n-m)/2; // mid point  
        Sum lower = new Sum(m, mid);  
        Sum upper = new Sum(mid+1, n);  
        lower.fork(); upper.fork();  
        return lower.join() + upper.join();  
    }  
}
```

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2. n^2 (the square of n)
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