

CSE332 Week 8 Section Worksheet

1. Run parallel prefix sum on the following array, using a sequential cutoff of 2, drawing the tree and showing the sum and fromLeft values for node.

7	4	3	5	1	7	5	3	9	2	8	5	4	7	6	1
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2. Concurrency: Given the following code in a BankAccount class (assume a valid constructor, etc.):

```
int balance;
void withdraw(int amt) throws Exception {
    if(amt>balance)
        throw new Exception("Insufficient Funds");
    balance=balance-amt;
}
void deposit(int amt) { balance=balance+amt; }
```

Note: assume that 'amt' for deposits and withdrawals are only positive values.

- a. Show an interleaving of calls that will result in an "Insufficient Funds" exception when there shouldn't be one (that is, if we had performed the calls sequentially, on one processor, the result would have been correct).
 - b. Show an interleaving of calls that will result in a negative balance instead of an exception.
 - c. How can these methods be fixed using 'synchronize'?
3. The day after project 3b is handed in, James maliciously springs a surprise project 4 on you; it is to be done in 2 parts, first, a sequential computation of something, then a parallel computation using threads and concurrent access to data. Given that your implementation of project4a (the sequential part) is correct and runs fine, describe what might be wrong when you attempt to parallelize it, given the following observations (answer each separately). Also state how they could be fixed:
 - a. Your thread-based program runs correctly sometimes, but gives seemingly random answers other times.
 - b. Your thread-based program runs correctly sometimes, but more often just never seems to terminate; it should run in 1 minute, but you've left it on for 4 hours and it's still running and is not appearing to do anything.
 - c. Your threaded program runs correctly, but it runs just as slow, if not sometimes slower, than the sequential version, despite the fact that you're running it on an awesome 64-processor machine; would could be wrong regarding your use of locks?