COS126 Practice Questions Exam 1 Solutions

1. **Short Answer**

    1. -20
    2. 3.0
    3. $-2^{31} = -2147483648$
    4. $6.022e23$
    5. Many correct answers. e.g. 1500, 2555, 4555
    6. java Recipe < cookbook.txt
       java Recipe < cookbook.txt > meal.txt
       java Recipe | java HungryThing

2. **Arrays, Functions**

    a) `mystery1(a, 5)` returns `true`.
    b) Fill in the trace table to show that `mystery2(a, 5)` returns the same thing.

target	low	high	mid	return value
5	0	6	3	
		2	1	true

    c) `mystery1(a, 20)` and `mystery2(a, 20)` both return `false` .
    d) These methods check whether `target` is an element in the array.

3. **Performance** X. Half a day

    When N doubles, the time increases by a factor of 4. This implies an N^2 order of growth. So, if we increase N = 10000 by a factor of 10, we hypothesize that the time will increase by a factor of 100. 800 minutes is just over 13 hours. The best answer is half a day.

4. **Recursion, Debugging**

    a.
    ```
                          func(3)
                             |
                   2*func(2) + 5*func(1)
                          |
            2*func(1) + 5*func(0)
                          |
              2*func(-1) + 5*func(-2)
    ```

    b. Change `if (j == 1) return 1;` to `if (j <= 1) return 1;`