Section #3

Tyler Conklin and Kate Rydberg (Based on handouts by previous CS106B instructors and TAs, especially those of Ashley Taylor and Shreya Shankar.)

Recursion: Solutions

1. Recursion Mystery A

```
mysteryA(6, 13):     6
mysteryA(14, 10):    4
mysteryA(37, 12):    1
```

2. Recursion Mystery B

```
mysteryB(4, 1):      4
mysteryB(8, 2):      16, 8, 16
mysteryB(3, 4):      12, 9, 6, 3, 6, 9, 12
```

3. Star String

```
string starString(int n) {
    if (n < 0) {
        throw n;
    } else if (n == 0) {
        return "*";
    } else {
        string s = starString(n - 1);
        return s + s;
    }
}
```

4. Sum of Squares

```
int sumOfSquares(int n) {
    if (n < 0) {
        throw n;
    } else if (n == 0) {
        return 0;
    } else {
        return n * n + sumOfSquares(n - 1);
    }
}
```

5. Stutter Stack

```
void stutterStack(Stack<int>& s) {
    if (!s.isEmpty()) {
        int n = s.pop();
        stutterStack(s);
        s.push(n);
        s.push(n);
    }
}
```

6. Greatest Common Divisor

```
int gcd(int x, int y) {
    if (x <= 0) {
        throw x;
    }
    if (y <= 0) {
        throw y;
    }
    if (x % y == 0) {
        return y;
    }
    return gcd(y, x % y);
}
```

7. Digit Sum

```
int digitSum(int n) {
    if (n < 0) {
        return -digitSum(-n);
    }
    if (n < 10) {
        return n;
    }
    return n % 10 + digitSum(n / 10);
}
```

8. Zig Zag

```
void zigzag(int n) {
    if (n == 1) {
        cout << "*";
    } else if (n == 2) {
        cout << "**";
    } else {
        cout << "<";
        zigzag(n  2);
        cout << ">";
    }
}
```

9. Is Subsequence

```
bool isSubsequence(string big, string small) {
    if (small == "") {
        return true;
    } else if (big == "") {
        return false;
    } else {
        if (big[0] == small[0]) {
            return isSubsequence(big.substr(1), small.substr(1));
        } else {
            return isSubsequence(big.substr(1), small);
        }
    }
}
```