1.6

```
if (low == high)

        System.out.println(new String(str));

else {

        for (int i = low; i < high; i++) {

                char word = str[low];

                str[low] = str[i];

                str[i] = word;

                permute(str, low + 1, high);

                word = str[low];

                str[low] = str[i];

                str[i] = word;

        }

}
```

1.11 (a)

Base Case ($N = 3$):

$$\sum_{i=1}^{N-2} F_i = \sum_{i=1}^{1} F_i = F_1 = 1 = 3 - 2 = F_3 - 2 = F_N - 2$$

Induction:

Assume $\sum_{i=1}^{N-2} F_i = F_N - 2$ for some $N \in \mathbb{N}$

$$\sum_{i=1}^{N-1} F_i = \sum_{i=1}^{N-2} F_i + F_{(N-2)+1}$$

$$= \sum_{i=1}^{N-2} F_i + F_{N-1}$$

$$= F_N - 2 + F_{N-1} \qquad\qquad \textbf{By IH}$$

$$= F_{N+1} - 2$$

1.12 (a)

Base Case ($N = 1$):

$$\sum_{i=1}^{N}(2i - 1) = \sum_{i=1}^{1}(2i - 1) = 2i - 1 = 2 - 1 = 1 = 1^2 = N^2$$

Induction:

Assume $\sum_{i=1}^{N}(2i - 1) = N^2$ for some $N \in \mathbb{N}$

$$\sum_{i=1}^{N+1}(2i - 1) = \sum_{i=1}^{N}(2i - 1) + (2(N + 1) - 1)$$

$$= \sum_{i=1}^{N}(2i - 1) + (2N + 2 - 1)$$

$$= \sum_{i=1}^{N}(2i - 1) + (2N + 1)$$

$$= N^2 + 2N + 1 \qquad\qquad \textbf{By IH}$$

$$= (N + 1)^2$$

5.1

0	9679

(b)

1	4371
2	1989
3	1323
4	6173
5	4344
6	
7	
8	
9	4199

(c)

0	9679
1	4371
2	
3	1323
4	6173
5	4344
6	
7	
8	1989

9	4199

5.2

0	
1	4371
2	
3	
4	
5	
6	
7	
8	
9	6173
10	
11	1989
12	1323
13	4199
14	
15	
16	
17	
18	
19	9679
20	4344
21	
22	

5.1 (b)

0	
1	6173
2	9679
3	4344
4	4371
5	1989
6	4199
7	1323
8	
9	

(c)

0	
1	6173
2	9679
3	4344
4	4371
5	1989
6	4199
7	1323
8	
9	