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Problem 1.6:

```
public class Permutations {
 /**    * Print all permutations of the given string.
   *
   * @author (Christopher Sinders)
   */
 public static void permute(String str) {
  permute(str.toCharArray(), 0, str.length()-1);
 }
 public static void permute(char[] str, int low, int high) {
  if (low == high) {
   System.out.println(String.valueOf(str));
  } else {
   for (int i = low; i <= high; i++) {
    swap(str, low, i);
    permute(str, low+1, high);
    swap(str, low, i);
   }
  }
 }
 public static void swap(char[] c, int x, int y) {
  char temp = c[x];
  c[x] = c[y];
  c[y] = temp;
 }
 public static void main(String[] args) {
  permute("abcd");
 }
}
```

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Problem 1.11

Claim: the sum of I = 1 to n-2 for F(i) = F(n) -2

Pf: Base Case: (n = 3) The sum of i=1 to 3-2 for F(i) = F(1) = 1

$$F(3) – 2 = 3 -2 = 1$$

Ind Case: Assume that the sum of i=1 to n-2 for F(i) = F(n) -2 for some n that is a member of natural numbers

So the sum of i=1 to n-2+1 of F(i)

The sum of i=1 to n-2 of F(i) + F(n-1)

F(n) – 2 + F(n-1)

F(n+1) - 2

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Problem 1.12

Claim: $$\sum_{i=1}^{n}(2i-1) = n^2$$

Pf:

Base Case: (n =1): (2(1) -1) = 1

1^2 = 1

Ind Case: Assume for some int n $$\sum_{i=1}^{n}(2i-1) = n^2$$

So the summation of 2i -1 from i =1 to N+1

= summation of 2i-1 from i = 1 to N + 2((N+1) -1)

= N^2 + 2N +2 -1 (I.H.)

= N^2 + 2N + 1

= (N + 1)^2

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Problem 5.1b

Resulting hash is {9679, 4371, 1323, 6173, 4344, null, null, null, 4199}

Problem 5.1c

Resulting hash is {9679, 4371, null, 6173, 4344, null, null, 1989, 4199}

Problem 5.2b

Resulting hash is {9679, 4371, 1989, 1323, 6173, 4371, 1323, 6173, 4199, 4199, 4344, 9679, 1989, null, null, null, null, null,}

Problem 5.2c

Resulting hash is {9679 4371 4371 1323 6173 4344 1989 1323 1989 4199 4199 null 6173 4344 null null null null 9679}

Homework Problem 6, Repeat problem 5.1 (b) and (c), but use the hash function h(x) = 7 - (x mod 7).

Problem 6.b

Resulting hash is {null, 6173, 4199, 4344, 4371, 9679, 1989, 1323, null, null}

Problem 6.c

Resulting hash is {1989, 6173, 4199, 4344, 4371, null, 9679, 1323, null, null}