```
J lab1.java
        " Characters are fixed. For example, if Str Corresponds to applicant,
 LV
 21
        * low is 2, and high is 5, then the following output is produced:
 22
             abCDEfah
 23
             abCEDfah
 24
             abDCEfgh
 25
             abDECfgh
             abEDCfgh
 26
 27
             abECDfah
 28
 29
        * @param str is an array representation of the string we wish to permute.
 30
        * @param low is the index of the leftmost character in the fluid range.
 31
        * @param high is one beyond the index of the rightmost character in the
        * fluid range.
 32
 33
        */
 340
         public static void permute(char[] str, int low, int high) {
 35
             if (low == high)
 36
               System.out.println(new String(str));
 37
             else {
 38
                 for (int i = low; i < high; i++) {
                     change(str, low, i);
 39
 40
                     permute(str, low + 1, high);
 41
                     change(str, low, i);
 42
                 }
             }
 43
        }
 44
 45
         private static void change (char[] str, int i, int j) {
 460
             char temp;
 47
 48
             temp = str[i];
 49
             str[i] = str[i];
 50
             str[j] = temp;
 51
         }
 52
 53⊜
       public static void main(String[] args) {
 54
         permute("abcd");
 55
         /* Expected output:
 56
            abcd
```

2 Problem 1.11

a)
$$\sum_{i=1}^{N-2} F_i = F_{ij} - 2$$

$$F_1 = F_1 + F_2 + F_3 + \cdots + F_{N-2} = F_N - 2$$

Base Case:

$$F_1 = F_{3-2}$$
 : $N=3$

$$F_{3-2} = F_{3} - 2$$
, so $3-2 = 1$

1 = 1 : Base case verified

Inductive Hypothesis

Assume
$$F_k = F_1 + F_2 + F_3 + \dots + F_{k-2} = F_k - 2$$

For some k>3,

$$: F_{k}-2+F_{k-1}=F_{k}+F_{k-1}-2$$

By the induction, $\Sigma_{i+1}^{N-2} = F_N - 2$ is the case for all $N \ge 3$

3 Problem 1.12

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

$$\frac{Bare Case}{(2-1) = 1^2} \Rightarrow 1 = 1$$
base case is verified.

Inductive Hypothesis

Assume
$$(2\times 1-1)+(2\times 2-1)+\dots+(2k-1)=k^2$$

 $1+3+5+\dots+2k-1=k^2$
 $1+3+5+\dots+2k-1+2k+1=(k+1)^2$
 $k^2+2k+1=(k+1)^2$

By mothematical Induction, $\sum_{i=1}^{N} (2i-1) = N^2$ for all $N \ge 1$

4. Problem 5.1

b) {4371, 1323, 6173, 4199, 4344, 9679, 1989} h(x) = x mod 10

0	96791
t	4371
2	1989
2	1323
4 5	6173
5	4344
6	
7	
9	
	4199

Linear probing

c) {4371,1323,6173,4199,4344,9679,1989}
has = x mod to

0	8679
all d	143711
2	
3	202
4	le in
Roy.	4344
6	

Ŷ	lan
\$	HIPPI

Quadratic Probing

David C	Pro	blem	5	.2	
Personal Contraction of the Cont	o)	0 1 2 3		and the contract of the contra	gertvorgensky gleutvussatellistera et sie verskaat van gegennen kaan en de gestraak en de gestraak en de gestra
		+ 6 0	The state of the s		
		8 0 0 -	THE COLUMN TWO IS NOT THE PROPERTY OF THE PROP	6173	Name of the state
		2 3	es and the constant of the control of the constant of the cons	198° 1323 419°	Analysis (1) - paragraphic second data are bed and being a paragraphic second data are being a paragra
		15615)	energy controlled to the contr	
		2	})	967	

4344

2 1

22

24371, 1323, 6173, 4199, 4344, 9679, 19895 Nex) = x mod 23

h(4371) = 4371 mod 23 =1 h (1323) = 1323 mod 23 = 12 h (6173) = 6173 mod 23 = 9 h (4199) = 4199 mod 23 = 13 h (4344) = 4344 mod 23 = 20 h (9679) = 9679 mod 23 = 19 h(1989) = 1989 mod 23 = 11

Linear probing

C)	
4	gamenta and and applications are an active to the property of the contract of
0	The street of th
[4300
2	edita en 1991pol
3	The second of th
4	
	Antonio (4 de la constitució de comencia
5	Physical Arternation (Arternation (Arternati
6	
-	
	and the state of t
8	
C	1-1-5
Ó	
- Service of the Serv	[1989]
12	SET-MANAGEMENT AND THE ACTUAL AND
13	
	44199
) (\$400-\$440-\$500)
*5	
- b	
and the same of th	Processing and the state of the
18	Comment of a policy of a continuous of the training of the continuous of the continu
4	
	9679
20	4344
2	
22	9679
	e š

24371, 1323, 6173, 4199, 4344, 9679, 19895

Quadratic Probing

6. Problem 5.1

> b) {4371, 1323, 6173, 4199, 4344, 9679, 1989} h(x) = 7 - (x mod 7)

```
0
              heu371) = 7-(4371 mod 7)=4
   6173
              h(1823) = 7- (1323 mod 7)=7
2
   4199
              h(6173) = 7- (6173 mod 7) = 1
3
   4344
             -h(4199) = 7 - (4199 mod 7) = 1
lui-
   4371
200
   9679
              h (4344) = 7 - (4344 mod 7)=3
   1989
              -h (969) =7 - (9679 mod 7) = 2
OLD T
   1323
               h (1989) =7 - (1989 mod 7) =6
             -> h(4199) = (7 - (4199 mod 7))+1 = 2
            -> h(9679) = (7-(9609 mod 7))+1=3+1
                                                 more Laborated
                                                 en Con
```

C) $\{4371, 1323, 6173, 4199, 4344, 9679, 1889\}$ h(x) = 7 - (x mod 7)

```
h(4371) = 7 - (4371 mod 7) = 4
  1989
0
  6173
           h(1323) = 7-(1323 mod 7) = 7
  MAA
            h (6173) = 7 - (6173 mod 7) = 1
  14344
3
            h (4199) = 7 - (4199 mod 7) = 1
4
  4371
5
            h(4344) = 7 - (4344 \mod 7) = 3
  76-19
6
            -h(9679) = 7 - (9679 \mod 7) = 2
   1323
            -h(1989) = 7 - (1989 \mod 7) = 6
           (7 - (4199)) = (7 - (4199 \text{ mod } 7)) + (2 = 2)
           -> h(9679) = (7-(4199 mod 7))+12=3
                                          +22=4
            -> h(1989) =(7-(1989 mod7))+1°= 7
```