CharAt Loop

Processing Each Letter

```
public class loopChar {
    public static void main (String args[]) {
        new loopChar ();
    }

    public loopChar () {
        String s = "word";
        System.out.println (reverse (s));
    }

    public String reverse (String s){
        String ans = "";
        for (int i = s.length () - 1 ; i >= 0 ; i--)
            ans += s.charAt (i);
        return ans;
    }
}
```

What is the name of the constructor?

What is the name of the method?

What is the return type?

What is the parameter?

```
public class loopChar {
    public static void main (String args[]) {
        new loopChar ();
    }

    public loopChar () {
        String s = "word";
        System.out.println (reverse (s));
    }

    public String reverse (String s){
        String ans = "";
        for (int i = s.length () - 1 ; i >= 0 ; i--)
            ans += s.charAt (i);
        return ans;
    }
}
```

Where is the method called?

What is passed into the method?

```
public String reverse (String s) {
   String ans = "";

   for (int i = s.length () - 1 ; i >= 0 ; i--)
      ans += s.charAt (i);

   return ans;
}
```

0	1	2	3	4	5	6	7	8	9	10	11	12
V	i	o	l	a		D	e	s	m	o	n	d

```
public String reverse (String s) {
   String ans = "";

   for (int i = s.length () - 1 ; i >= 0 ; i--)
      ans += s.charAt (i);

   return ans;
}
```

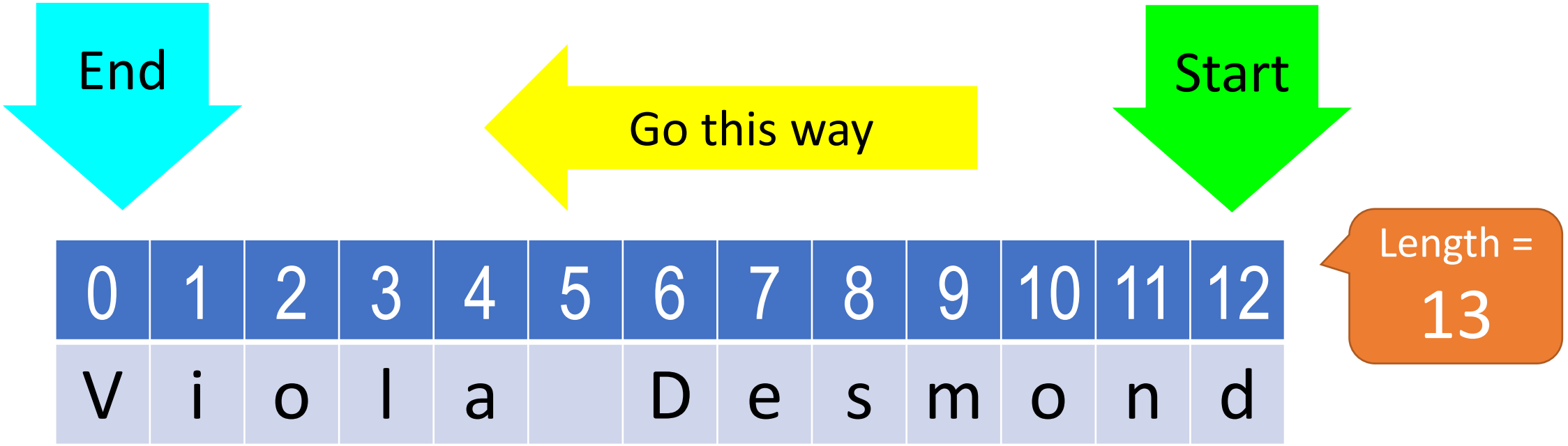
A place to build up the answer.

0	1	2	3	4	5	6	7	8	9	10	11	12
V	i	o	l	a		D	e	s	m	o	n	d

```
public String reverse (String s) {
   String ans = "";

   for (int i = s.length () - 1 ; i >= 0 ; i--)
      ans += s.charAt (i);

   return ans;
}
```



```
public String reverse (String s) {
   String ans = "";

   for (int i = s.length () - 1 ; i >= 0 ; i--)
      ans += s.charAt (i);

   return ans;
}
```

ans values
d
dn
dno
dnom
dnoms
dnomse
dnomseD
dnomseD (space)
dnomseD a
dnomseD al
dnomseD ali
dnomseD alio
dnomseD alioV

0	1	2	3	4	5	6	7	8	9	10	11	12
V	i	o	l	a		D	e	s	m	o	n	d


Caesar
Shift

Alice

HELP

Plaintext

Key: shift of 1 letter

ABCDEFGHIJKLMNOPQRSTUVWXYZ
ZABCDEFGHIJKLMNOPQRSTUVWXY

Ciphertext

GDKO

Bob

Alice

HELP

Encryption

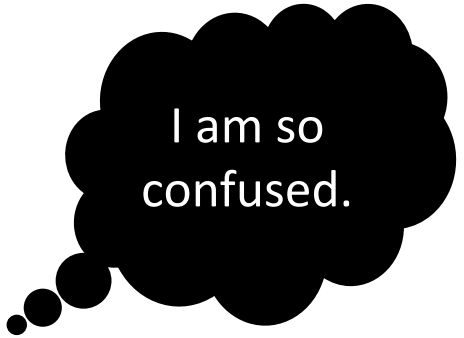
Key: shift of 1 letter

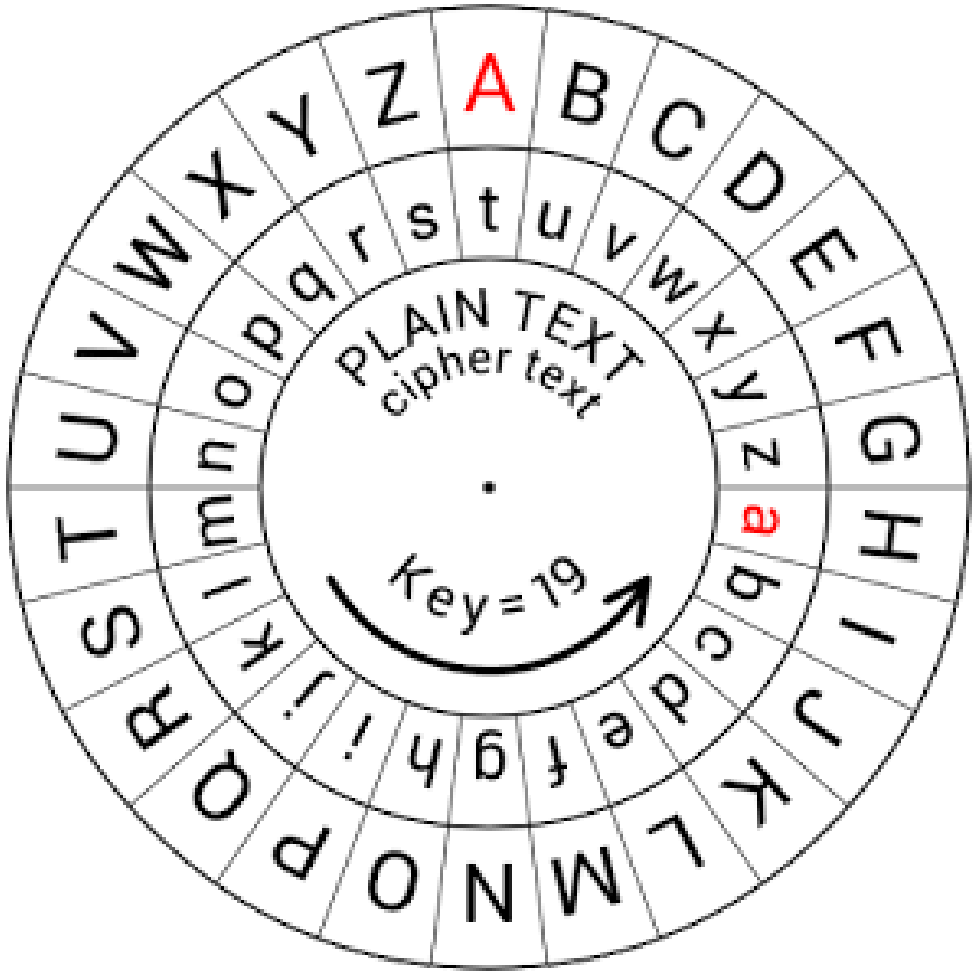
ABCDEFGHIJKLMNOPQRSTUVWXYZ
ZABCDEFGHIJKLMNOPQRSTUVWXY

GDKO

Bob

Eve




A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
PLAIN TEXT
cipher text
Key=19

```
public class encrypt {
   public static void main (String args[]) {
      new encrypt ();
   }

   public encrypt () {
      String s = "babyz";
      System.out.println (caesar (s));
   }

   public String caesar (String s) {
      String ans = "";
      s = s.toLowerCase ();
      for (int i = 0 ; i < s.length () ; i++) {
         int ascii = (int) (s.charAt (i));
         if (ascii == 32) //space
            ans += ' ';
         else if (ascii == 122) //z
            ans += 'a';
         else //all other letters
            ans += (char) (ascii + 1);
      }
      return ans;
   }
}
```

A program that does a one position Caesar shift.

```
public String caesar (String s) {
    String ans = "";
    s = s.toLowerCase ();
    for (int i = 0 ; i < s.length () ; i++) {
        int ascii = (int) (s.charAt (i));
        if (ascii == 32) //space
            ans += ' ';
        else if (ascii == 122) //z
            ans += 'a';
        else //all other letters
            ans += (char) (ascii + 1);
    }
    return ans;
}
```

Starts and ends where?

What does this do?

```
public String caesar (String s) {
    String ans = "";
    s = s.toLowerCase ();
    for (int i = 0 ; i < s.length () ; i++) {
        int ascii = (int) (s.charAt (i));
        if (ascii == 32) //space
            ans += ' ';
        else if (ascii == 122) //z
            ans += 'a';
        else //all other letters
            ans += (char) (ascii + 1);
    }
    return ans;
}
```

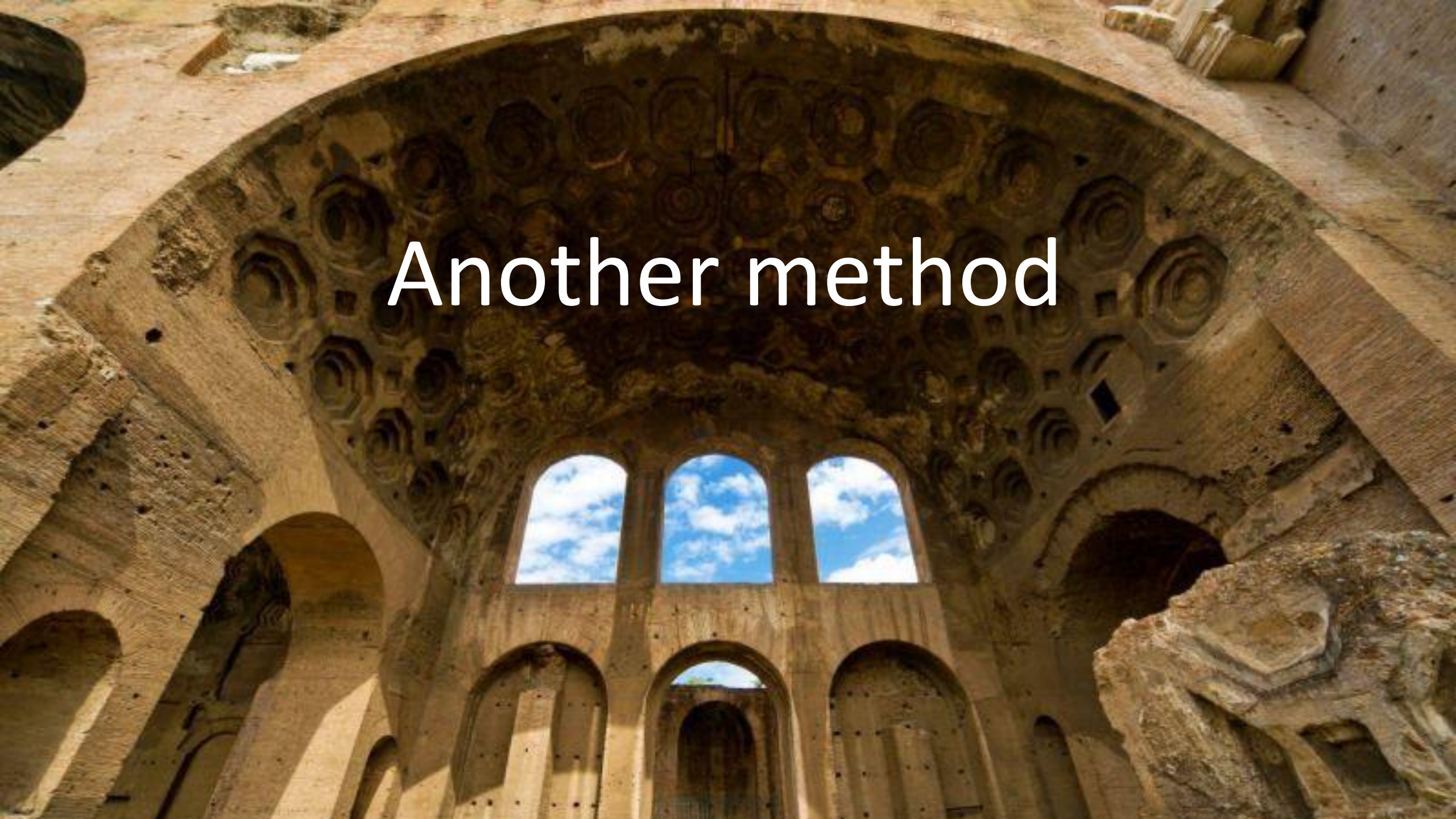
Take the next letter.

What does this do?

```
public String caesar (String s) {
    String ans = "";
    s = s.toLowerCase ();
    for (int i = 0 ; i < s.length () ; i++) {
        int ascii = (int) (s.charAt (i));
        if (ascii == 32) //space
            ans += ' ';
        else if (ascii == 122) //z
            ans += 'a';
        else //all other letters
            ans += (char) (ascii + 1);
    }
    return ans;
}
```

Add on the shifted next letter

What does this do?


Another method

```
public String caesar2 (String s) {
    String alpha = "abcdefghijklmonpqrstuvwxyz ";
    String key =   "bcdefghijklmonpqrstuvwxyza ";
    String ans = "";
    s = s.toLowerCase ();
    for (int i = 0 ; i < s.length () ; i++)  {
        char letter = s.charAt (i);
        int place = alpha.indexOf (letter);
        ans += key.charAt (place);
    }
    return ans;
}
```

0	1	2	3	4
V	i	o	l	a

```
public String caesar2 (String s) {
    String alpha = "abcdefghijklmonpqrstuvwxyz ";
    String key =   "bcdefghijklmonpqrstuvwxyza ";
    String ans = "";
    s = s.toLowerCase ();
    for (int i = 0 ; i < s.length () ; i++)  {
        char letter = s.charAt (i);
        int place = alpha.indexOf (letter);
        ans += key.charAt (place);
    }
    return ans;
}
```

22

v

22

w

0	1	2	3	4
v	i	o	l	a

These three lines can all be done in one glorious line of code. However, it tends to freak students out, so I trace the first one.

```
for (int i = 0 ; i < s.length () ; i++)  {
   char letter = s.charAt (i);
   int place = alpha.indexOf (letter);
   ans += key.charAt (place);
}
```

```
public String caesar2 (String s) {
  String alpha = "abcdefghijklmonpqrstuvwxyz ";
  String key = "bcdefghijklmonpqrstuvwxyza ";
  String ans = "";
  s = s.toLowerCase ();
  for (int i = 0 ; i < s.length () ; i++)
     ans += key.charAt (alpha.indexOf (s.charAt (i)));
  return ans;
}
```