## Zebras! Problem 2a

A zebra family is an interesting thing! There's the Mama zebra, who has $n$ stripes, and the Baby zebra has 0 stripes. In addition, there's a family member with each integer number of stripes in between.

Your task is to write a C program that reads in a number of stripes for the mother zebra, and then prints out the zebra family, starting with the mother, and ending with the baby, with each zebra on a new line.

For example, if the user input a 4, your program should output

```
-||||^*
-|||^*
-||^*
-|^*
-^*
```

Make use of your `PrintZebra` function, and write your solution on the provided overhead—one per group. No fighting!

Isaac Kunen, 33 January 2000

## Zebras! Problem 2b

It's said that the average family in America has 2.5 children, and thus we have the Simpsons, but a more pressing question is, "How many stripes does the average zebra have?"

Your task is to write a program that reads in a list of stripe numbers from the user, and then prints out a zebra corresponding to the average zebra of the group.

One more thing! Since we don't allow zebras with fractional stripes, we want to round off the average. If the average zebra has $< .5$ of a stripe more than the integer number, we want to round down, if it has $> .5$ we want to round up. Stop reading when you get a sentinel zebra—one with -1 stripes.

For example, if the user input stripe numbers 4, 4, 5, 5, -1, the average is 4.5 stripes, so we want to print a zebra with 5 stripes, and your program will output

```
-|||||^*
```

Make use of your `PrintZebra` function, and write your solution on the provided overhead—one per group. No fighting!

Isaac Kunen, 33 January 2000

## Zebras! Problem 2c

As you may know, zebras tend to form herds, but how do they manage the size of their herds? Recent studies indicate that zebras are very good at arithmetic, and actually size their herds so that they have at most 50 total stripes.

Your task is to write a program that reads in a stripe count for a zebra, and if the corresponding zebra can still fit in the herd, it should print out the zebra. If the zebra would make the total stripe count more than 50, the herd won't allow it in, and your program should not print it out, and instead end, printing the total number of stripes in the herd.

For example, if the user input 12, 13, 14, 15, your program should output

```
-|||||||||||^*
-|||||||||||||^*
-|||||||||||||||^*
oops! too many stripes for you!
total stripes: 39
```

Make use of your `PrintZebra` function, and write your solution on the provided overhead—one per group. No fighting!

Isaac Kunen, 33 January 2000

## Zebras! Problem 2d

In any particular herd of zebras, the "range" is the difference between the largest and smallest number of stripes that the zebras have. This statistic has a multitude of uses, particularly in computing the horoscopes of zebras.

Your task is to write a program that reads in a the stripe counts for a zebra herd, and then prints out the largest and smallest zebras and the difference between their stripe counts. Stop reading when you get a sentinel zebra—one with -1 stripes.

For example, if the user inputs 7, 8, 3, 9, 5, -1, your program should output:

```
-|||||||||^*
-|||^*
range = 6
```

Make use of your `PrintZebra` function, and write your solution on the provided overhead—one per group. No fighting!

Isaac Kunen, 33 January 2000

## Zebras! Problem 2e

What's the life of a zebra like? Well, there's eating and drinking, pacing around, and running from the occasional member of the cat family. But what do zebras do for fun?

They dance!

In particular they participate in zebra square dances. These dances are not like ours, but they are square. Zebras collect into groups that have a like number of stripes, and form squares so that the side length corresponds to the number of stripes. For example, for side length 4, one needs 16 zebras with 4 stripes a piece to participate.

Your task is to write a program that reads in a number of stripes, and prints the corresponding dance formation.

For example, if the user input 3, you should print out

```
-|||^* -|||^* -|||^*
-|||^* -|||^* -|||^*
-|||^* -|||^* -|||^*
```

Make use of your `PrintZebra` function, and write your solution on the provided overhead—one per group. No fighting!

Isaac Kunen, 33 January 2000

## Zebras! Problem 2f

Given all these zebras with their various numbers of stripes, you might wonder how some zebras got so many. The answer is that every year, the stripe fairy comes and adds some stripes to each zebra.

The number of stripes she adds is related to how many stripes the zebra already has, since she always adds the number of stripes that the zebra currently adds plus one.

For example, if a zebra had 3 stripes, she would add 4, for a total of 7 stripes.

Your task is to write a program that takes a stripe number for a particular zebra, and a number of years to track it, and print out pictures of the zebra as it changes.

For example, if the user input 2 stripes, and 4 years, you should print out

```
-||^*
-|||||^*
-||||||||||||^*
-||||||||||||||||||||||||^*
```

Make use of your `PrintZebra` function, and write your solution on the provided overhead—one per group. No fighting!

Isaac Kunen, 33 January 2000

## Zebras! Problem 2g—(hard!)

You might wonder about the miracle of zebra childbirth. Well, unlike the higher mammals, it isn't too exciting. Like many life forms, zebras produce children by binary fission, i.e., by splitting in two.

A curious fact is that the product zebras always have exactly half as many stripes as their progenitor rounded down. So, if the parent zebra has 5 stripes, it will yield two children with 2 stripes each. Zebras with 0 stripes cannot have children yet—they need to grow up first.

Your task is to write a program to model successive zebra generations. The user should input the number of stripes for the original zebra, and you should print out each generation, one per line, with spaces separating the zebras.

For example, if the user input 7 stripes, your program should output

```
-|||||||^*
-|||^* -|||^*
-|^* -|^* -|^* -|^*
-^* -^* -^* -^* -^* -^* -^* -^*
```

Make use of your `PrintZebra` function, and write your solution on the provided overhead—one per group. No fighting!

Isaac Kunen, 33 January 2000