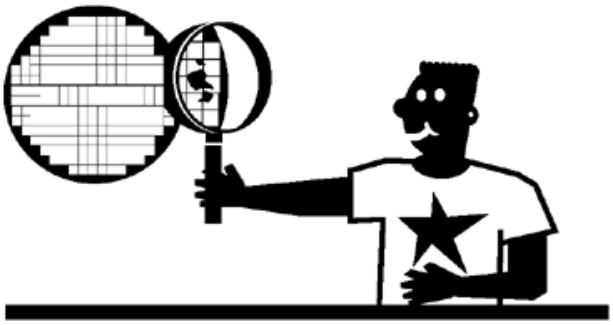
The Journey Inside[SM]: Microprocessors
Student Handout: Making a Complex Product

Making a Complex Product

The process of fabricating a chip takes many steps. Each step is done carefully. However, it is not possible that every step is always done perfectly. Some of the chips produced are defective in some way and are rejected.



You and the other members of the class are going to simulate the manufacture of a new product. Each person in the class will be making one part of the final product. Each part is essential in creating the final product.

Each of you will be given a number and a sheet of paper. Tear or cut your sheet of paper into small pieces. You should have twice as many pieces as there are students in your class. These small pieces of paper represent the parts that you are manufacturing.

Write your number on one side of each piece of paper. This is the part number for the component you are manufacturing. On the other side of two of the pieces, write "Defective."

Next, make sure that all your pieces of paper are placed with the numbers facing up. Each person will collect one piece of paper from each other member of the class until everyone has all the "parts" necessary to complete one product.

Check to be sure that you have all the parts. Look at the parts you have selected. If even one part is marked defective, your final product is defective. How many students have defective products?

Activities

1. Discuss the results of the experiment. Do they seem surprising to you?

2. You may want to experiment with fewer defective parts or more defective parts. How do these changes affect how many final products are without defects?

3. Suppose that half the parts were made with fewer defects, and half were made with more defects. For example, suppose parts 1, 3, 5, 7, etc. are made with half as many defects, and parts 2, 4, 6, etc. are made with twice as many defects. Will this lead to more of the final products being defective, about the same number as before, or less? Explain how you came to your conclusion.