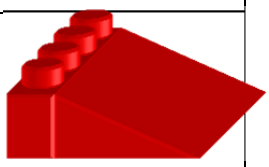
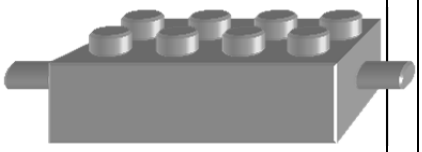
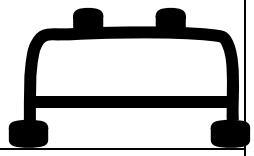
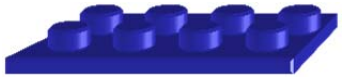
A Hands-On Exercise Using LEGO® Brand Bricks

Exercise setup:

Form teams (size 3 or 4). Make sure that number of parts (LEGO® bricks) in the packet match with the parts list given below and write the numbers is the Qty columns.

Part	Qty		Part	Qty	
28 of 1x4			8 of Sloped 1x4		
4 Axels			8 Wheels		
6 of 2x4			4 Handles		
4 of 2x4 strips			12 of 1x2		
64 of 1x1			**Some parts such as 1x1 may come in multiple colors; use them interchangeably.**		

Schematics of 3 toys (Ladder, Dolly, and Wishing Well) are given on pages 3 and 4. Assemble 1 unit of each before working on the two problems on page 2. For each problem you may have to disassemble part of the assembled toys made earlier. Show your answer to Problem 1 to the instructor before starting the second problem.

Problem #1: Suppose each assembled toy generates 3 dollars of profit per unit. From the components supplied make as many toys you can to maximize your total profit. Write your numbers in the table.

Number of Ladders	Number of Dollies	Number of Wishing Wells	Total Number of Toys

Problem #2: Suppose per unit profits are as follows: Ladder - $1, Dolly - $3, Wishing well - $5. From the components supplied make as many toys you can to maximize your total profit. Write your numbers in the table.

Number of Ladders	Number of Dollies	Number of Wishing Wells	Total Number of Toys

After class Exercises:

Problem formulation (for #2):

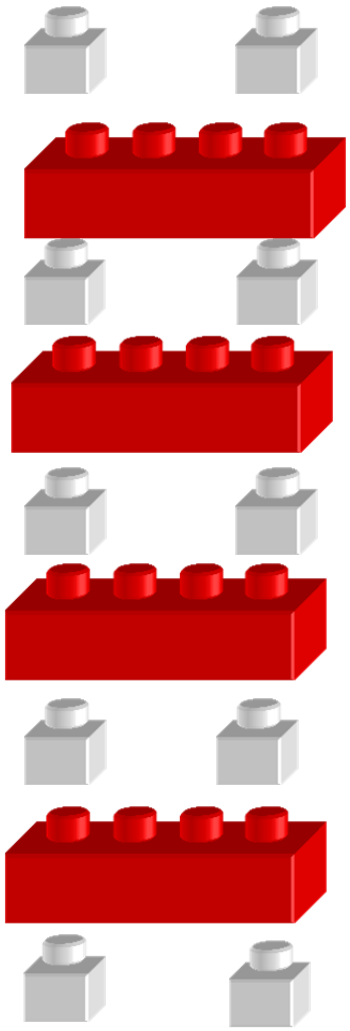
1. **What are the decision variables?**

2. **What will be the objective function?**

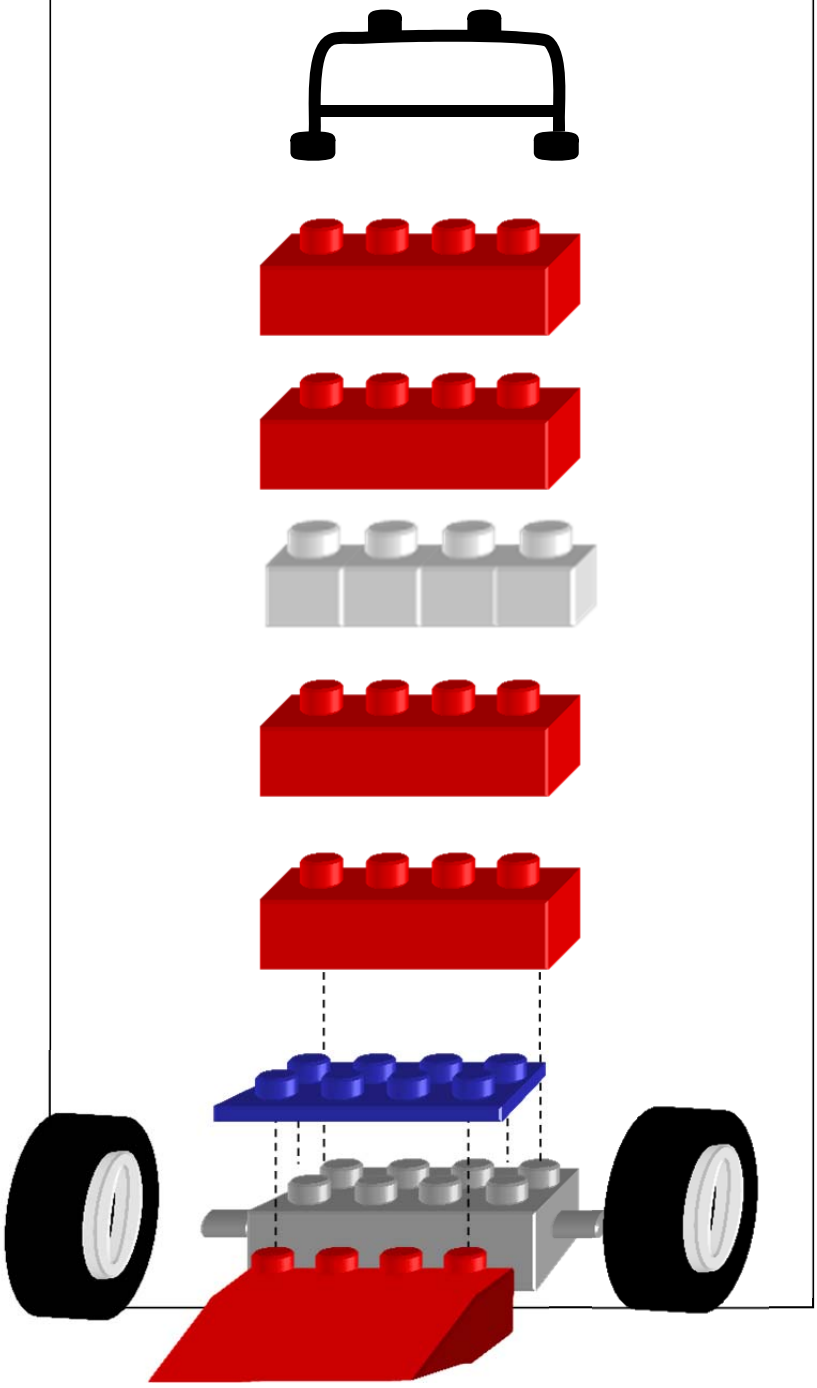
3. **There are 9 constraints, one per component. Explain the constraints for 1x4 and 1x1?**

4. **Are there any other types of constraints?**

Ladder



Dolly



Wishing Well