**A chocolate company based out of Switzerland is known for its world-famous chocolates. The company has kept its manufacturing process and ingredients a secret for centuries. Recently, they encountered huge competition in the market (We all know the delicious chocolate varieties in the market, right?) and approached your organization for help in optimizing their sales revenue.**

**By the market rates, we know that their premium chocolate sells for $10 per ounce whereas the other version sells for $7 per ounce.**

**They have given us details on the combination of cocoa and flavorings (two of their major ingredients) they use in both these versions – first version consisting of at least 75% cocoa whereas the second version containing 45%.**

**They usually produce cocoa and flavorings in two methods – either by investing in 3 hours of labor and 8 ounces of raw material or by investing in 2 hours of labor and 6 ounces of raw material. Both methods usually yield 4 ounces of each ingredient.**

**The company current has 2000 hours of skilled labor and 6000 ounces of raw material available.**

**Determine how you and your organization could maximize the sales revenue with the information provided?**

**Discussion.**

This is an example of a blending problem where a particular product is a mix of two or more materials. Here, there are 2 types of chocolate, each made from a mixture of 2 ingredients. We have the requirement that at least a certain fraction of each chocolate of must be composed of a specific ingredient. Instead of directly giving us the availability of each of the ingredient, here we are given details of how the ingredients can be produced, i.e. by running processes 1 and 2. Since we have a limit of the labor and raw materials available to run these processes, we can determine what is the maximum amount of each type of ingredient that can be produced given these constraints. Since the question does not specify any cost associated with running these processes, we can simply aim to maximize the production of these ingredients, which in turn would maximize the amount of chocolates that can be produced from these ingredients, thereby maximizing the revenue from selling these chocolates, which is our main objective. Hence our decisions will include the number of hours to run process 1 and 2 to produce the ingredients so that the above can be achieved. We must also decide amount of a ingredient type that must be contained in each chocolate so that the required proportions mentioned in the question are satisfied. Once a ingredient is allocated to both the chocolates, we must ensure that the total amount of this type of ingredient present in both the chocolates does not exceed the initial availability of this ingredient produced by processes 1 and 2.

