**Algorithms**

An ***algorithm*** is a series of steps required to perform a certain task. A cooking recipe is a perfect example. Here is the algorithm for making cupcakes:

*Preheat oven to 350 degrees.  Line cupcake pans with paper liners.*

*Combine flour, sugar, baking powder, and salt in a large mixing bowl.  Add shortening, milk, and vanilla.*

*Beat for 1 minute on medium speed.  Scrape side of bowl with a spatula.*

*Add eggs to the mixture.*

*Beat for 1 minute on medium speed.  Scrape side of bowl with a spatula.*

*Beat on high speed for 1 minute or until well mixed.*

*Spoon cupcake batter into paper liners until 1/2 to 2/3 full.*

*Bake for 20 to 25 minutes or until toothpick inserted in center comes out clean.*

*Cool 5 minutes in pans then remove and place on wire racks to cool completely.*

*Once cupcakes are completely cooled, frost with your favorite frosting recipe or decorate as you desire.*

You’ll notice that the above recipe is very much like a program. There are assignment statements (set the temp to 350), conditional statements (“do this until that happens”), loops (repeat this step) and so on.

As our programs become more useful, they also become more complex. If we just try to tackle them without making a plan, chances are we will become confused and give up. An algorithm is a battle plan for our program. Complex programs are going to require an algorithm (written or thought through) before we start.

**Exercises**

You would be surprised how complex common everyday tasks can be. By writing an algorithm for them, you will appreciate this fact. These are not programming problems. For each situation below, write the algorithm in the space provided on this page. For example, here is an algorithm for shoveling the driveway:

1. Pick up shovel.
2. Scoop snow with shovel.
3. Throw snow on shovel to the side of driveway.
4. Repeat steps 2&3 until driveway has no more snow on it.
5. Put shovel down.
   1. I have a drawer containing N socks, some of them matching, some of them not. Write the algorithm to find one pair of matching socks. You cannot use the words “search”, “find” “look for” etc.
   2. Your friend has no short-term memory due to an accident, but he can read and follow directions. You send your friend into a classroom and return to you with an answer: “(the person) is in the room” or “No (the person) is not in the room”. Write the algorithm to do this. You cannot use the words “search”, “find” “look for” etc.
   3. You and a friend are partners in a relay race at a carnival. In this race, you and your partner must pick up a balloon each with your teeth, run with it through an obstacle course, then switch the balloons with each other (ugh!) then complete the race again and sit down. The hard part is the switch because you are not allowed to use your hands! Write a short algorithm to explain how you can switch the balloons using only your teeth.