Exercises

For additional practice you will create a program that scores the user’s mouse clicks on a soccer ball sprite. You will be given a program that moves the sprite. You will modify the program to score the clicks on the ball and to keep a list of the times at which the clicks (goals) were made.

1. Open the Scratch project 1.1.5.e.A RolesChallenge.sb2 in the Scratch 2 Offline Editor or in a browser with <http://scratch.mit.edu/projects/22629898/>.
2. Create a new **accumulator** variable called totalGoals by clicking the **Make a Variable** button in the **Data** category as shown below.

Once you have done this, you will see several new blocks as shown below to use for that variable:

1. Modify the program so that when the sprite is clicked, the totalGoals changes by 1.
2. Now create a list using the **Make a List** button. Name it timesOfGoals.
3. You will see several new blocks that you can use to modify the contents of the list. Modify your program using one of the blocks so that when the ball is clicked, the time at which the click occurred will be added to the list (*Hint: the “thing” to add to the list is the* timer *in the* ***sensing*** *palette*).
4. When you use variables, it is important to make sure that they **initialize** at the beginning of your code. To initialize a variable, set it to a value at the beginning of your program. The stack of blocks below shows how the timeris initialized.

Add the code to initialize totalGoals and timesOfGoals. The variable totalGoals should start as 0, and timeOfGoals should start out empty. The blocks that perform these functions are shown below.

1. Test your code to see if it collects the times at which the ball is clicked. If it doesn’t work the way you wanted, strategize, code, and test in additional iterations.

Conclusion

Remember that variable roles refer to why a variable is being used. In this activity we have examined four of the eight most common variable roles: fixed value, most recent, accumulator, and aggregator.

1. What do you see as the primary advantage of using a fixed value variable?
2. Write a pseudocode segment that shows usage of a most recent variable that is significantly different than the example given in this activity.
3. Explain the accumulator role:
   1. List two examples of software you have used that you suspect might have used an accumulator.
   2. Choose one of your examples from part (a) and explain what you think the accumulator in the program might have been doing and why this function leads you to classify the object as an accumulator.
4. Explain the difference between the accumulator role and the **aggregator** role.
5. Summarize in your own words the role of Stepper, Walker, and Best-so-far.
6. Describe an application you have used that required a variable for the best-so-far role.