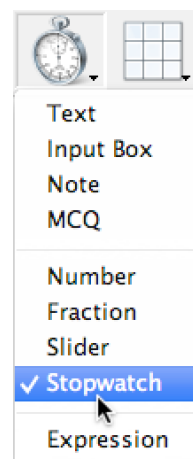# STOPWATCHES

Stopwatches are used to handle time in Cabri. A *Stopwatch* object is a time counter, with an accuracy of one second. You can give a stopwatch an initial value, and start or stop it.

1. HOW TO CREATE A STOPWATCH

Select the **Stopwatch** tool from the **Text** toolbox.

Click in the view to position the stopwatch and then type a number for its initial value. Press `return` or click elsewhere to finish.

Click on the hourglass icon which also starts animations. You will see the stopwatch value increase at the rate of 1 per second. Click again on the icon to stop the stopwatch.

When the hourglass icon is vertical , you may start and stop individual stopwatches by selecting the stopwatch and using the stopwatch checkbox in the Animation box in the **Attributes** panel of the Inspector.
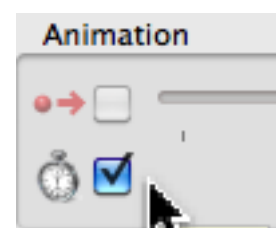
Note that the stopwatch is simply a number, which may be formatted, inserted in text, used in calculation, etc. as desired. The value of a stopwatch may be changed by editing the number, or by using the actions "reset value" "increase by 1" or "decrease by 1".

## 2. USING ACTIONS TO START AND STOP A STOPWATCH

The hourglass icon enables stopwatches to run. Stopwatches are always disabled in Teacher mode, may be enabled or disabled in Author mode, but are always enabled in Student mode. It is hence necessary to create actions which will start and stop individual stopwatches. See the **ACTIONS** documentation for more details.

Here is an example of resetting, starting, and stopping a stopwatch with a toggle button. It is also possible to reset, start, and stop a stopwatch using actions attached to any other object or to the page. Also note that the menu command **Page - Reset Stopwatches** will set all stopwatches to the value 0.
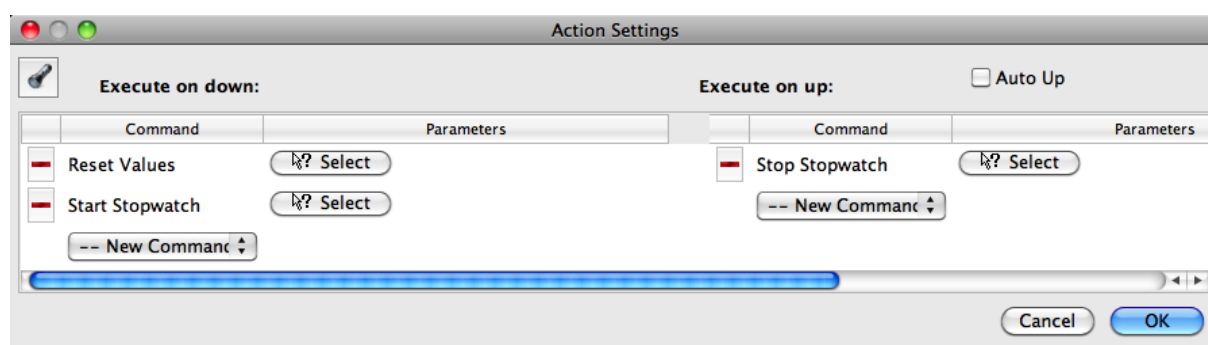
Make sure that the hourglass is horizontal and create a stopwatch with an initial value of 0.
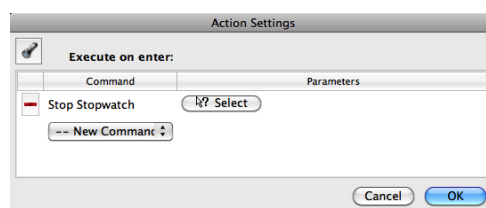
Create a new toggle button and position it on the page.
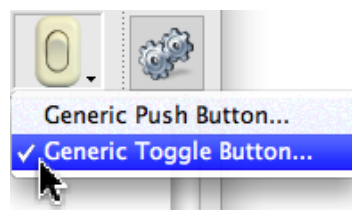
Create the actions shown below, select the stopwatch as parameter for each action, and click on OK.

Now add an action to the page to stop the stopwatch. Otherwise the stopwatch will automatically run when enabled.

Now move to a different page and click to make the hourglass vertical and enable the stopwatch. Return to the original page: the stopwatch should not be running.

When you click on the button, the stopwatch will start. Click again, and it will stop. Click a third time, and its value will return to zero and it will then start again.

3. USING STOPWATCHES TO START ACTIONS

In this more elaborate example, we will create the countdown for a race between a deer and a cow. We will use a stopwatch and also actions, animation, Booleans, expressions and media to achieve this. You might want to refer to the documentation for these.

Open the Cabri Author file **stopwatches** and click on the Start button to begin the countdown to a race between a cow and a deer. Click on Stop to end the race, and Reset for the beginning of a new race.
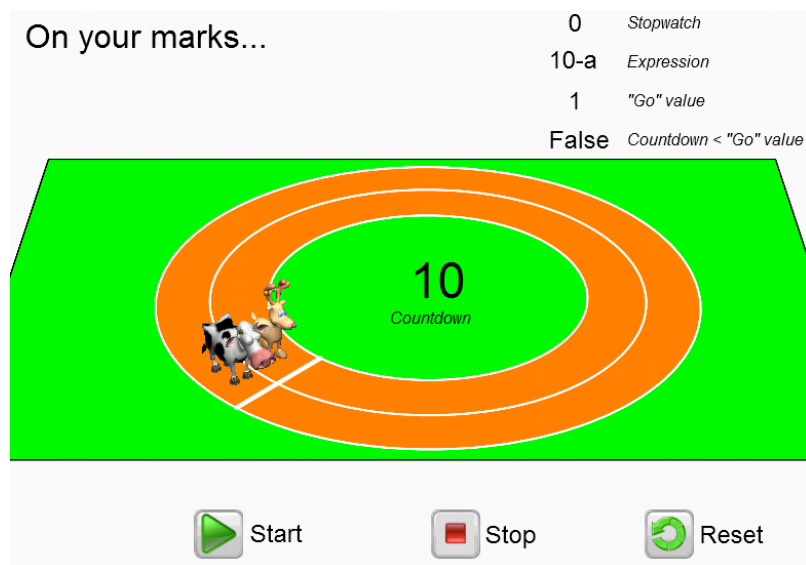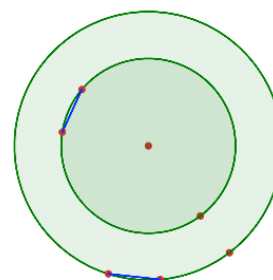

To create this example, proceed as follows:

1. Create two circles with the same centre using the **Circle** tool.
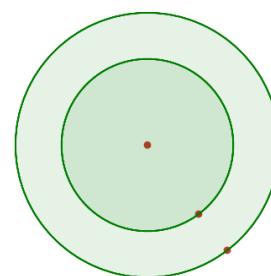
2. Create two pairs of points joined by a segment on each circle using the **Segment** tool. DO NOT use the radius points.

3. Press shift and click on both points in one pair and set a speed for these points (see the **ANIMATION** documentation). Repeat with the second pair of points. Do NOT check the Animated box; we want our animals to be still until the race starts.

4. Put a deer on one of the segments and a cow on the other using the **Media - Models** panel in the Inspector. See the **MEDIA** documentation for further details. Adjust the segments so that the animals are lined up to start the race and are of similar sizes.
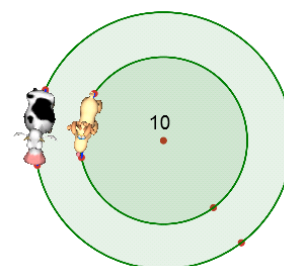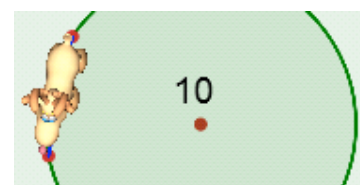
5. Create a stopwatch as in the above example. Set its initial value to 0.

6. Create the expression **10-a** with the **Expression** tool.

7. Use the **Apply Expression** tool to evaluate this expression with the stopwatch value for **a**. Put the result (which should be 10) near the center of the circles. This will show the countdown for the race.
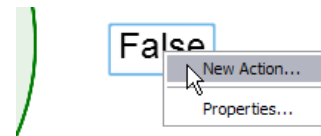
8. Create a new number using the **Number** tool. Set its value to 1. This is the "Go" value; when the countdown reaches this value the race will start.
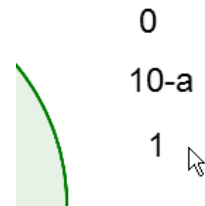
9. Use the **Less Than** tool to check whether the countdown value created in step 7 is less than the "Go" value created in step 8.
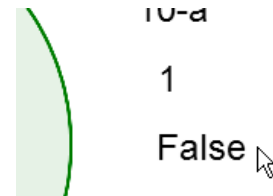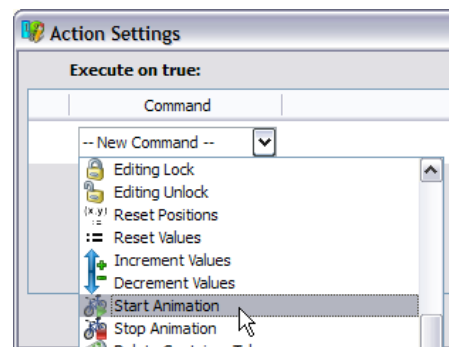
10. Select the **Manipulation** tool, right click on the Boolean just created and choose New Action.

11. Under Execute on true, add a Start Animation command. As parameters, select the four points on the circle created in step 2 (NOT the radius points).

   Refer to the **ACTIONS** documentation for more details.

12. Add a Stop Stopwatch command under Execute on True. Select the stopwatch created in step 5 as parameter.
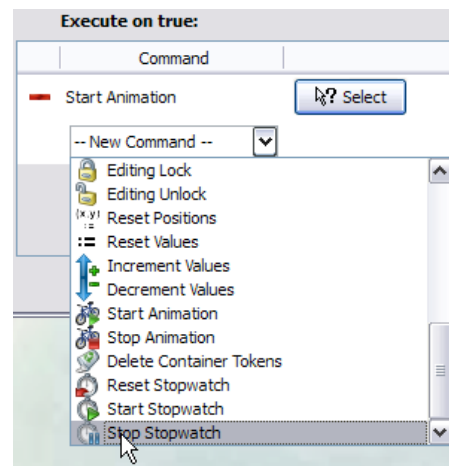
13. Now let's set up the page so that when it opens in the Player, no action happens until a button is pressed.

    The first action to add to the page is to stop the stopwatch, as otherwise

this will start as soon as the page is opened. Select Stop Stopwatch as an action, with the stopwatch as parameter.
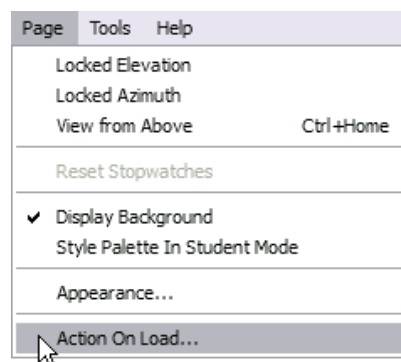
14. The three other actions are to ensure that if a race is running and the user switches to another page, then the race is reset when they return. The parameter for stopwatch actions is the stopwatch, and the parameters for Stop Animation and Reset Positions are the four points.
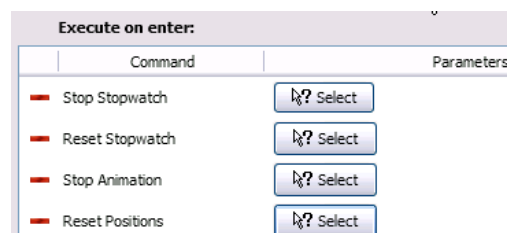
15. Next, you will create three buttons to:

a. start the race by starting the stopwatch. Choose the command Start Stopwatch with the stopwatch as object.

b. end the race by stopping the animals. Choose the commands Stop Animation with the four points as objects and Reset Stopwatch with the stopwatch as object.

c. reset the animals to their initial position and the stopwatch to 0 ready to begin another race. Choose the commands Reset Stopwatch, Reset Positions and Stop Animation with the stopwatch and the four points as objects.

16. Add text, further circles and a starting segment to improve the appearance of the page.

17. Save the file, reopen it, turn on the hourglass ⧗ and the race is ready to go.

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