**Bug Report for CCK (AC+DC), Version 3.04.09**
Testing on Windows XP Professional, Service Pack 2
Java Version 1.5.0_06

December 12, 2006

1. I have my Windows task bar located on the top of my desktop (instead of on the bottom, as most people do). When I opened CCK, the title bar on the window for CCK (that allows me to move, minimize, maximize, or close the window) somehow got hidden behind the task bar, which was annoying and strange at first. I don't think I've seen this happen before.

2. When you connect a simple circuit (battery, bulb, and wires), the final circuit element that you move to connect the circuit remains highlighted in yellow. When you click on the background, the highlighting does not go away. When you click on a different circuit element, the new element becomes highlighted, and the old element is no longer highlighted. In the old version of CCK, this did not happen.

3. A junction formed by two wires looks different from before (see photos). It is not as smooth as before.

New: Old:
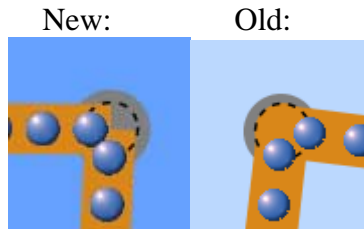
4. When you grab a junction and move it around, the blue spheres stop flowing from the gray end of the battery (see photo). After you let go, the electrons eventually catch up to the others.
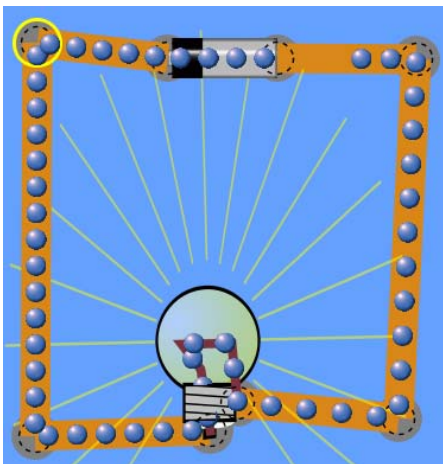
5. When you adjust the voltage of a battery in a simple circuit (such as the one above) with the slider, the change in speed of the electrons is very slow and choppy. The same is true for the response in the yellow light rays from the light bulb.

6. When you choose the "show connection at right" for a light bulb (whether or not it's in a circuit), you get the following effect:
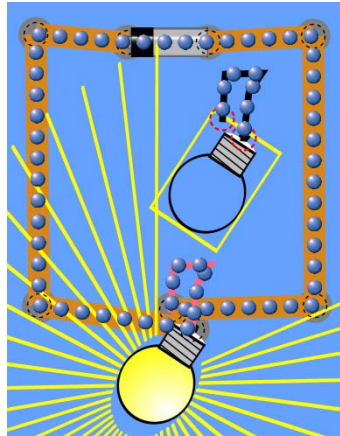

7. The default is the have the "Show Value" checked for any individual circuit element (bulb, resistor, etc.). This is a bit confusing, since you have to select "Show Values" in the right tool bar to actually see the values of elements. Also, when you try to uncheck "Show Value" for a specific element, nothing happens.

8. When you select "Show Values" in the right tool bar, it also displays the resistance of each wire element, which looks a bit cumbersome. (Note: I'm not sure if everyone has already had a lengthy discussion on showing the resistance of wires). Perhaps showing this may reinforce the belief that wires always have zero resistance.

9. The yellow light rays from a bulb appear in front of the tool bar/palette and not behind it. The old version does this too, but now when you try to click and grab a circuit element from the tool bar/palette and you accidentally click on a yellow light ray (instead of the intended circuit element directly behind the light ray), this action moves the light bulb where the light rays are coming from, and does not grab a new circuit element from the tool bar/palette. This happens regardless if the light bulb emitting the light rays is high lighted or not.

10. This same problem with the yellow light rays also occurs when the light rays overlap another circuit element (either connected to the circuit or disconnected). When you click and drag on the yellow light ray that is overlapping a circuit element in the play area, this action moves the bulb and not the circuit element directly behind it. In order to move the circuit element, you have to click directly on the graphic of the element (i.e., between the yellow light rays). However, if the light rays appear behind the circuit element, you do not encounter this problem anymore. The light rays can appear behind an element if that element was highlighted after the light bulb was highlighted.

11. The default size for circuit elements is "medium," but when you click on either large or small, and then go back to medium without changing anything else in between, the circuit in the play area does not appear in same location (relative to the edges of the screen and the tool bar). This can be problematic for big circuits near the edge of a screen, since part of the circuit can now appear off the screen when you return back to your original size.

12. This relocation effect also caused the voltmeter to disappear. In certain cases, clicking the check box for the voltmeter will make it appear off-screen because the user has resized the circuit elements. If the voltmeter always appeared in the same location relative to the center or edges of the screen (regardless of size), then this would fix the problem.

13. The light rays can obscure the reading on the ammeter when the light rays are in front of the ammeter.

14. When adjusting the battery voltage, the stated voltage of the battery in the window with the slider has 5 significant figures. This same voltage of the battery also appears right above the battery, but only has 4 significant figures (rounded off). Just a little confusing at first.

15. When you leave the "non-contact ammeter" over a wire in a closed circuit, and then open the circuit, the non-contact ammeter still reads the same value as before. Also, if you leave the non-contact ammeter over a wire in a closed circuit, and then change the current somehow (e.g., by changing the battery voltage), the non-contact ammeter still reads the same value. It appears that the non-contact ammeter does not refresh itself unless you click on it **and** move it to a different location.

16. When using the "Current Chart" with a simple DC circuit, the sign of the current may be a little confusing (see photos below). When you measure the current on one side of a node, you get a positive current, while on the other side of the node, you measure a negative current. The same effect happens on the lower-left node of the circuit. This same effect occurred a different time, but the nodes that made the current flip were the ones closest to the light bulb (i.e., upper left and right nodes).
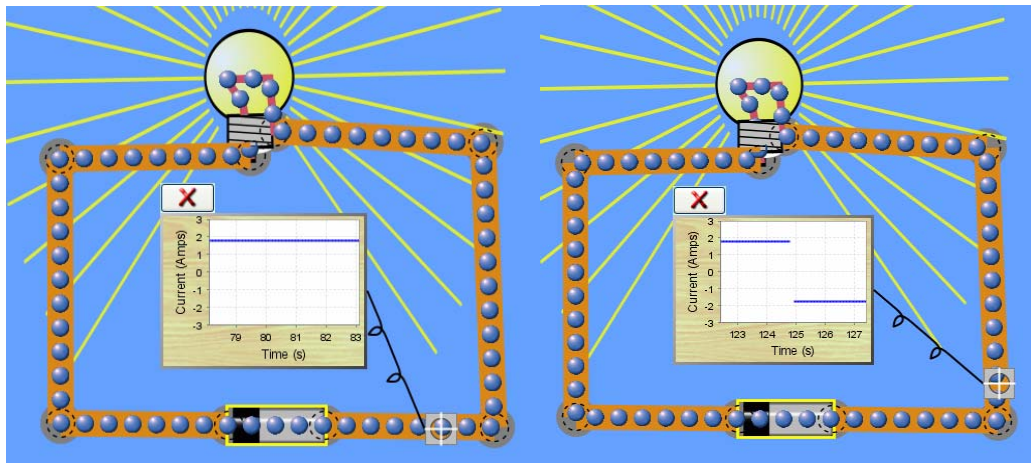
17. The Stopwatch is not accurate. 60 seconds, as measured on the Stopwatch, is equal to 44 real/true seconds.

18. Frequency of the AC source does not match the stopwatch. The period of 1 Hz is equal to about 6 seconds on the stopwatch.

19. I'm not sure if this is a bug: when you set the frequency of the AC source to 0 Hz, the voltage automatically goes to 0 Volts. Is this intentional, or should the voltage just remain constant at the level it was immediately prior to becoming zero?

20. Also, in the configuration in the photos below, when you move the slider slowly to adjust the voltage of the AC source, you get the expected result—the frequency is preserved, and the slope of the blue line in the graph changes smoothly. However, when you move the slider slowly to adjust the frequency of the AC source, it seems like the AC source resets the voltage to some default value and then changes the frequency accordingly. You would expect that slowly adjusting the frequency to see the resulting effect would produce a smooth curve, but instead it produces a very jagged graph because of the resetting of the voltage.
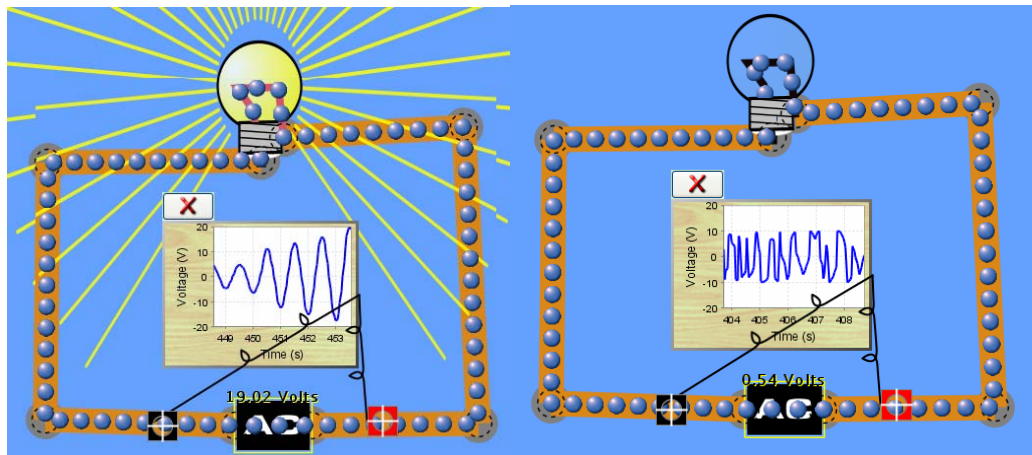
21. An AC source, regardless if it is in a circuit or not, displays the default voltage and frequency within the respective window that allows you to change that particular value. For example, drag a new AC source into the play area, and right click on the AC source to change its voltage. The number in the window displays the correct (default) value of 10 Volts. Now change the voltage to something else, say, 5 Volts. Click "Done." Do this again—right click on the source to change it's voltage and the window incorrectly displays the default value of 10 Volts, regardless of the sources' actual maximum voltage (5 Volts in this case). The same problem occurs for frequency as well.

22. When you right click on the AC source, it should read "Change Frequency" instead of just "Frequency."

23. On this same note, maybe change the phrase from "Edit Capacitance/Inductance" to "Change Capacitance/Inductance," just to be consistent.

24. Put any circuit element in the play area, right click and hold on one of the ends of the element and wiggle the cursor around. This makes the play area (along with the tool bar) zoom in and out. Very strange.

25. This bug is very difficult to track down, and it is sometimes reproducible. Here's the set up which I think will reproduce it:
    1) Build the circuit in the photo with the switch initially open.
    2) Close the switch.
    3) Let the cap charge up all the way until the electrons stop flowing.
    4) Open the switch.
    5) Left click on the node connecting the right side of the cap to the wire.
    6) Now, right click on this same node and choose "Split Junction."
   7) The cap now mysteriously discharges when it should not.
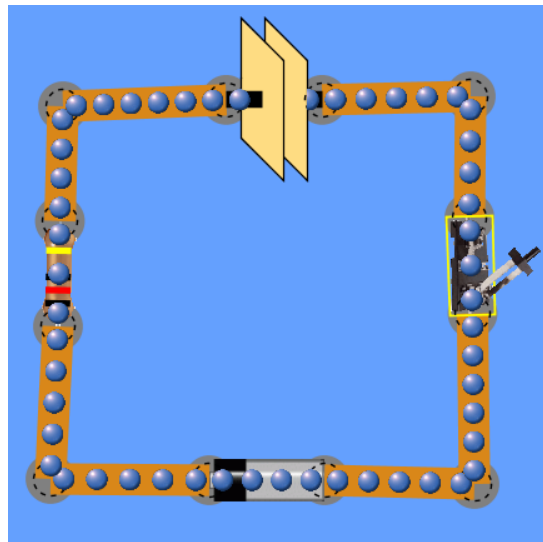
I tried all different combinations for this—sometimes, this would happen when I split the junction and the switch was still closed. Sometimes it happened when I only right clicked (instead of left clicking first) on the node to remove the capacitor. Sometimes it only worked if I had a fresh/new cap in there (not one that had already been discharged).

26. When you resize (by clicking large, small, medium), the only thing that does not change size are the Current and Voltage Charts. This is a problem because their position relative to the circuit changes (the charts do not move at all) and a chart's crosshair detector no longer points to the same place on the circuit. For example, if you go from the default medium to small, the Current Chart no longer detects current (and most likely points to the play area and reads nothing, as it should). When you move the crosshairs back over the circuit, it starts reading the correct current. For the Voltage Chart, when you go from medium to small size, the chart **still** reads the original voltage and thinks the circuit is still in its original position (as it was when it was 'medium'). When you now go from

small to medium, the chart **still** thinks the circuit is in it's original position before any resizing took place (because of the bug mentioned earlier where if you go from medium to small and then back to medium, the circuit appears in a completely different position relative to the edges of the window and no longer appears in its original location). If you delete this non-functioning Voltage Chart and get a new one, it still suffers from the same problem. In fact, even if a user was not using a Voltage Chart prior to resizing, the Voltage Chart still does not work properly and thinks the circuit is in its old position.

27. When you check the box for "Show Values," the capacitor reads "Ohms" instead of "Farads."

28. In the circuit (below, left; note exact orientation of components), if you try to click on the bulb and move it slightly to the left, the bulb jumps back to the right. Also, if you simply left click on the left wire, the wires and bulb rotate slightly clockwise. More left clicks result in the circuit continuing to rotate clockwise, pivoting at the battery. If you move the bulb to the left so that the left most wire is to the left of being vertical (roughly 11 o'clock on a clock face), this effect disappears (see photo; below, right). When the left wire is slightly to the right of vertical (roughly one o'clock on a clock face), you get the problem described above.
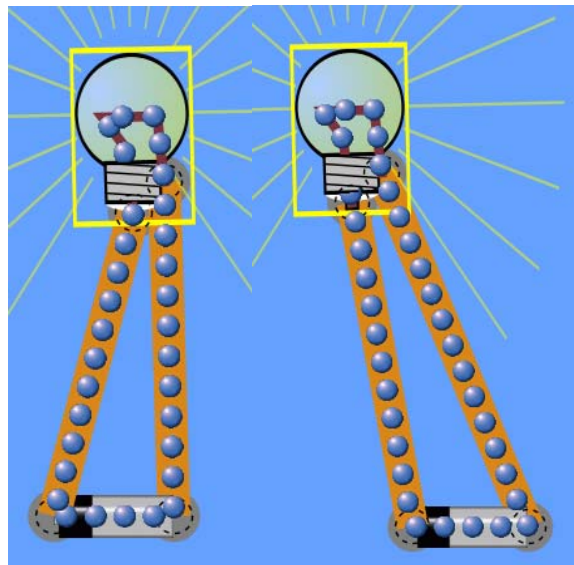
29. When two components are near each other, they automatically jump together and connect. It seems that in this new version, the components automatically connect at a distance that is greater than in the original version. This got a little annoying at times when trying to drag components across the screen.

30. When you change the battery voltage by checking the "More Volts" box and adjust the slider, click done or close the window, and then try to change the voltage again, the "More Volts" box is unchecked and the slider points to 100 Volts, where it should read the true voltage.

31. With a battery, cap, and switch all in series (no resistor or bulb), if you close and open the switch quickly, you get a few oscillations of the electrons within the cap.

32. In the following circuit with a cap, resistor, and battery all in series, if you change the capacitance of the cap, you see the change in charge on the cap plates, but the electrons do not move (i.e., there is no current). Also, when you change the capacitance, close the window, and then try to open up this same window again, the slider used to change the capacitance always reads the default value of 0.02.
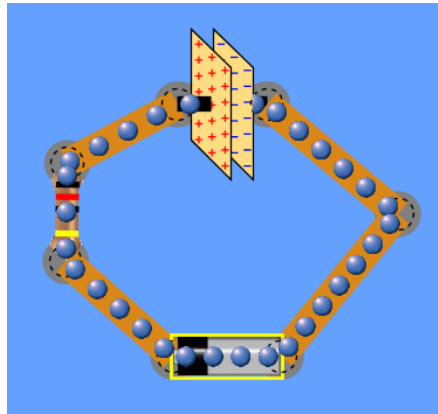
33. If you were to take this same circuit and completely remove the charged cap from the circuit and try to change the capacitance, the charge on the plates changes as if the same fixed voltage were still across the cap, but the charge cannot change in this case for a free capacitor. Also, the voltage across this free capacitor should change as you change the capacitance, but if you measure the voltage with the voltmeter as you change the capacitance, the voltage across the capacitor plates remains constant.

34. When you add a Current Chart to the play area and move the detector crosshairs without moving the actual chart, and then try to add an additional Current Chart, it adds the new chart directly on top of the original one. This may be a bit confusing to users at first, and it would be nice to have them appear in different locations.

35. I had trouble opening the switch occasionally, since the cursor changes to a white pointing hand whether you want to move the location of the switch or open the switch. Many times, I accidentally ended up moving the switch around instead of opening up the switch. Is there some other cursor icon that we can use to signify that if you click on the switch, you are going to open the switch?

36. The inductor reads "Ohms" when you check 'Show Values' instead of "Henries."

37. Performance was an issue for any circuit larger than the simplest. I figure we can worry about performance once we get everything working first. Also, occasionally when I would switch to another application and then go back to CCK, the play area would appear, but the tool bar would be grayed out. I would have to move my mouse over that area in order for it to reappear.

38. Design Issue: This may have already been discussed, but I thought I'd share it. On the right-most tool bar/palette under the title "Tools," there are 6 tools: Voltmeter, Ammeter(s), Non-Contact Ammeter, Stopwatch, Current Chart, and Voltage Chart. These tools operate in 3 different ways:

      1) Voltmeter, Non-Contact Ammeter, and Stopwatch: when you check the box, the tool appears in the play area. You are not allowed to have multiple tools (e.g., multiple voltmeters). To remove these items, you have to uncheck the box.
      2) Ammeter(s): when you check the box, the tool appears in the tool bar/palette and then you have to drag it into the play area. You are allowed multiple Ammeters. To remove these items, you have to right click and choose "Remove."
      3) Current and Voltage Chart: when you click on the button, the chart appears in the play area. You are allowed to have more than one Current (or Voltage) Chart at a time. To remove the tool, click on the red "X" on the top left corner of the chart.

    It seems a bit odd to have these different tools operate in different manners. Why not choose one standard, and create a palette similar to that for circuit elements where the user drags and drops the tool in the play area, right clicks to remove, and is allowed to have more than one of the same tool in the play area? It does not seem to make sense to have these tools operate in different manners—they are all tools.