

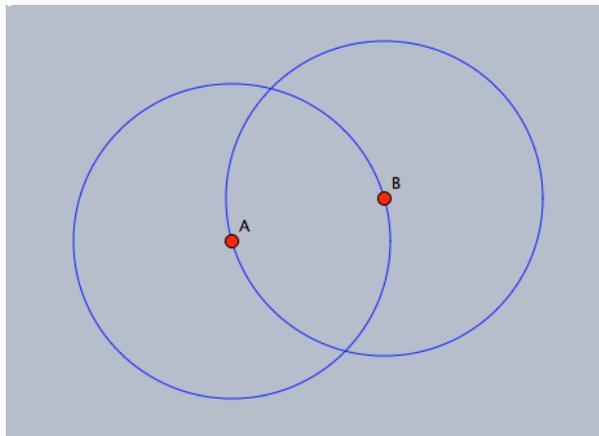
Handout 6

Developing Macro-constructions

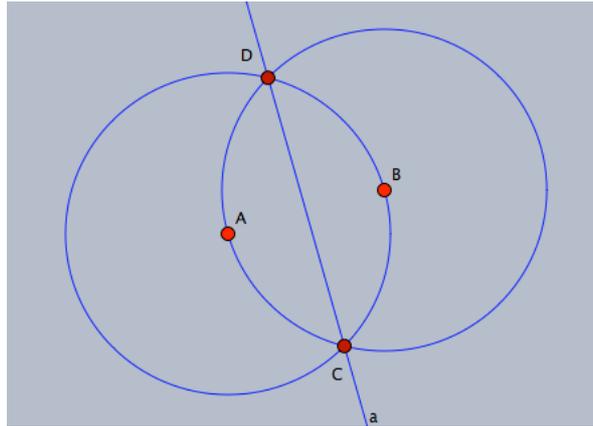
Cinderella has the ability to encapsulate a sequence of construction commands into a new command/tool, which is called Macro-constructions. In this activity, you will experience how to use Macro-construction facilities to develop some geometric tools such as: perpendicular bisector and circum-center point of a triangle.

Student Activity: Developing a macro tool for perpendicular bisector.

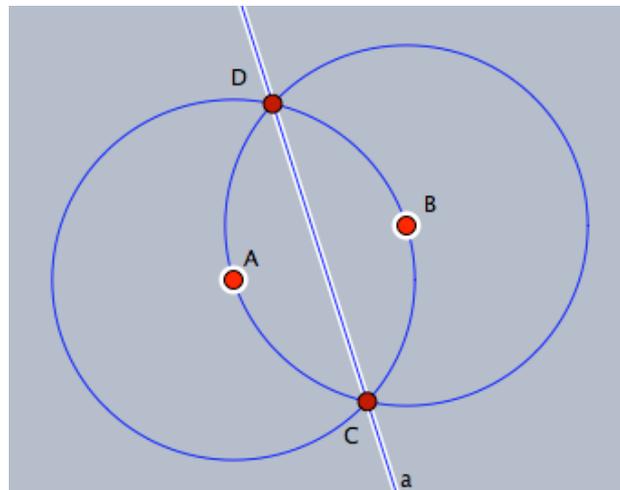
1. Launch Cinderella or open new Cinderella window.
2. Switch to **“Circle by Two Points”** mode using **“Modes”** menu or by pressing the button  in the toolbar. This mode allows you to construct a circle with two points one at the center and the other at the circumference of the circle.
3. Use a press-drag-release sequence with the mouse twice to construct two points A and B and two circles that use A and B as centers and B and A as point on the circle.



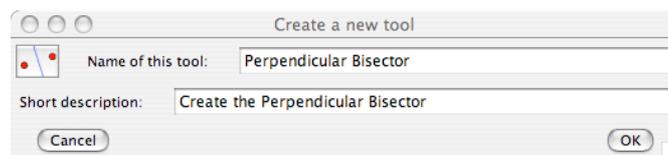
4. Generate the intersection points between the two circles at C and D, using the **“Intersection”** mode . Then, switch to **“Add a Line”** mode  to construct to the perpendicular bisector of A and B.



- To define a macro you have to select the initial elements – here the two points A and B – and the final elements – here the line a. So, Switch to “Move” mode, and then use Shift key to select the two points A and B and the connecting line a.



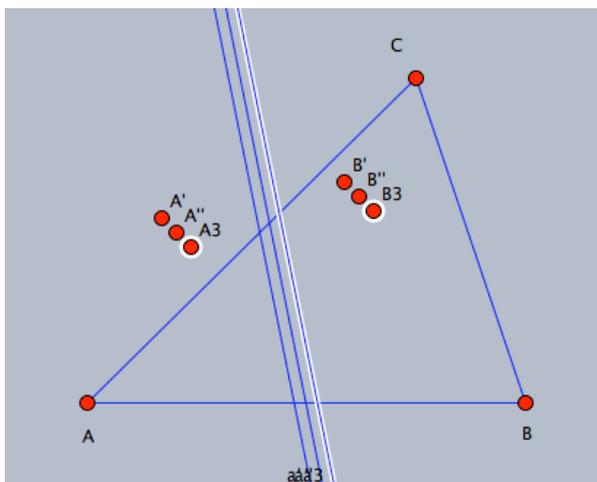
- Now, the three selected elements, the two points A, B and the line a, which represent the initial and final elements, can be used to create a macro tool for the perpendicular bisector. For doing so, choose menu item **“Edit/Create Tool from Selection”** or press the keyboard shortcut **“Ctrl+Shift+N”**. A new window of two fields pops up that requires a name and a description for the new tool. Enter the name and the description for the new tool – Perpendicular Bisector and Create the Perpendicular Bisector are suggested to be a name and description for the new tool – then, click OK button to confirm the creation of the tool. The icon is created automatically and will be available in the toolbar.



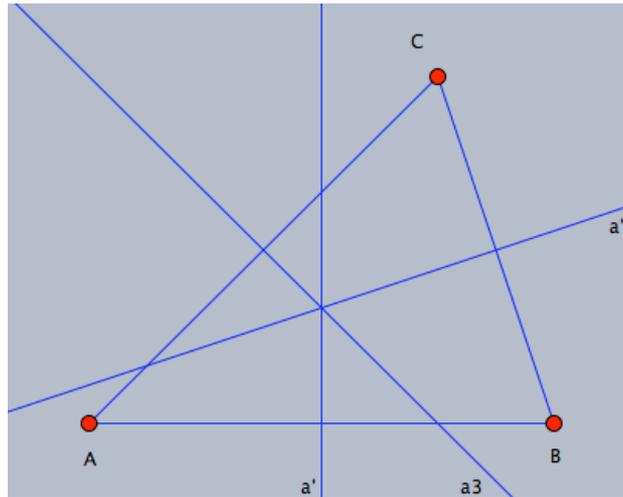
Student Activity: Developing a macro tool for circum-center point of a triangle.

In this activity, you will be guided to use the perpendicular bisector tool to construct the circum-center point of a triangle and develop a new macro tool for the circum-center point of a triangle as well.

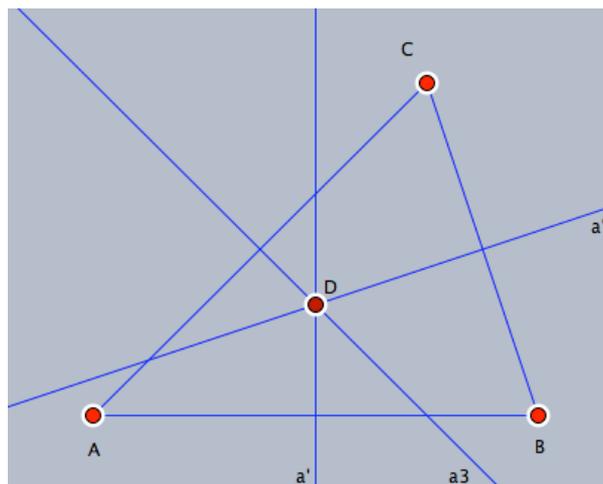
1. In the last Cinderella window that contains the developed perpendicular bisector tool. Clean the construction area by selecting all elements using the item menu **"Edit/Select all"** or by clicking the button  or by pressing the keyboard shortcut **Ctrl+A**. Then, delete elements using the menu item **"Edit/Delete Elements"** or by clicking the button  or pressing the keyboard shortcut **Ctrl+Delete**.
2. Construct a triangle ABC.
3. To construct the perpendicular bisectors for the triangle sides, click the developed perpendicular bisector tool button  three consecutive times this action will instantly paste the points A' and B'; A'' and B''; A3 and B3 and the perpendicular bisector lines a', a'' and a3.



4. Switch to **"Redefine Point"** by using the menu item **"Modes/Redefine Point"** or by clicking the button  in the toolbar mode and then move A' to A, B to B', A'' to B, B'' to C, A3 to A, and B3 to C. That will end up with a configuration of a triangle and its side perpendicular bisectors.



5. Generate the intersection point of the perpendicular bisectors at D^1 to get the circum-center point of triangle ABC.
6. Switch to “Move” mode, and use Shift key to select the points A, B, C as initial elements and D as final element for the macro.



7. After you select the initial and final elements of the macro, use **“Create Tool from Selection”** command from edit menu to develop a new macro tool for the circum-center point of a triangle, and give it a name and a description. A new icon for the circum-center point of a triangle will be created in the toolbar.

¹ Remark: The perpendicular bisectors of the sides of a triangle are concurrent. The automatic proving facilities of Cinderella can be used to show that, while you are generating the intersection point D.

Assignment project:

Use Cinderella to develop a macro tool for each of the following:

- In-center point of a triangle
- Orthocenter point of a triangle
- Center of mass or centroid point of a triangle
- Euler line of a triangle