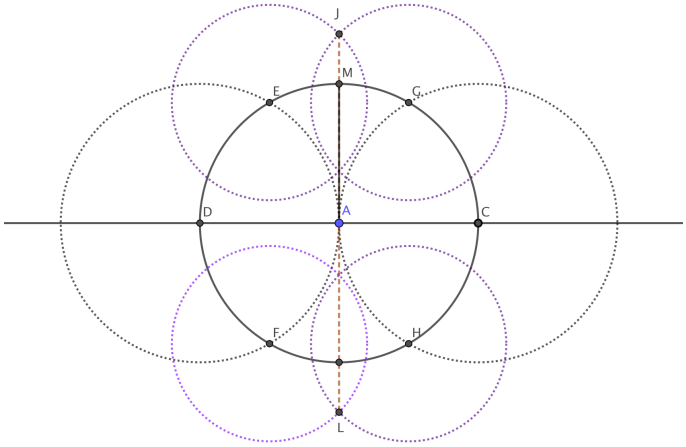
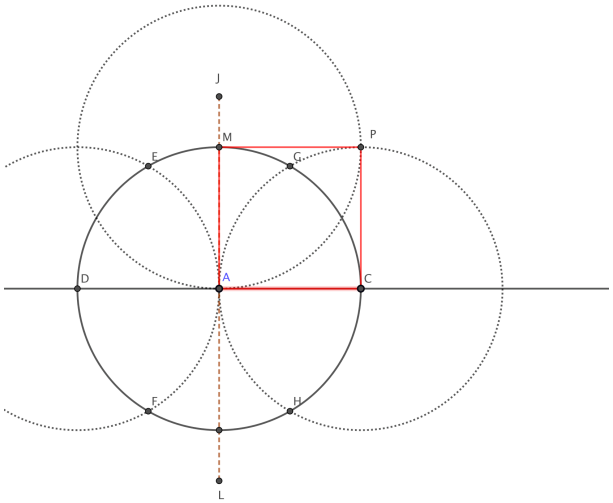
Square Tessellation Pattern.

While the most basic of shapes, constructing a square requires some care. Here are two interesting methods. Begin by constructing a circle about A, and then two other circles of same radius at C and D. This identifies 4 points as their intersection, E,G,F and H. Now about each of these 4 points, construct circles of equal radius that intersect at J and L. The line through J and L is now perpendicular to the horizontal through D and C. Point M is on this segment and provides MA which is perpendicular to and of equal length to AC.



Now two other segments can be found to complete the square by drawing a circle about M that has the original radius AC. Along with the circle about C, we define the intersection point P. This gives us the fourth point of the square.



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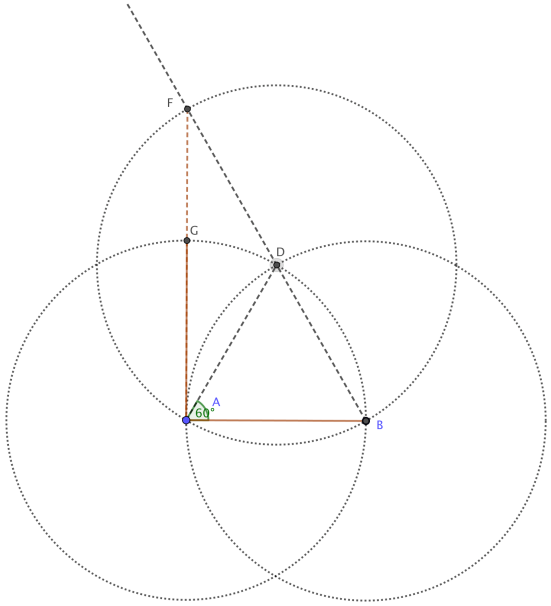
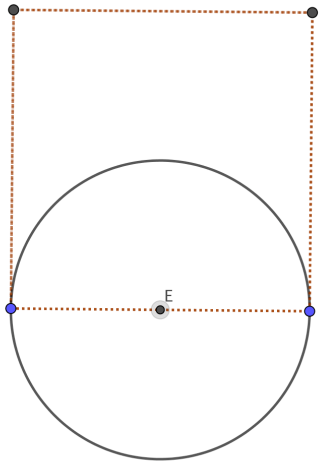
An alternative method to establishing the perpendicular is illustrated below.

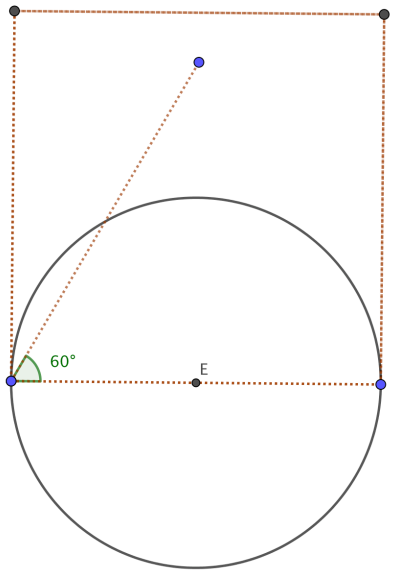
Given a segment AB, construct a circle about A and B, each with radius AB. The intersection of these circles is marked by D, and then draw a circle about D of that same radius. Now extend BD to where it intersects the circle, and note point F. Now connect F to A, and the required perpendicular to AB is given by AF. G marks where that vertical intersects the circle around A and provides 3 of the the 4 corners of the square. The fourth corner is found as we did above.



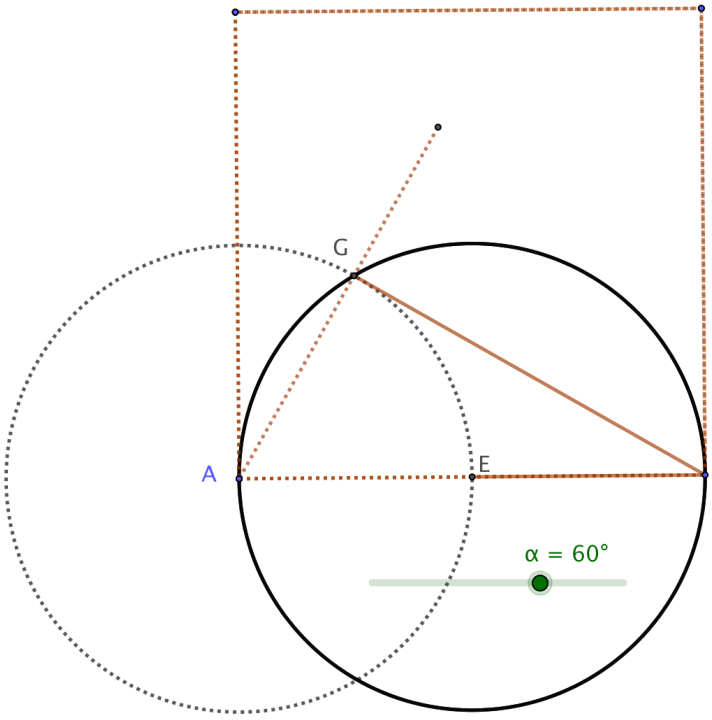
We now begin a new pattern by bisecting one side of a square and centering a circle at the midpoint E as illustrated.



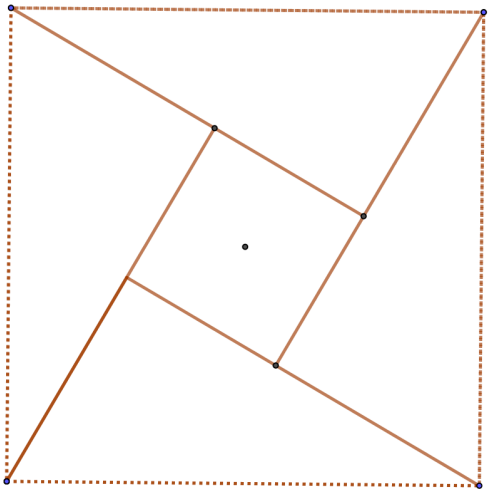
Next create a line segment from the corner at an arbitrary angle, here illustrated to be 60.



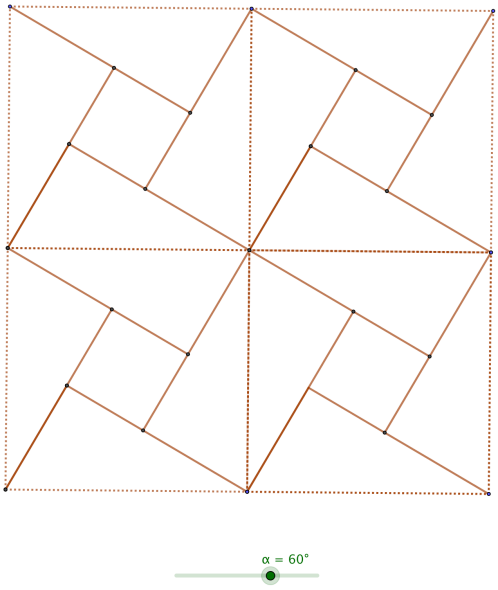
If G is the point where the ray intersects the semicircle, and then G is connected to the lower right corner, we create a right angle at G, because any triangle with a hypotenuse given by a diameter of a circle is right. If the ray is chosen so that G is at the intersection of the circles about A and E, then the angle GAE will be 60.



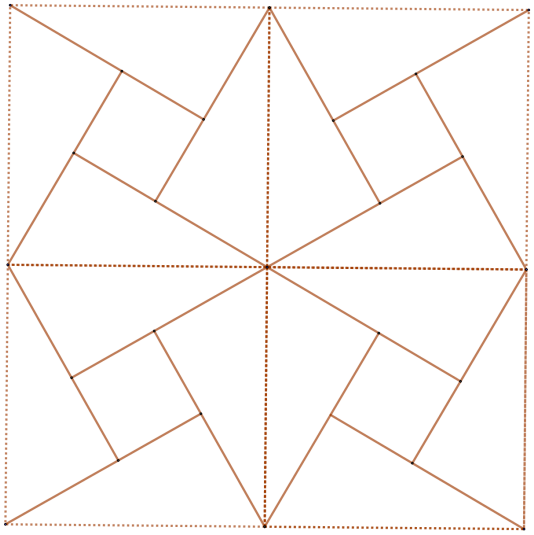
Repeating this construction on each side produces the pattern shown below.



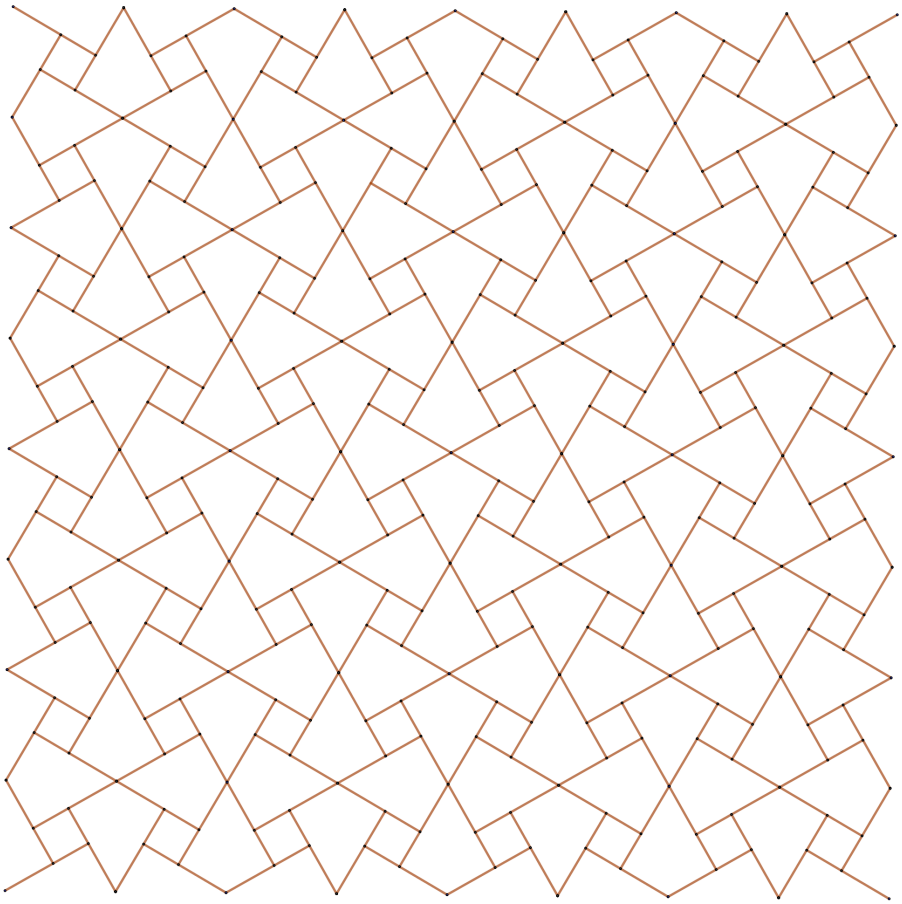
By tessellating this piece, we can obtain the following pattern.



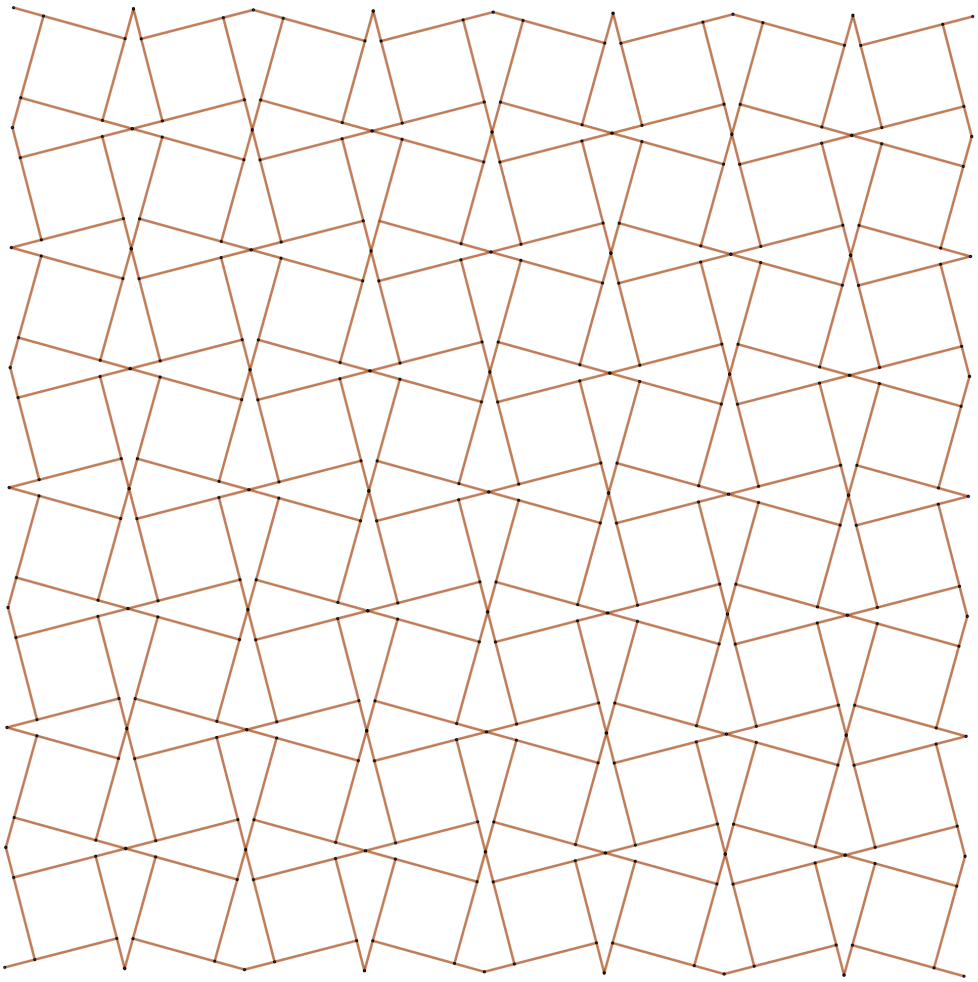
A more traditional pattern is created If when tessellating, we also reflect the individual squares.



α = 60°



α = 60°



α = 75°