Computer graphics have become an essential tool for engineers. We use it to help in visualization of a design, display simulation results, and much more. In fact, plotting is computer graphics. In this project we want to produce a working LED 24-Hour clock (so 11pm will be 23:00 on this clock) that will both display the current time and scroll across the screen to add complexity.

The Following are some functions/ideas/commands that might be useful for the project:

GET( )
SET( )
CLOCK
MOVIE
GETFRAME
PAUSE
FILL

Handle Graphics
Cell Arrays
PROJECT PARTS:

I.) Make a FUNCTION called “My_Circle” which takes as inputs:
   a. R, Radius of the circle
   b. Xc, x-position of the circle’s center
   c. Yc, y-position of the circle’s center

And outputs
   d. Data, the matrix which hold all the X, Y points of the circle (to be used for plotting, make 1024 points so that it looks smooth). Use Transformation matrices!

II.) Write a PROGRAM (doesn’t have to be a function) called “My_Clock_Initialize” that produces, using My_Circle, a grid of circles on a figure. This grid should have 17 columns and 5 rows. Also, you should define all the numbers 0-9 in this part. When I say “define”, how does the number “4” look like when referring to the LED grid? Three columns will define each number. This will be your simulated LED

HINTS:
   1.) Use FILL and choose WHITE (or any color you want to be the OFF color) to be the fill color. This will give you the option of changing the fill color for each circle
2.) Use Handle Graphics. Give a handle for each circle. It might make sense to make an array of handles.
3.) To define each number (0-9), it could be useful to use Cell Arrays. But it is not mandatory.

III.) Produce a PROGRAM called “My_Static_Clock”, that produces the clock shown above. It should display the current time.

IV.) Produce a PROGRAM called “My_Clock”, that produces a scrolling clock across the LED grid. See the animation under the MATERIAL link, on the website.

HINTS:
1.) Change the fill color, so that the correct LEDs light up. Take a picture(use GETFRAME) and than move the LEDs over 1 and repeat.

V.) BE CREATIVE AND COME UP WITH SOMETHING COOL

This is your chance to get creative. For example, you could make a Tic-Tac-Toe game. Or if you’re really ambitious, you could make something like tetris and use the KEYPRESS function. This part should only be done after everything works. The point is, that this part is graded the least, but could set you apart from your fellow students.