Graphics Animation Using Terrapin LOGO

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Blinking Objects

- The algorithm for a blinking object is as follows:

  For a definite number of iterations do (or while)

  Draw the object (in a foreground color)

  Pause (WAIT) for a specified time (as necessary)

  Erase the object (draw in the background color)

  Pause (WAIT) for a specified time (as necessary)

  If you wish to leave the object visible then

  Draw the object (in a foreground color)

LOGO Animation

- The simplest form of animation in LOGO is to:
  - Change the shape of the turtle
  - Pick the Pen Up
  - Move the “new” turtle around the graphics window.
- You may have to slow the “turtle” down in order to see the animation.
  - You can use SETSPEED .1 to SETSPEED .9
  - You can use a REPEAT or FOR loop combined with a WAIT command.

Animation Basic Concepts

- The basic concept for graphics animation in LOGO is to:
  - Have some form of REPEAT, FOR, or WHILE loop where you move the “turtle” around the graphics window **updating its position and / or its coordinates**.
  - This process repeats until the image reaches a desired location, or until some other condition is met.

Linear Motion

- In LOGO you can turn the turtle in any direction or set its heading, and move the turtle forward or backwards.
- You can also move the turtle using SETX, SETY, or SETXY to move the turtle along a horizontal, vertical, or diagonal path.
- You can also create a mathematical equation in conjunction with a FOR or WHILE loop to move the turtle along a path.

Linear motion 2

- The algorithm for linear motion using a mathematical formula is:

While the image is not at its destination (or use a for loop)

Draw the image in the foreground color(s)

Pause (WAIT) for a specified time (use symbolic constants)

Update the image's position

Linear motion: y in terms of x

- The algorithm remains the same as defined on previous slides. The difference is how we calculate the value of y in terms of x.
- The equation of a line between 2 points is:

$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)$$

- For example:
- FOR "X 1 200 [SETXY LIST :X (0.5 * :X + 10) WAIT 20]

Non linear motion

- The algorithm remains the same as defined on previous slides. The difference is how we calculate the value of y in terms of x.
- The basic formula for a parabola in standard form:

$$y = a(x - h)^2 + k$$

•For example:

•FOR "X 0 120 [SETXY LIST :X (0.01 * :X * :X) WAIT 20]

Animation Categories

- There are two types of animation. They fall into the following two categories:
  - non-interactive animation
    - as previously discussed
  - interactive animation
    - Control the path of the turtle using the keyboard.
    - Use READCHAR with IF THEN statements.
    - Use a recursive procedure with a choice to quit.

AnimationExamplesv3.lgo