*More and more of the world's computing power is going into processing graphics. The interface you use on the NeXT is a GUI—*Graphical *User Interface. Movies such as* *<u>Terminator II</u> use computer graphics for many of their special effects. Even the text that you print out on laser printers is graphical since each character of a font is drawn using a graphics package. In this lab you will learn to speak a common graphics language—PostScript. You will also see demonstrations of color graphics, including real-time video on the NeXTdimension computers in the back of the lab.*

Purpose

- To learn the fundamentals of PostScript for several reasons:
  - It is what the NeXT computer uses to display everything on the screen.
  - It is the language used in most laser printers to describe what to print.
  - It is a stack-based language, which is interesting in itself.
- To explore the current state of high-end graphics processing.

References

Required CheatSheets

- PostScript
- UNIX, especially the section on `lpr`.
- Edit
- Yap
- TopDraw

Helpful CheatSheets

- Recursion

Online Help

- man page for `lpr`
- Help within TopDraw—click **Help...** in the main menu.

Procedure

Log in to a NeXT

PostScript

- Start Yap**.**
- Draw a nifty picture, using PostScript. (See the PostScript CheatSheet for some examples.) From Yap, save it in your directory as **postscript.ps**. *This will be submitted later, after you have printed it out and looked at it.*
- Open a Terminal window.
- Use `lpr` to send the PostScript file you just saved directly to the printer. *This is to show you that this is indeed the language the printer uses. It is going directly there!*
- Start TopDraw and create a simple drawing similar to the one you created using PostScript.

- Save the drawing in one of your directories by choosing **Export...** from the **File** menu. Use the filename **TopDraw.drawing.topdraw**, and make sure the EPS icon (toward the bottom of the panel) is highlighted. If it is not, click it. This will ensure you are saving in a PostScript format. *You will submit this file later, so don't lose track of it!*
- Load the file from within Edit :
  - Start **Edit** by double-clicking it in /**NextApps**.
  - Choose **Open...** from the **File** menu.
  - Find your file, click it so it is selected, then click the **OK** button.
- Realize that hey...this looks extraordinarily similar to (although longer than) the stuff you wrote in the PostScript section...

Congratulations. You can now speak the same language as the printer. Many Macintosh, NeXT and IBM laser printers use this language, so most drawing programs do nothing more than take what you draw and translate it into PostScript. You now know how to cut out the middle man and talk directly to the printer!

Nifty graphics & video

- Meet the TA in the back of the room to see the graphics demos on one of the color NeXTdimensions. Bring popcorn.

Do not forget to turn in all of the material listed below before the given due date!

Log out of the machine.

What should be handed in

- Your PostScript drawing(s). (**postscript.ps** and any others you create)
- Your TopDraw masterpiece (**TopDraw.drawing.topdraw**)
- Anything you do in any other sections of this lab, or anything else you want us to see. We're not picky!

Above and Beyond

Try anything you have time for, in any order.

More PostScript

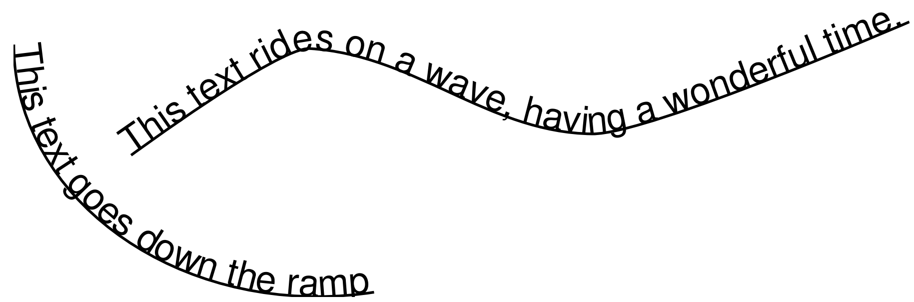
Go for it. Do anything you want in PostScript, but go beyond the simple drawings in the mandatory part of the lab. Try some of the more advanced PostScript operators, especially the ones for looping. If you really want to test your knowledge of PostScript, try creating your own recursive picture. See the Recursion CheatSheet for more information. You may not succeed in making a real recursive drawing in the time you have, but you may still get interesting results. Turn in anything you do, including non-working code. Recursion is difficult, so a valiant attempt to use it will be smiled upon. A good exercise to try is modifying the example code in the Recursion CheatSheet. Tell us what you try to do, then include the modified code and your evaluation of the results it produces. Good luck!

Special Effects in TopDraw

Choose several advanced features of TopDraw and use them to create a drawing that uses more than just basic shapes and fills. Possible choices:

- **Effects** from the **Draw** menu
- **Skew**ing from the **Transform** menu
- **Flip**ping from the **Transform** menu
- Placing text along a path as in the example below. (Just draw your path, double-click it using the pointer tool, and type away!)

These are just some of the more obvious choices. Explore others! Also, don't forget to put your results into a file and use the `handin` program to turn them in!



For further exploration

More color graphics

If you want to see some more amazing color graphics, check out the Interactive Computer Graphics Laboratory (ICGL). This lab contains many IRIS computers, which are very fast graphics machines with some incredible demos installed. The machines are located in E-Quad room B423. You can login with your normal userid and password, but the operating system is different than the NeXT's, so you will have to pester a guru there to show you how to get to the demos. If there is enough interest, perhaps a TA will go over for a few hours and show you some of the better ones. Another neat feature of the IRIS computers is a flight simulator called **Flight**, which allows you to fly against other humans in an aerial dogfight. Amazing graphics, amazing game. It was banned a while back for using too much computing power, so you can currently only fly a plane solo...no dogfighting. Nonetheless, it is quite a bit of fun.