ASSIGNMENT INFORMATION

Due Date

Monday, March 16, 2020

8:00 AM

Points Possible

100

For this project, you will be creating a new programming language. This language will not be very complex (certainly not Turing complete!). The language w are making will allow us to draw simple pictures.

We are going to call our language Zoomjoystrong (thank you to the "Product Name Generator"). Zoomjoystrong will will be written in C, with the help of Flex and Bison. As such, we will need the following pieces:

A Flex file to define our tokens. We will call this zoomjoystrong.lex.

A Bison file to define our grammar. This will be called zoomjoystrong.y.

A graphics library with functions we can call to do the drawing. This will be provided to you in files called zoomjoystrong.h and zoomjoystrong.c.

Note that you don't have to create the graphcs library; it is provided in this repo.

Project Specifications

Flex File

Your Flex file should define the following tokens:

END. This statement ends a program.

END_STATEMENT. All commands should end with a semicolon.

POINT. When we match the command to plot a point.

LINE. When we match the command to draw a line.

CIRCLE. When we match the command to draw a circle.

RECTANGLE. When we match the command to draw a rectangle.

SET_COLOR. Matches the command to change colors.

INT. Matches an integer value.

FLOAT. Matches a floating-point value.

A way to match tabs, spaces, or newlines, and to ignore them.

A way to match anything not listed above, and to tell the user they messed up.

Bison File

Your Bison file will define the grammar of the language. We want to support:

A statement list of one or (arbitrarily) more statements followed by the END token.

Valid statements followed by the END_STATEMENT token.

A line command of the syntax line x y u v that will plot a line from x,y to u,v.

A point command of the syntax point x y that plots a single point at x,y.

A circle command with the syntax circle x y r that plots a circle of radius r around the center point at x, y.
A rectangle command with the syntax rectangle x y w h that draw a rectangle of height h and width w beginning at the top left edge x,y.
A set color statement with syntax set_color r g b that changes the current drawing color to the r,g,b tuple.
Note that functions that perform this code has been given to you!

Compiling

Make sure the SDL2 library is installed on whatever system you are using. This is fairly trivial to do; if you are on a system with a package manager install through that (apt, dnf, yum, brew, chocolately, etc.). Otherwise, visit the SDL2 page and download and install manually.

When your parser file is complete, generate the parser code with:

```
bison -e zoomjoystrong.y
```

This will create zoomjoystrong.tab.c and .h files.

Then, create your lexer code. Generate the lexer with

```
flex zoomjoystrong.lex
```

This will generate a lex.yy.c file.

Then, compile it all together with

```
clang -o zjs zoomejoystrong.c lex.yy.c zoomjoystrong.tab.c -lSDL2 -lm
```

This will output the executable file zjs.

This program will NOT run remotely on EOS, so you need to either be in EOS or install the libraries needed on your own machine.

Rubric

Criteria	5 Points	3 Points	0 Points
Compilation	Compiles with no errors or warnings	Compiles with warnings	Doesn't compile. Wastes my time. User wants my ghost to haunt them for eternity.
Style Guide	Perfectly adheres to style guide	Minor style guide mistakes	Programmer is an anarchist and hates Mr. W
Error Handling	Gracefully handles errors (i.e. tells the user when a syntax error occurs without crashing). Also applies to letting the user know when an invalid value has been passed (400 for a RGB value??? I don't think so...)	Handles most errors correctly.	"Error handling? Just don't let stupid people my code."
On time	Submitted on time, before due date	Within a day late	"Seriously, Woodring doesn't have anything to do exam week except grade anyway."