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CS 122L-1

Lab 8: Matrix Arty

9 April 2018

**Task Description**

For this lab we will be tasked with creating an image out of characters. This image will be within a 25x50 matrix. The matrix can also be any combination of lengths, so long that there are twice as many columns as rows so that it appears square. We will be using loops to change the matrix so that a picture is created. After the image is drawn, we will be using the dlmwrite function to output this image to a text file.

**Learning Objectives**

The purpose of this lab is to get us familiar with loops, outputting data to a file, and matrices. The loops that we will be using are for loops. For loops provide an easy way to iterate through a set range of numbers. This will allow us to iterate through the matrix with ease and change the value stored within the matrix to 1. The dlmwrite function will allow us to easily output a matrix to a text file. By completing this lab, we will be learning more about matrices and how to access/change the data within a matrix.

**Approach**

For this lab we must first decide what we want to draw. We decided on drawing a cactus as it is a simple drawing and is easily recognizable. For the actual drawing of the cactus there are a few constraints we must follow. These constraints are:

* Our matrix must be a minimum size of 25x50
* The matrix must appear to be square
* We must use loops to change the matrix
* Our shape cannot be a simple square or plus sign. It must involve at least four different
* Our shape will be outputted to a text file

Following these constraints, we begun drawing our cactus.

**Program Description**

Our program uses 5 nested for loops. We start off by creating the matrix using the zeros function in MATLab. This gave us a starting matrix of zeros to begin manipulating. Using the for loops, we created the main body. This was the easiest to do as we just needed to create a block in the middle of the matrix. Next, we started drawing the arms for the cactus. The arms are separated into two “pieces”. This was the easiest way for us to create the arms. Once drawn, we output the matrix into a file called ‘outFile.txt’ using a delimiter of ‘’. We didn’t want to use a delimiter as it cause the picture to look unrecognizable.

**Source Code**

matrix=zeros(25,50);

for xPos=21:29

for yPos = 1:25

matrix(yPos,xPos)=1;

end

end

for xPos=10:21

for yPos = 10:12

matrix(yPos,xPos)=1;

end

end

for xPos=10:15

for yPos = 5:9

matrix(yPos,xPos)=1;

end

end

for xPos=30:41

for yPos = 12:14

matrix(yPos,xPos)=1;

end

end

for xPos=35:41

for yPos = 7:11

matrix(yPos,xPos)=1;

end

end

dlmwrite('outFile.txt',m,'delimiter','');

**Code Execution Results**

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**Conclusions**

This lab proved to be quite simple. We had begun by overthinking it, but after drawing it out we were able to complete it with ease. This has shown us that drawing out problems can sometimes be the key to programming. We believe that the image came out quite nice. It is easily recognizable as a cactus. If we were to improve upon it, we might add more arms and make it bigger. But for a 25x50 matrix, the cactus is drawn quite nicely. It follows all constraints and is made up of 5 pieces/blocks. We prefer the cactus with a blank delimiter. It can be drawn with a space delimiter but can be a bit difficult to make out on smaller screens. This lab has improved our skills with for loops and nested for loops. Both of us did not know you could fill a matrix with zeros by using the zero function. This can prove useful in the future if we ever need a zero-filled matrix.