Ain Shams University
Faculty of Computer and Information Sciences
Data Strucutres Project

Title	Visualizing Pointer Operations
Description	It is very effective to use interactive visualizations in illustrating data structures. An interactive visualization of a linked-list, for example, would allow the students to see how insertions and deletions are handled in a linked-list. Interactive means that the student should be able to insert and delete arbitrary values in the data structure, and see a step-by-step animation of how the algorithms are executed. The student should be given a control toolbar that allows for stepping forward, backward, controlling the animation speed, undo, redo, and most important controlling the display parameters like font size, color, and line width. I have tried to use several such visualization tools in this course, but the problem was always that you couldn't see the visualization clearly on the data-show, because the fonts and line widths were small. Try the visualizations on: http://algoviz.org/catalog/entry/932 , http://www.cs.usfca.edu/~galles/visualization/StackLL.html **The goal of this project is to develop an interactive Javascript program that illustrates the pointer operations: new, delete, shallow copying, deep copying, and dangling pointers (any other operations?). The program should show a nice piece of C++ code covering all these operations, and trace it by sketching the memory parts (stack and heap), and illustrate the changes that happen to them step by step.** Your program will hopefully be used as an illustration tool in the DS course in the coming years. The choice of Javascript is because of it portability. You program will run on any Javascript enabled browser.
Group size	3 – 4 members.
Duration	4 weeks.
Deliverables	1- A Javascript program doing the specified task. 2- A short (1 page) user manual.
Bonus extensions	- Additionally illustrate function calling, parameter passing (by value, by reference), and the call-stack.
Mentor	Dr. Mahmoud Attia Sakr.
Notes	In order to implement this Plugin you'll need to self study HTML (easy) and Javascript (moderate). Here is one example of writing a BST class in Javascript: https://gist.github.com/821973. And here is a tutorial of plotting drawings and graphics in Javascript: http://home.cogeco.ca/~ve3ll/jstutorg.htm Google has plenty of other tutorials that can support in learning Javascript. My advice is to start directly writing code while you learn. Don't waste long

	time reading books without writing code.