Assignment Zero: C++ Warmup

CS314 Operating Systems

Write a program in C++ that implements a smart memory manager for a graph that has no memory leaks.

Assemble a 10x10 grid of nodes connected by edges. Use a C++ class or struct to represent a node. Use C++ pointers to represent an edge. Edges are bidirectional so you will need two pointers (one from node A to node B and one from node B to node A) to reperesent an edge.

A node will have two (corner), three (grid edge, non-corner), or four edges (non-corner, non-grid edge) depending on its location in the grid.

Delete a random node. If the deletion results in a node that has no edges going to it, then delete that node as welll. For example if the node below and to the right of the upper left corner node of the grid have been deleted, then the upper left corner node of the grid has no edges and should be deleted.

The program terminates when there are no more nodes to delete.

NOTE: You must use the new operator to construct and assemble nodes in the grid and you must use the delete operator to eliminate nodes in the grid.

NOTE: You can read about memory leak detection schemes here -
> https://gcc.gnu.org/onlinedocs/libstdc++/manual/debug.html

NOTE: I'll be using valgrind to check for memory leaks with this command:

```
valgrind --leak-check=yes ./assignment0
```

DELIVERABLES (Please follow these directions precisely… it saves me a lot of time when I grade your assignment):

Upload to elearn the following:

- An ELECTRONIC document describing how to run the program you created. Call this document README.TXT.
- These files should be placed in a directory called "<username>assignment0".
- Use the tar command to place all the files in a single file called "<username>assignment0.tar". Assuming you are in the directory "<username>assignment0" do the following:

- Goto the parent directory: `cd ..`
- tar the files: `tar -cvf <username>project0.tar ./<username>assignment0`
- Verify the files have been placed in a tar file: `tar -tvf <username>assignment0.tar`
- Compress the files using gzip: `gzip <username> assignment0.tar`
- Verify that the gzipped file exists: `ls <username> assignment0.tar.gz`

- Here's a screen snapshot (just replace assignment0 with project1) of these commands: