MASS C++ Update and Benchmarking

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OVERVIEW
MASS is a distributed simulation software library that enables users to develop massive scale data and computation intensive simulations. MASS runs these simulations on a multi-node array of machines to massively enhance performance over single machine operation.

OBJECTIVE
- Bring MASS C++ in line with MASS Java by implementing functionality added to MASS Java.
- Begin Benchmarking MASS C++ to test performance.
- Update and enhance MASS C++ documentation for future developers.

WHAT I HAVE DONE
- Feature Upgrade
  - doAll method to simplify interface for application developer.
  - Method that combines all agent management calls into a single call.
  - Neighbor functionality allows users to define which places each place communicates with.
  - Built in neighborhood definitions that can be set for 2D and 3D.
  - Virtual methods for custom functionality when an Agent is created or migrates.

- Benchmarking
  - MASS C++ was not functioning on the Hermes machines due to an OS upgrade, I worked to resolve this issue to enable future development to occur.

WHAT I HAVE LEARNED
- Extensive debugging skills in distributed and networked systems.
- How to dig into an extensive code base and add functionality.
- How to adapt my work to feedback given by stakeholders.
- How to create and maintain documentation for software libraries.

RELATED COURSEWORK
- CSS 434 - Distributed systems principles, multithreaded system operations.
- CSS 342/343 - Problem solving skills
- CSS 301 - Documentation
- CSS 430 - Multithreading
- CSS 432 - Networking in systems

TOOLS AND LANGUAGES
- C++ | MASS C++ Development
- Visual Studio Code | Dev Environment
- MobaXterm | SSH & SFTP terminal
- Bitbucket + Git | Source control

DOCUMENTATION
- Added full in code documentation to MASS C++.
- Created Online documentation website (Doxygen)
- Updated Developers manual.

SPECIAL THANKS
Thank you to the UWB Distributed Systems Lab, led by Dr. Fukuda. I really enjoyed working with everyone and getting support as needed.

Thank you to Dr. Munehiro Fukuda for guiding me throughout my work.