**Blue Waters Petascale Semester Curriculum v1.0**

**Unit 9: Optimization**

**Lesson 3: Cache Memory Efficiency**

**Sample Assessment**

*Developed by* *Paul F. Hemler for the Shodor Education Foundation, Inc.*



*Except where otherwise noted, this work by The Shodor Education Foundation, Inc. is licensed under CC BY-SA 4.0. To view a copy of this license, visit*[*https://creativecommons.org/licenses/by-sa/4.0*](https://creativecommons.org/licenses/by-sa/4.0)

*Browse and search the full curriculum at*[*http://shodor.org/petascale/materials/semester-curriculum*](http://shodor.org/petascale/materials/semester-curriculum)

*We welcome your improvements! You can submit your proposed changes to this material and the rest of the curriculum in our GitHub repository at*[*https://github.com/shodor-education/petascale-semester-curriculum*](https://github.com/shodor-education/petascale-semester-curriculum)

*We want to hear from you! Please let us know your experiences using this material by sending email to* [*petascale@shodor.org*](mailto:petascale@shodor.org)

1. What technology makes accessing the cache faster than accessing the main memory?
2. What are the two principles the cache utilizes?
3. Why is the cache much smaller than main memory?
4. What happens when the cache is full and another memory word must be accessed?
5. What happens when a memory word presently stored in cache is changed by the program?