This README file explains how to use the TicketService Application

---- BUILD AND RUN APPLICATION ON THE COMMAND LINE ----

- Firstly, download and set up Maven (explained in APPENDIX).
- Go to the TicketService location in the command line
  C:\{classpath*} \TicketService>
- TicketService should have the maven's pom file. The pom file has all the dependencies and build configurations set up. Just run the following command
  C:\{classpath*} \TicketService>mvn clean install
- The above command builds the application successfully and creates target directory. In the target directory an executable jar file with name "TicketService-0.0.1" is created.
- To execute the jar file, give the following command along with command line variable {number of customer threads to run}
  C:\{classpath*} \TicketService\target>java -jar TicketService-0.0.1.jar 10
- The above command creates 10 customer threads to serve the customers

---- BUILD AND RUN JUNIT TEST CASES ON THE COMMAND LINE ----

- Go to the TicketService location in the command line
  C:\{classpath*} \TicketService>
- To build the Junit give the following commands
  C:\{classpath*} \TicketService>mvn test
- Run the test class, in this project TicketServiceTest is the test class
  C:\{classpath*} \TicketService>mvn -Dtest=TicketServiceTest test
- All the test cases should run successfully.

--- ASSUMPTIONS MADE ---

- To find and hold best seats, the minLevel and maxLevel parameters are integer values representing the Venue Levels.
  Orchestra – 1, Main – 2, BalconyOne – 3, BalconyTwo – 4
- SeatHold object returned, will expire in 60 seconds if it isn't reserved.
- Cleaning up of expired seats held is done by a daemon thread for every 20 seconds.
- Reserve seats by a specific customer can be done only after that customer holds the seats.
- All locks are acquired fairly by threads. If there are 10 threads running, thread-1 got the service, the next service is granted only after serving remaining 9 threads.

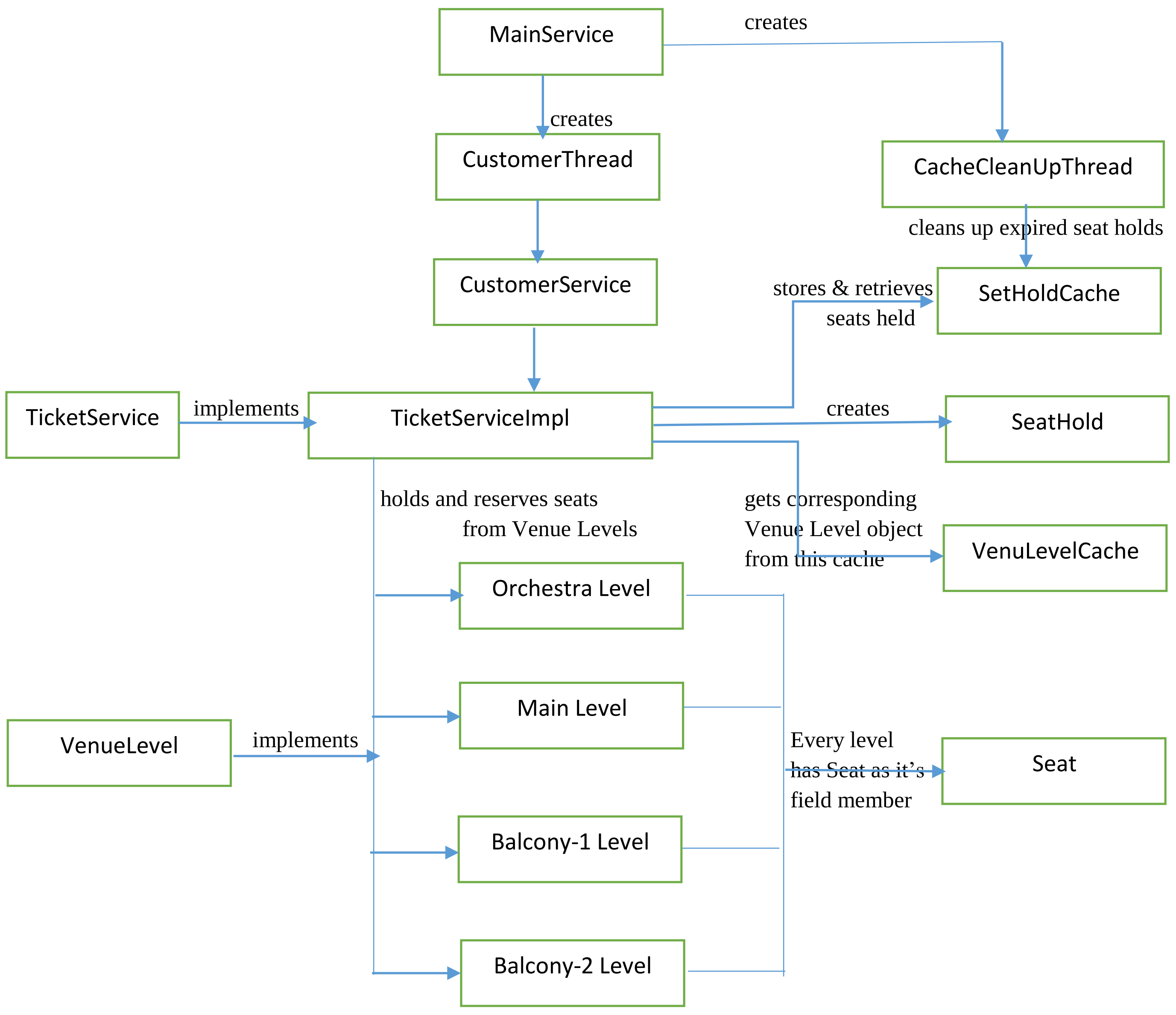
--- APPLICATION'S CLASSES SUMMARY ---

- **MainService:** The starting point of execution with main method. It creates fixed number of customer threads and CacheCleanUpThread.
- **CustomerThread:** An instance of the customer.
- **CustomerService:** It provides options to every customer thread to view, hold and reserve seats.
- **TicketServiceImpl:** An implementation of TicketService, serves the available ticket count, holds and reserves tickets.
- **VenueLevels: Orchestra, Main, BalconyOne, BalconyTwo** are model classes representing the venue levels and provides seats count, seats to be held and reserved.
- **SeatHold:** model object representing held seats by a particular customer. It has a field to expire the seats held.
- **Seat:** model object to uniquely represent a seat in a particular Venue Level.
- **CacheCleanUpThread:** Daemon thread cleans up expired held seats for every 20 seconds.
- **SeatHoldCache:** Maintains record of the cached SeatHolds.
- **VenueLevelCache:** Maintains details about VenueLevels.

--- CONCURRENCY PROBLEMS AND LOCKS ---

- It is a customer input driven application. Every customer thread has to provide input from console/command prompt about the service expected, here concurrent access to common resource namely Standard Input (stdin) may lead to data ambiguity, hence implemented lock on stdin, where only one thread has hold on stdin. No lock is used on stdout, there can be scrambled display, which is an expected behavior here. Using locks on stdout may affect the performance, hence voted against it.
- Every customer thread access common resources like Venue Levels and SeatHoldCache for data manipulation, to prevent data inconsistency, locks are used.

--- EXECUTION FLOW SUMMARY ---



--- APPENDIX ---

- Download latest Maven version from this link, https://maven.apache.org/download.cgi.
- Extract files and place it any classpath, copy the classpath and include it to system environment variables.