Advanced Programming: Assessed Exercise 1 **26 February 2019**

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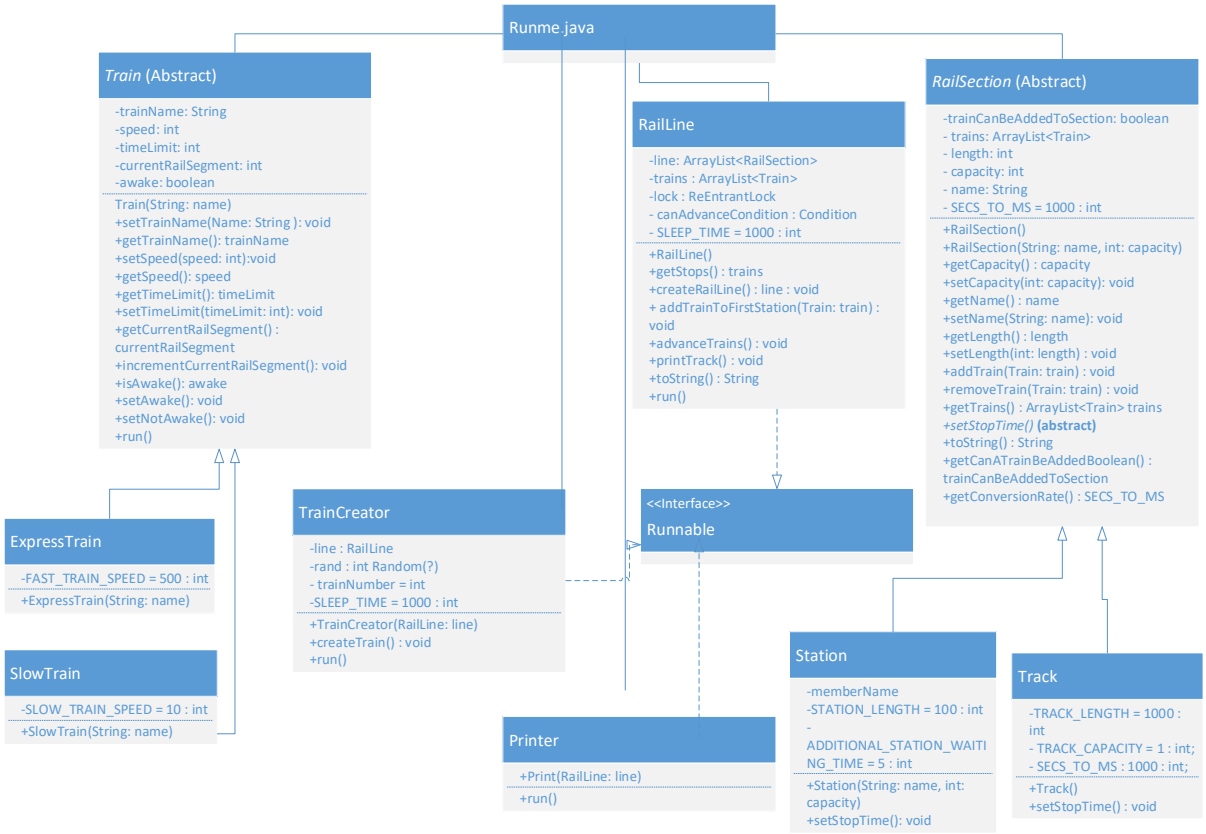
My program consists of nine class plus an additional Runme class that executes the program. It can be illustrated by the following UML Diagram.



Both ExpressTrain and SlowTrain classes inherit from the abstract Train class. Express and slow trains differ in speed; therefore, each class has a constant to reflect this.

The train thread implements the Runnable interface. Although an instance of this class cannot be instantiated as the class itself is abstract, the subclasses will inherit the run method. The aim of this method is to force a train thread to sleep for the allotted time on a rail section that was calculated to by the setStopTime() method in the track/station subclasses.

Similarly, both Station and Track classes inherit from the abstract RailSection class. The different lengths of each rail section are reflected by the constants, TRACK_LENGTH/STATION_LENGTH in either subclass. For a track segment, the capacity is fixed as a constant. Meanwhile, a station's capacity is determined by the value that is passed to the constructor. The Rail Section has a constant, SECS_TO_MS, that both subclasses invoke to be able to convert stop times into milliseconds to get the correct value for a train's stop time on a rail section.

The TrainCreator class is responsible for creating trains indefinitely. The printer class is responsible for printing the status of the rail line indefinitely and the RailLine class is responsible for advancing trains indefinitely. These three classes implement runnable and a thread object is created per class. The thread object created from the TrainCreator instance will try and place a train on the first station. If there is not enough room, the thread will go into the waiting state. This allows the thread created from the Rail Line class to invoke the

advanceTrains method, and will try and move a train along the railway line and update the shared RailLine object. When successful, the thread will call the signalAll method to enable the thread from the TrainCreator class to finish adding a new train to the first station.