Advanced Programming: Assessed Exercise 1 **05 March 2019**
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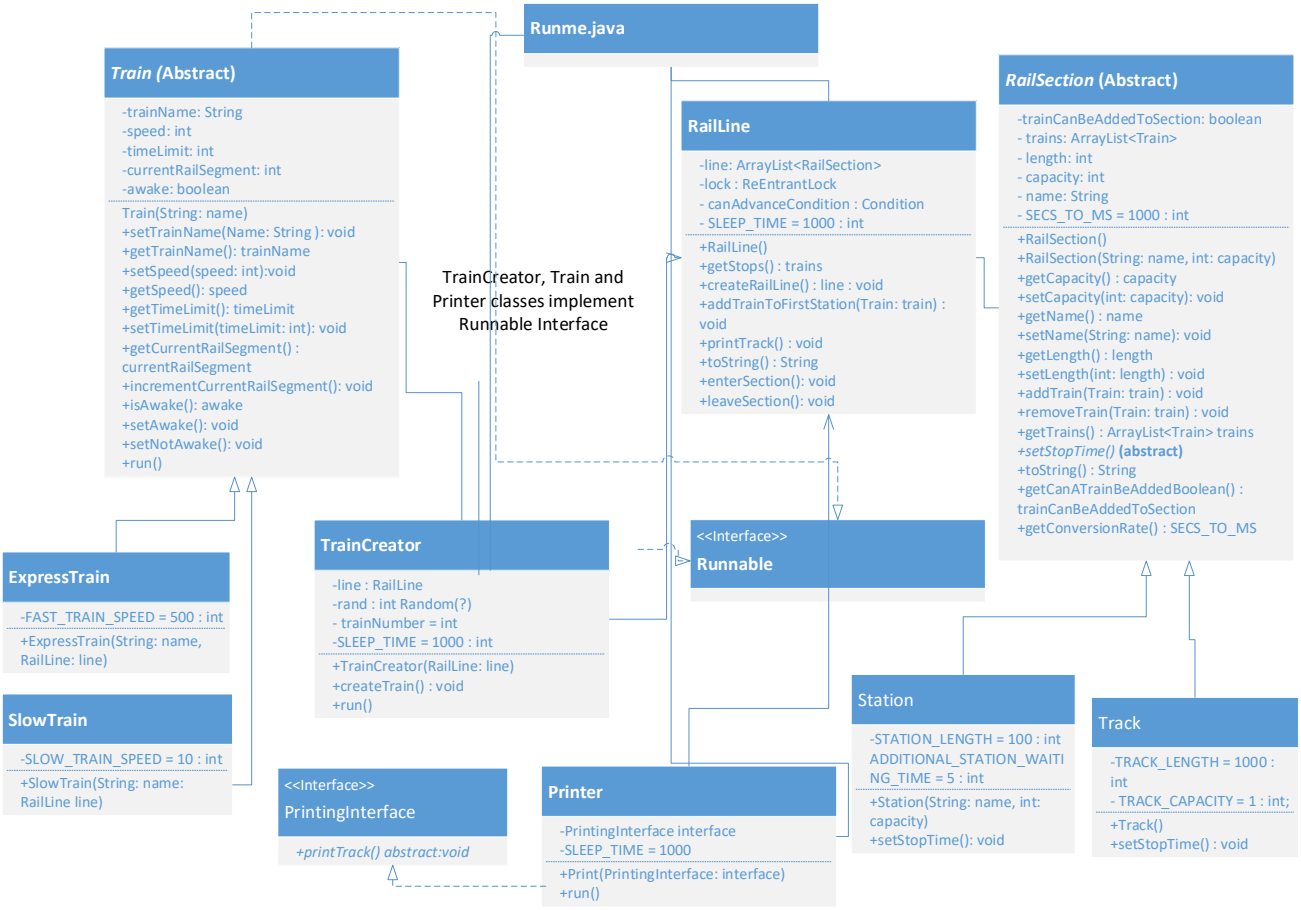
My program consists of ten classes plus an additional "Runme" class that starts the program. It can be illustrated by the following UML Diagram.



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

The train class 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 and a thread object of each subclass will be created. The aim of this method is to force a train thread to sleep for an allotted time on a rail section that was calculated using the setStopTime() method in the track/station subclasses. Once it awakens, it'll call the enterSection() and leaveSection() methods in the Rail Line class. This determines whether a train can move to the next section. If not possible, it'll go into a blocked state in the enterSection() method.

The "Station" and "Track" classes will inherit from the abstract "RailSection" class. The different lengths of each rail section are reflected by the constants 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 class has a constant, SECS_TO_MS, that both subclasses invoke to convert stop times into milliseconds and get the correct time that a train occupies a rail section.

The "TrainCreator" class is responsible for creating trains indefinitely, while the "Printer" class is responsible for printing the status of the rail line indefinitely. These classes implement Runnable and a thread object is created per class. The thread object created from the "TrainCreator" instance will

place a train on the first station. If there is not enough room, the thread will go into the waiting state, until it is signalled once a train has vacated the station, and finish adding to the first station.