**Introduction:**

“lunarMining” is simulation of a lunar Helium-3 space mining operation. The simulation involves

1. Mining Sites: Lunar sites where Helium-3 is extracted. There are infinite number of mining sites.
2. Mining Trucks: Trucks which extract Helium-3 at the mining site and transport and deliver the extracted Helium-3 to unloading stations. There are limited number of trucks.
3. Unload Stations: Stations where truck deliver the Helium-3. There are limited number of unload stations.

The “lunarMining” software runs a scenario of operation of the space mining operation.

**Description:**

By default, “lunarMining” software runs a scenario for 72 hours, as per requirement, of operation. The scenario can be run for user specified number of mining trucks and user specified number of unload stations.

A mining truck may spend anywhere between 1 to 5 hours for mining Helium-3. The amount of time spent for mining can vary at every visit by the truck to the mining site. The truck needs 30 minutes of travel time, in either direction, between the mining site and unload station. It takes 5 minutes to unload the Helium-3 at the unload station. Only one truck at a time can unload the Helium-3 at the unload station. A truck upon arrival at the unload stations has to wait if all the stations are occupied by other trucks; in this case, the truck is assigned to the station which has least wait time. Once assigned to a station the truck must stay at the assigned station.

**Software Details:**

“lunarMining” software is written in C++ using Apache NetBeans IDE. It consists of a main program and two classes (truck and unloadStation). It can be executed either in NetBeans IDE or interactively on a windows platform. The user needs to specify number of trucks and number unload stations to be simulated in the scenario. The software runs in a non-real-time mode with 1 minute time step simulating 4320 minutes (72 hours) of mining operation.

The ”lunarMining” software is delivered as Windows “Compressed (zipped) Folder”. User needs to install this folder at a convenient location. A folder “lunarMining” will be created which will contain all the files (code, executable and configuration) needed for using the software.

The truck class is the important class in this software. It simulates operation in time of a truck object. The truck object is controlled by the state change process shown in Figure 1 (see attached powerpoint).

**Software Execution:**

Executing in NetBeans IDE:

When executing with the NetBeans IDE the software asks for user input for number of trucks and number stations. Once these are provided the software will run the 72 hour scenario and write out a summary report for every truck in the simulation.

Executing in Windows Environment:

When executing within Windows change directory to: \dist\Release\Cygwin-Windows under the folder lunarMining where it is installed. Then issue a command:

lunarMining <truckCount> <stationCount>

The two arguments <truckCount and <stationCount> are not necessary; the software will ask for these values if they are not provided on the command line.

**Scenario Results:**

The software generates, for each truck, a simple report at the end of the scenario execution. A sample report is shown here:

