ASSIGNMENT 2 REPORT

Exploring Mars

FACULTY OF COMPUTING AND INFORAMTICS

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SUNBECT CODE: **TCP0101**
LECTURE SECTION: **TC1V** **TUTORIAL SECTION: TT4V**
TRIMESTER INFO: **TRIMISTER 2 20/21**
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1 INTRODUCTION

1.1 General Briefing

The game Mars Rover typically involves the player controlling a rover that has just landed in mars. The mission of the rover is to collect all the gold on mars as was specified by the NASA headquarters on Earth, for research purposes. However, as the rover lands on planet MARS a huge dust storm strikes and as a consequence, the rover now can only view few meters in front of it making the mission even more difficult as there might be many challenges that were set by aliens to keep away humans from looting the resources. Nevertheless, there are supplies sent by NASA to help the rover to successfully accomplish the mission.

1.2 Game Challenges

There might be traps on Mars that will demolish the rover. Moreover, there are hills that block the rover from moving. Adding to that, there are rocks that may damage the rover. Lastly but not least, there might be black holes that throws the rover in any random place on planet Mars.

1.3 Collecting Gold

The rover will now have to carefully examine the gold position and get to it without falling into the trap and before the rover fuel runs off! Also, the player has to be careful the rover doesn't hit a rock or else, the rover will get damaged and its health will reduce. Moreover, watch out as there might be backup tools to repair the rover offered by NASA, these tools can be dropped

at any place on MARS, and the rover will have to look and go for it if it is running low in health or fuel.

1.4 Rover Control

The rover will receive commands from the player who will be in the control room to navigate the rover. The commands will be in the form of characters such as ‘M’ for move, ‘L’ for left & ‘R’ for right. The player has to make wise movements to collect all the golds, considering the rover fuel and health. The more movements the more fuel is consumed! Adding to that, the more golds collected with the least movements, the better the score will be. Once all of the gold is collected, the rover mission is completed and would have to head back to planet EARTH. After the mission has completed (success/failure), the player will have a chance to view the MARS map before exiting the game or playing again.

1.5 User Guide

Last but not the least, the user can briefly get introduced to the content of the game by choosing “help” option in the menu section, where the user will be introduced about the mission and its main objective. Also, the user will get to know the obstacles that the rover might face during the mission such as, hitting a rock damages the rover or falling into aliens’ trap will mean the mission has failed.

2 USER MANUAL/INSTRUCTIONS

2.1 Main Menu

As an additional feature, we have implemented a main menu to the game which allows the user to pick between 3 of the given options and for the user to do this, they would just have to press on the respective key to their desired option instead of typing it and hitting the enter button. The first option "P" will initiate the game for the user to start playing, the second option "Q" will shut down the game and the last option "?" will display to the user the instructions of the game.

2.2 How The Game Starts And What The Player's Objective Are

Upon hitting the "P" key, the player will be asked to enter the dimensions of the map as well as the amount of gold in which the user wants to collect (Note that there is validation to ensure that the user will input the correct information so that the game can function properly). The objective of the game as well as the only to win is to obtain all the gold without getting trapped or running out of health or fuel. The Map and style in which the game will have will be derived from the users input, so generally speaking the bigger the map and amount of gold, the more challenging it is for the player. The map that will be generated will also be filled with "?", which are hidden characters that can only be revealed in a row of 3 positions in which the rover is facing.

2.3 Game Play Guide

The player will be freely controlling the rover from the center of the map towards a specific destination by entering a command sequence in the form of a string without spaces, for example, the player will can input “MRLM”. The user has access of only four commands which are the M, L R and Q commands, any other command that the user inputs will be not be accepted thanks to the validation that has been implemented.

The “M” command will move the rover 1 space towards the direction in which it is facing. The “R” command will rotate the rover to the right, the “L” command will rotate the rover to the left and the “Q” command will immediately stop the game and will automatically make the player loose as a result of giving up.

2.4 Score System

The game has a score system which is based off of 3 key components; The gold collected, the amount of command sequences that were input and the number of commands in each sequence. Every time a player collects a gold, their score will be added up by 50. Each command sequence that the user inputs will deduct the total score by 5 and each command in the command sequence will subtract the total score by 1. This challenges the player to win the game with the least number of commands and command sequences in order to obtain a higher score. If the player were to win in the end of the game, they game will rate their performance based off of their total score. The range of the rating from lowest to highest of total score are average, amateur, smart and genius. The player will be given one of these ratings based on how many command sequences/commands that they have used.

2.5 Rover Health And Fuel

As an additional feature to the game, we have implemented a health and fuel bar to the rover, where the health bar will represent the condition of the vehicle while the fuel bar will represent how much further the rover can travel across marks. The rover will start the game with 100% Health however if the health were to reach 0% (meaning the vehicle is completely destroyed), the player will automatically lose the game. The health bar will decrease each time the rover was to cross over/land on a rock (information about the rock will be explained upon in the following section) whilst the fuel bar will decrease each time the command "M" is used. The only way for the rover to replenish its health and fuel is if it were to collect a fixer (information about the fixer will be explained upon in the following section).

2.6 Objects In The Game That Can Affect The Rover.

The hill will occupy that specific position in the map and it cannot be removed and it doesn't allow the rover to move over it if the rover were to try to go over the hill, the program will tell the user that the command given has failed to been executed.

The trap will automatically cause the player to lose the game if the rover were to somehow moved to the traps position. The game will stop and the player will be told that they have lost.

The rock will cause the rover to lose health if the rover were to move across/ land on the rock. The rock will stay in their specific location throughout the duration of the game and will not disappear if the rover moves across it.

The fixer will replenish the rover's fuel back to 100% and will increment the rover's heath by 1 point, if the rover were to move across/land on it. The fixer however, will not disappear if the rover moves across it, making it available for use as long as the game is on. However, it is not confirmed that a fixer will be available in the map every time the game runs.

The hole will cause the rover to be thrown into a random position in the map if the rover were to move across/land over it. No health or fuel will be lost as a result of the rover falling into the hole. (Note that there is validation to ensure that the rover will not get stuck after being thrown into a random position in the map.)

The Gold in the map is what the player will be trying to discover and obtain as it will be the only way for them to win the game. Each gold that the player obtains will not only contribute to getting closer to winning the game but will also add a score of 50 to the total score each.

2.7 What Happens If The Player Were To Win Or Lose

Once the player has successfully collected all the gold, the player will be congratulated by the game and would be asked if they would want to see the original map without any of the hidden objects.

After the map is revealed, the player will be asked if they want to play again whether they will enter the key respective to their choice.

If the player presses the "N" key, the game will shut down and if the player presses the "Y" key, the player will be taken back to the main menu.

You can refer to the sample run in the upcoming section for extra guide.

4 SAMPLE RUN

4.1 Main Menu

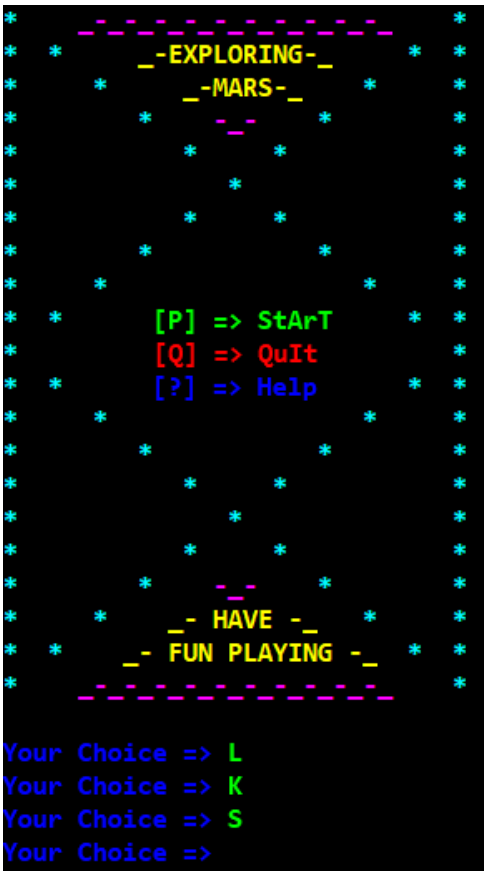


Fig 4.1 Shows the menu options and choice validation

4.2 Instructions

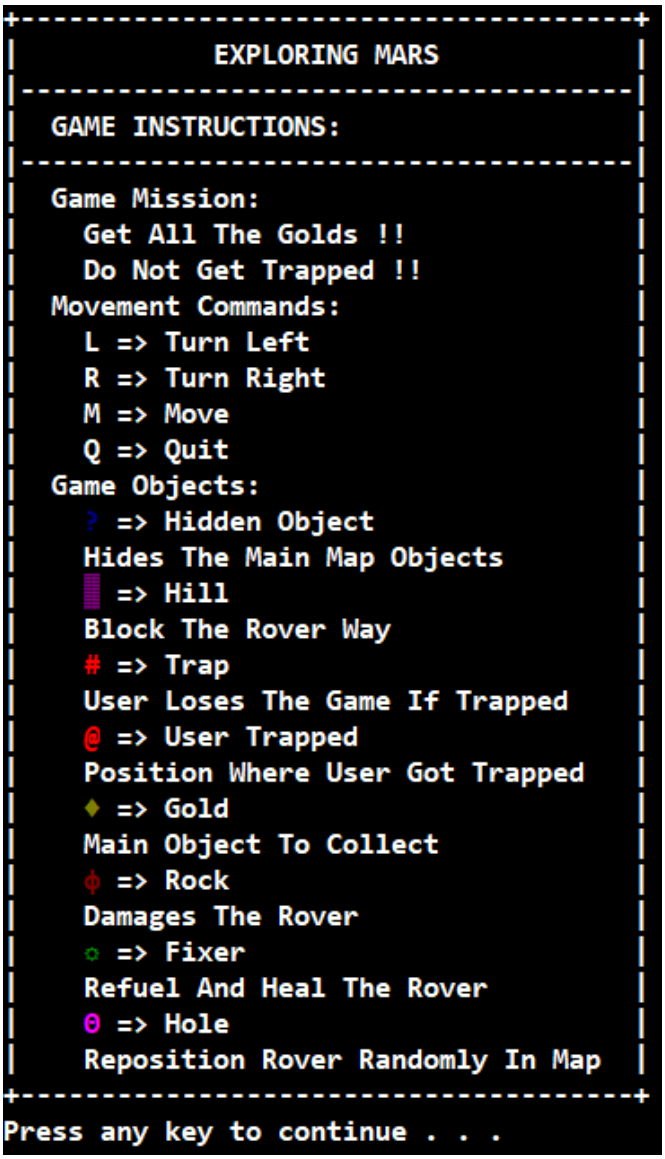


Fig 4.2 Shows the game instructions that will be displayed if player chooses option '?' from menu

4.3 Dimensions

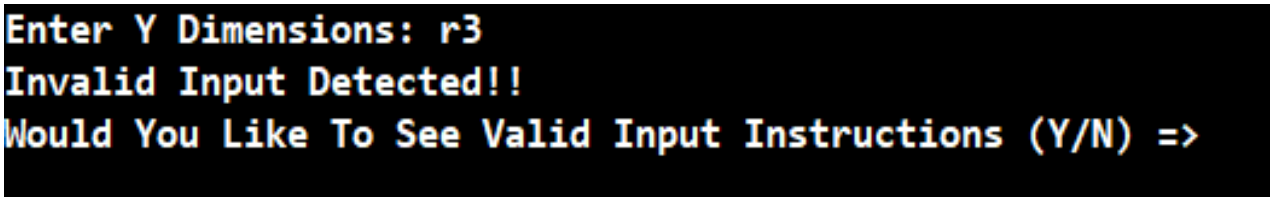


Fig 4.3 Shows the player prompted to enter Map Dimension Y and validated wrong data given

4.4 Valid Input Instructions

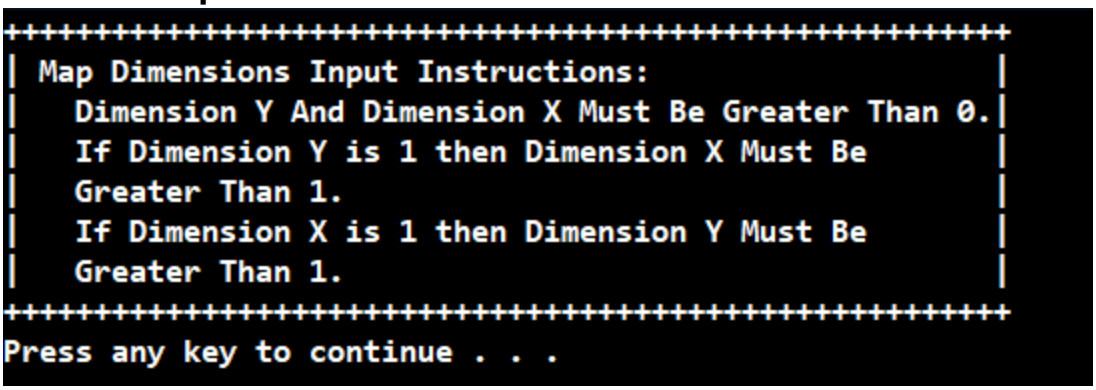


Fig 4.4 Shows the instructions to input valid Dimensions

4.5 Game Start

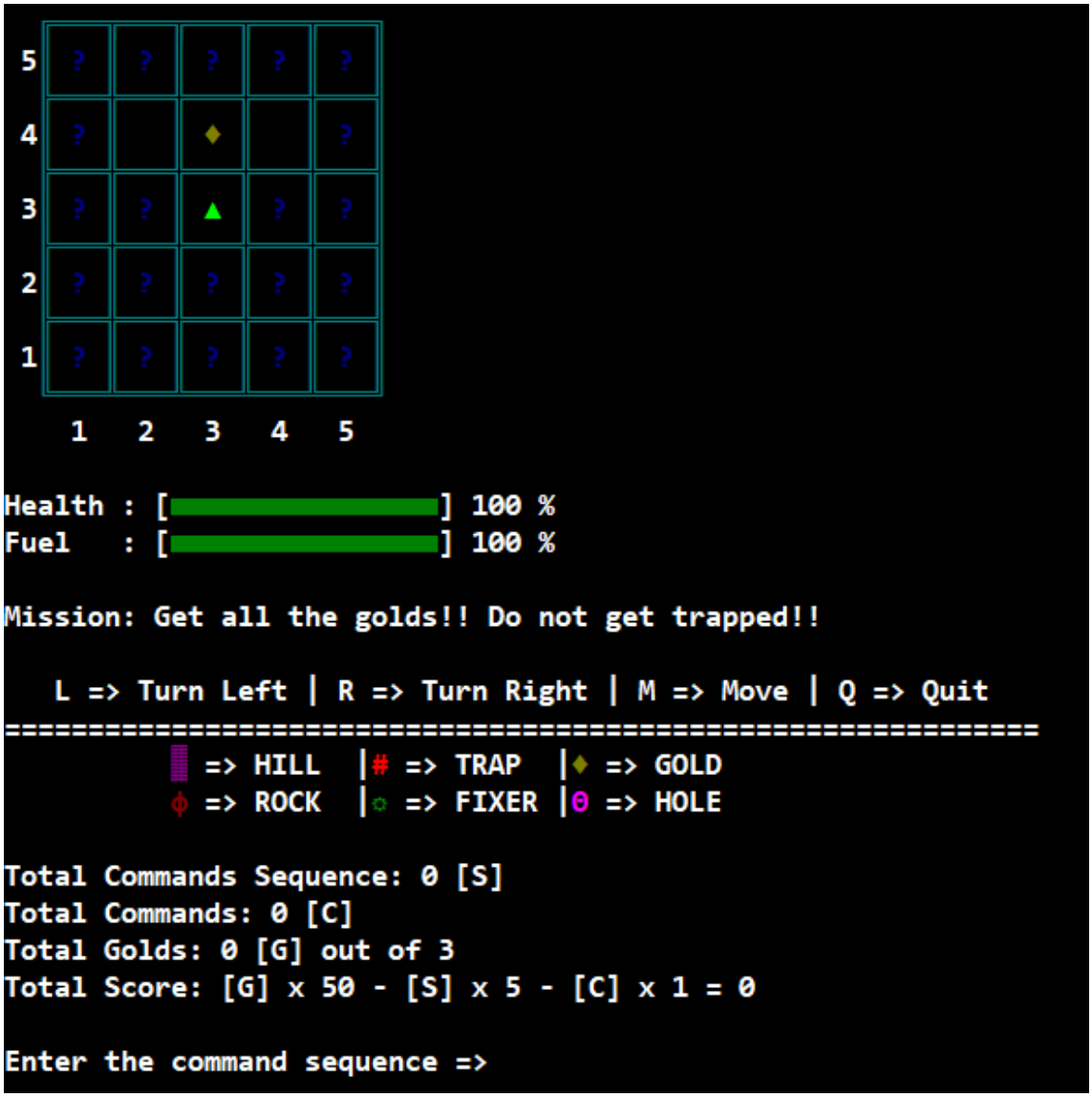


Fig 4.5 Shows a game run and how the map, instructions, score and prompt to enter the command

4.6 Command Execution

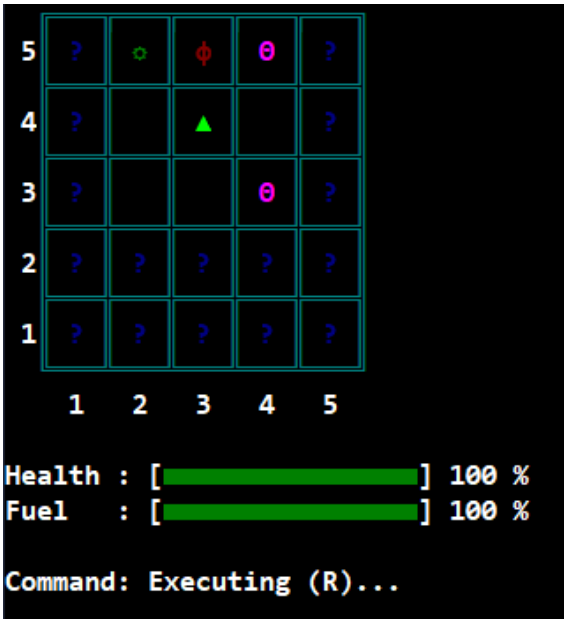


Fig4.6 Shows the command being executed

4.7 After Execution Map Display

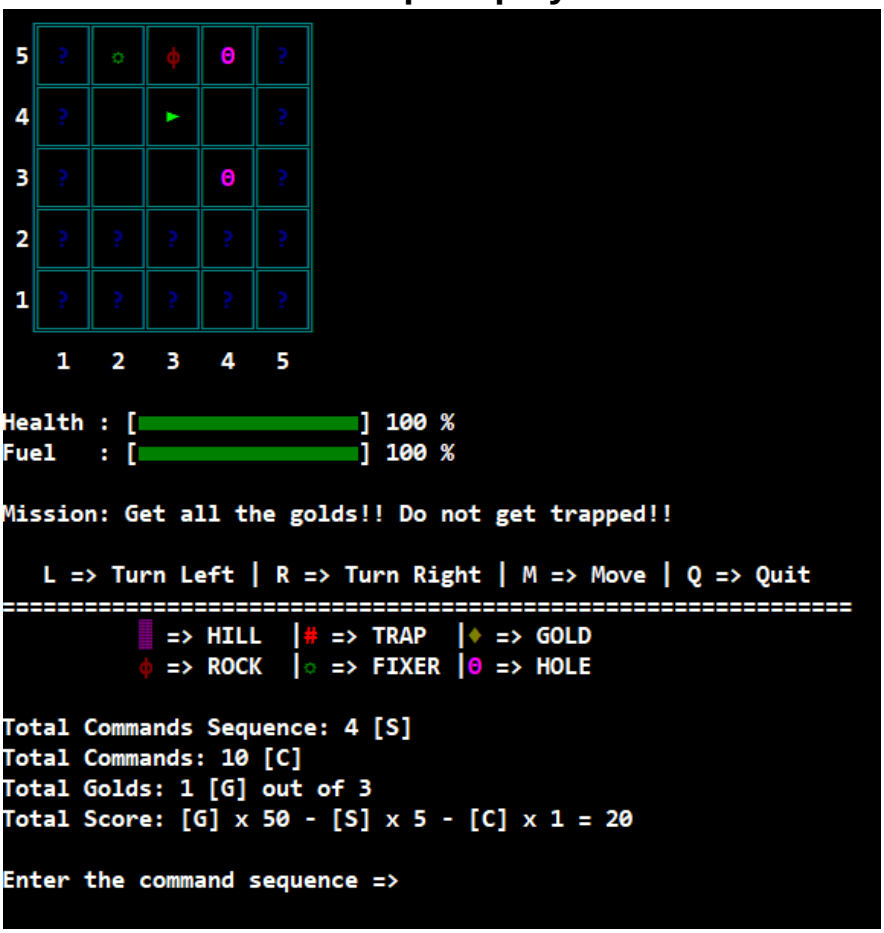


Fig 4.7 Shows the map and score changes after the command had been executed

4.8 Hill Object

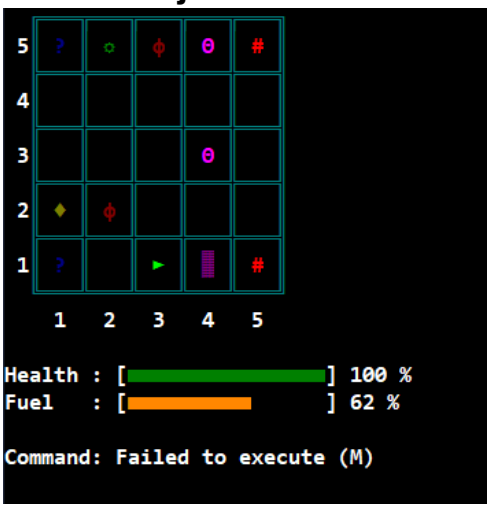


Fig 4.8 Shows the command execution failure Due to hill blocking rover from moving

4.9 Trap Object

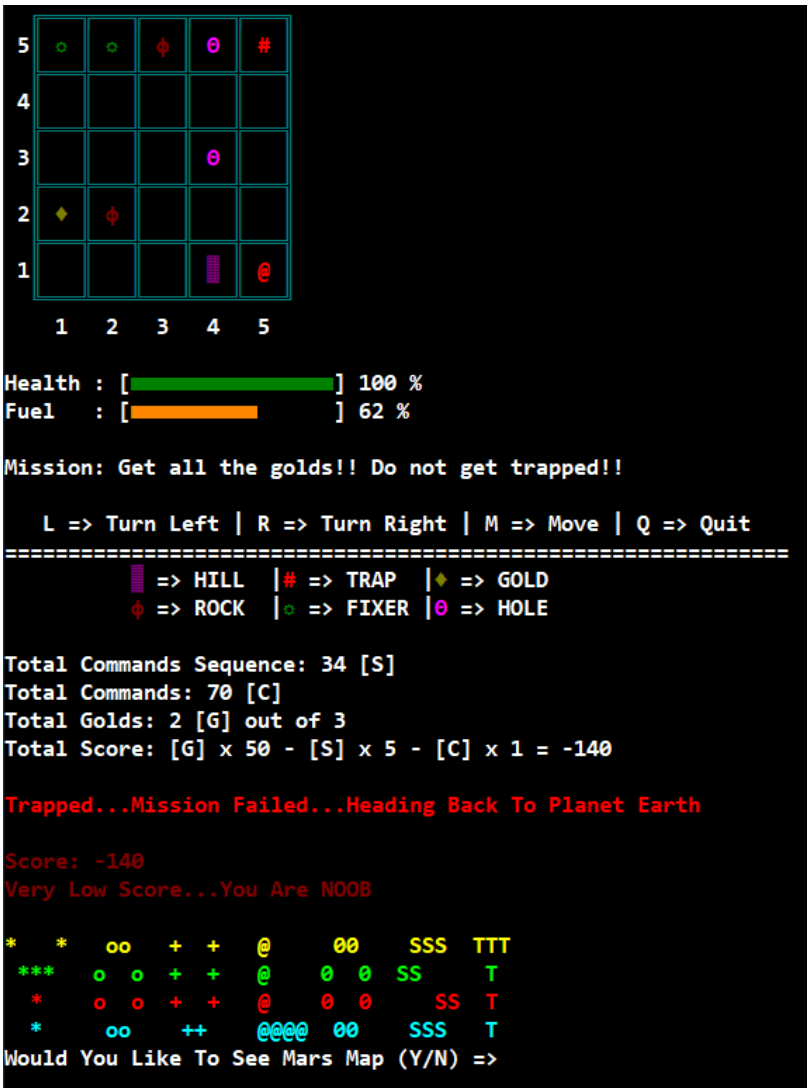


Fig 4.9 Shows the rover after Trapped and shows the score rating message with the losing message and trapped message then asks the user if he wants to show original map of planet Mars

4.10 Show Mars

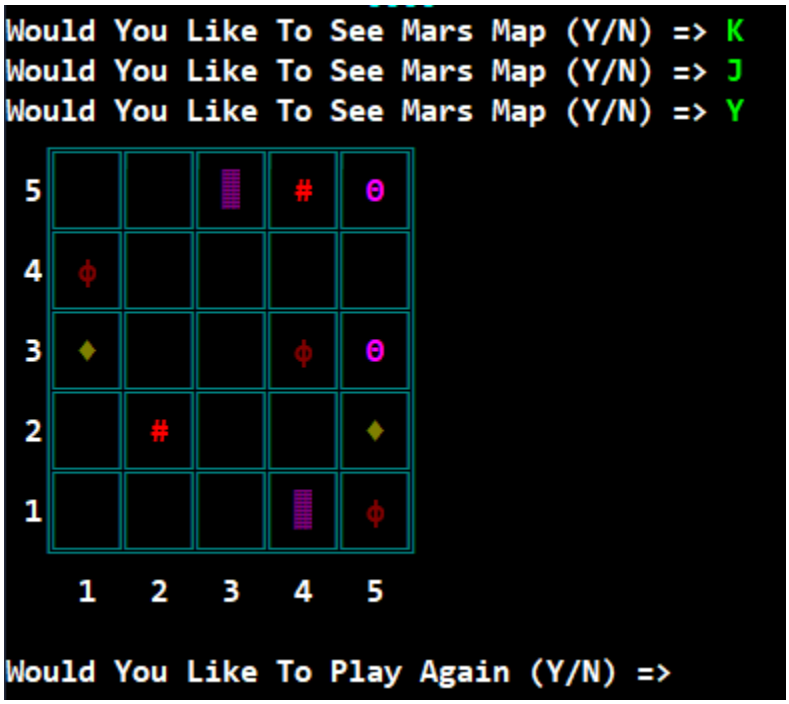
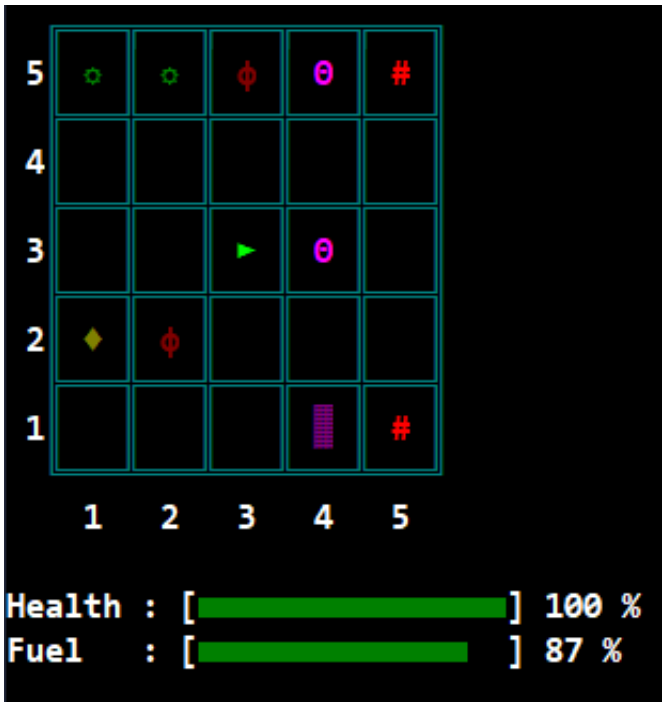


Fig 4.10 Shows the user input validated and shows the original mars map when user input 'Y'

4.11 Hole Object

Before



After

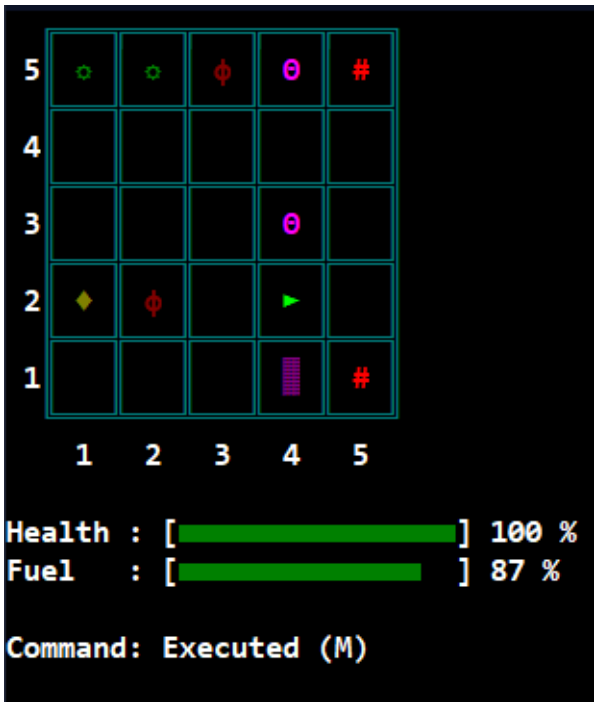
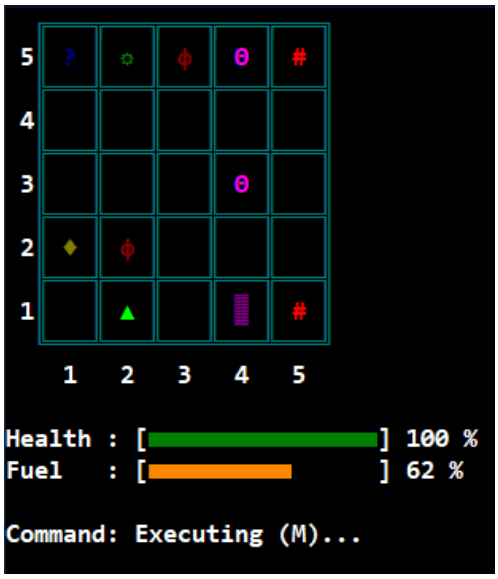


Fig 4.11 Shows the rover moved into random position after moving into a hole

4.12 Rock Object

Before



After

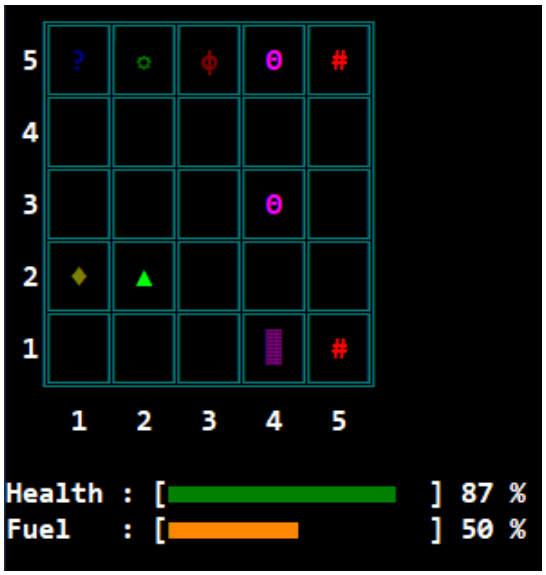
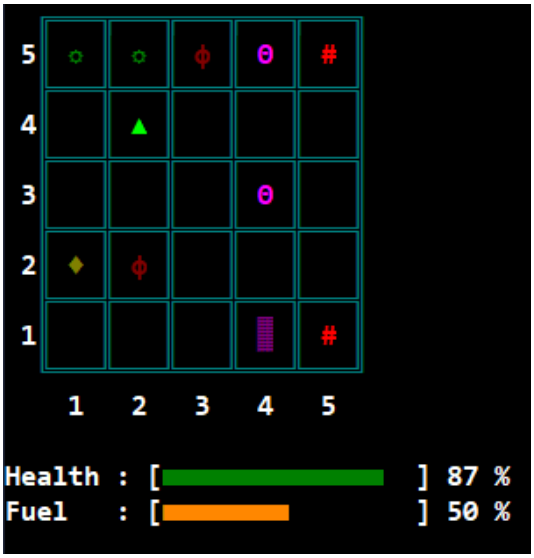


Fig 4.12 Shows what will happen to the health of the rover after it hits a rock object. The health of the rover will decrease.

4.13 Fixer Object

Before



After

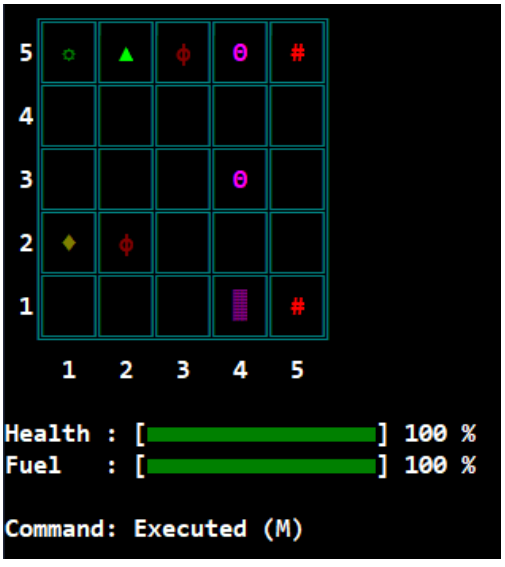


Fig 4.13 Shows what will happen to the rover when it steps on the fixer object. The fixer object will repair the rover & heal refuel it.

4.14 Boundary Check

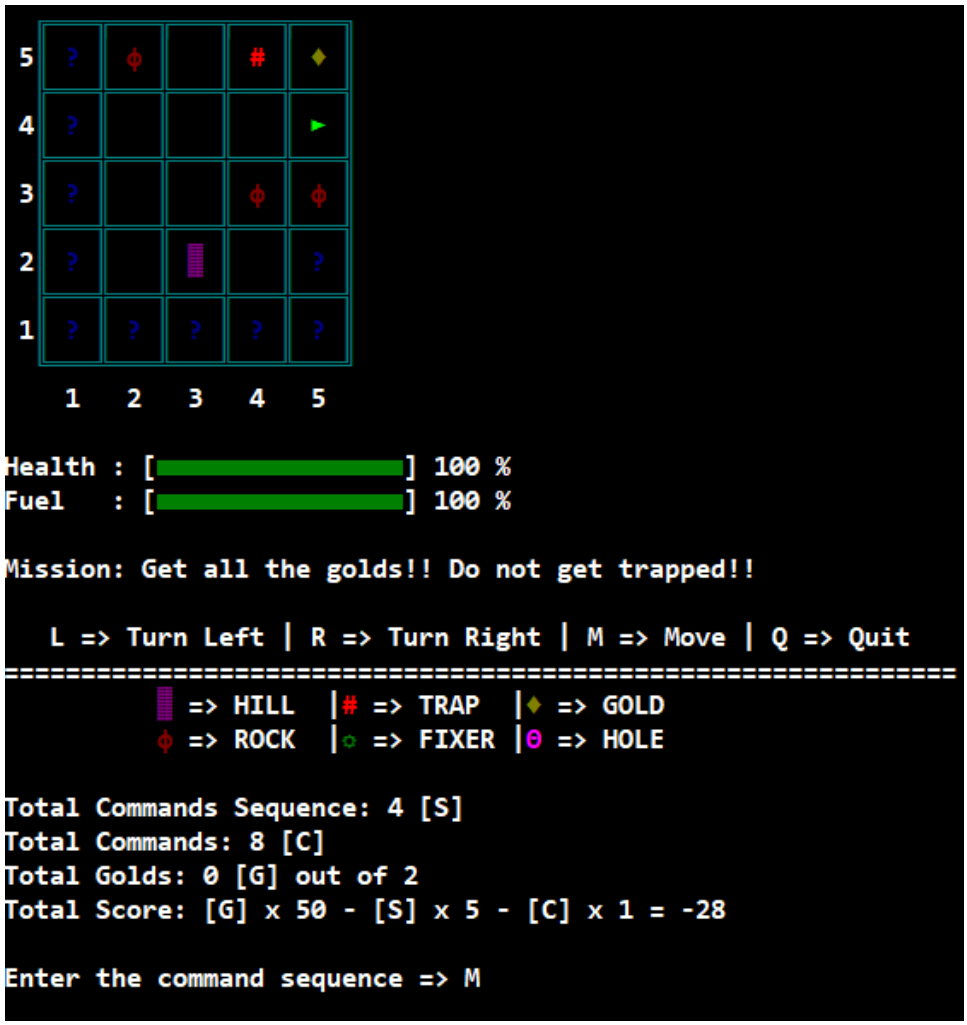


Fig 4.14.1 Shows player trying to move outside map boundaries

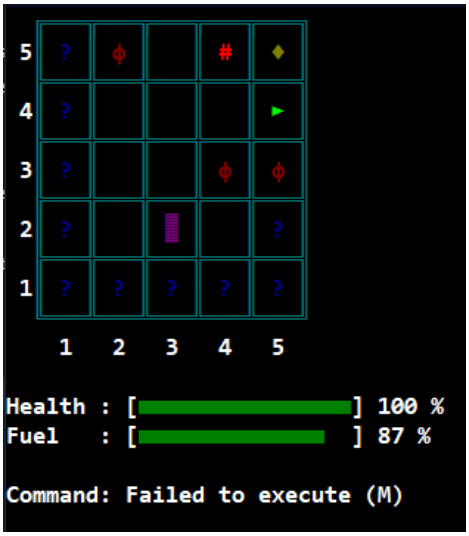


Fig4.14.2 Shows the command failure to execute as rover cannot go out of map boundaries

4.15 Unknown Command

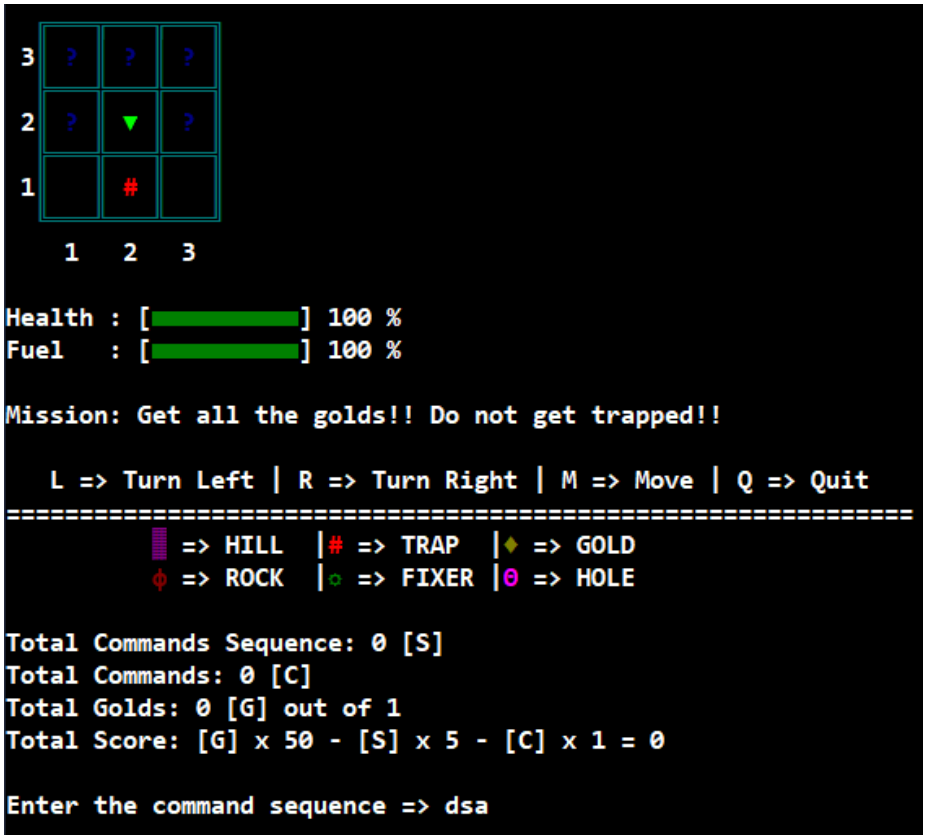


Fig 4.15.1 Shows the user giving command not listed in 'MRLQ'

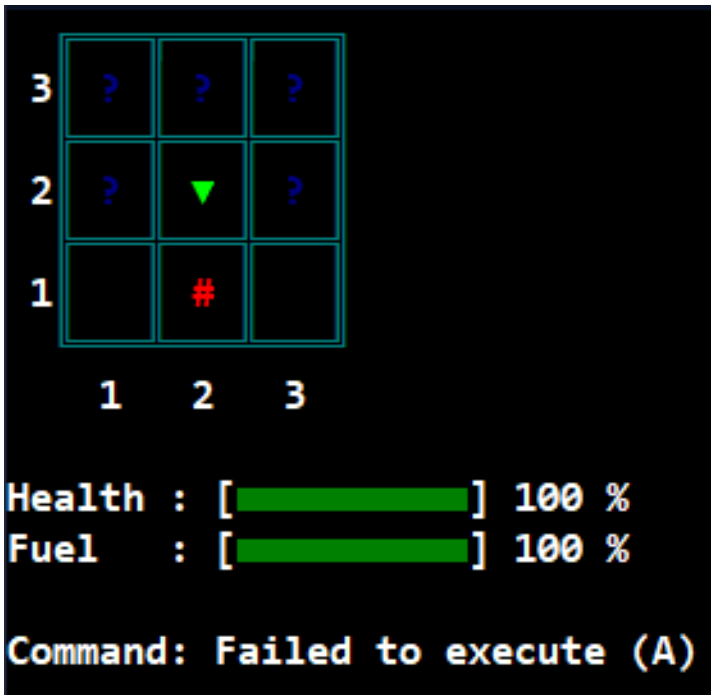


Fig 4.15.2 shows the rover not responding to the incorrect command and command execution failed will be displayed to the player

4.16 Run Out of Fuel

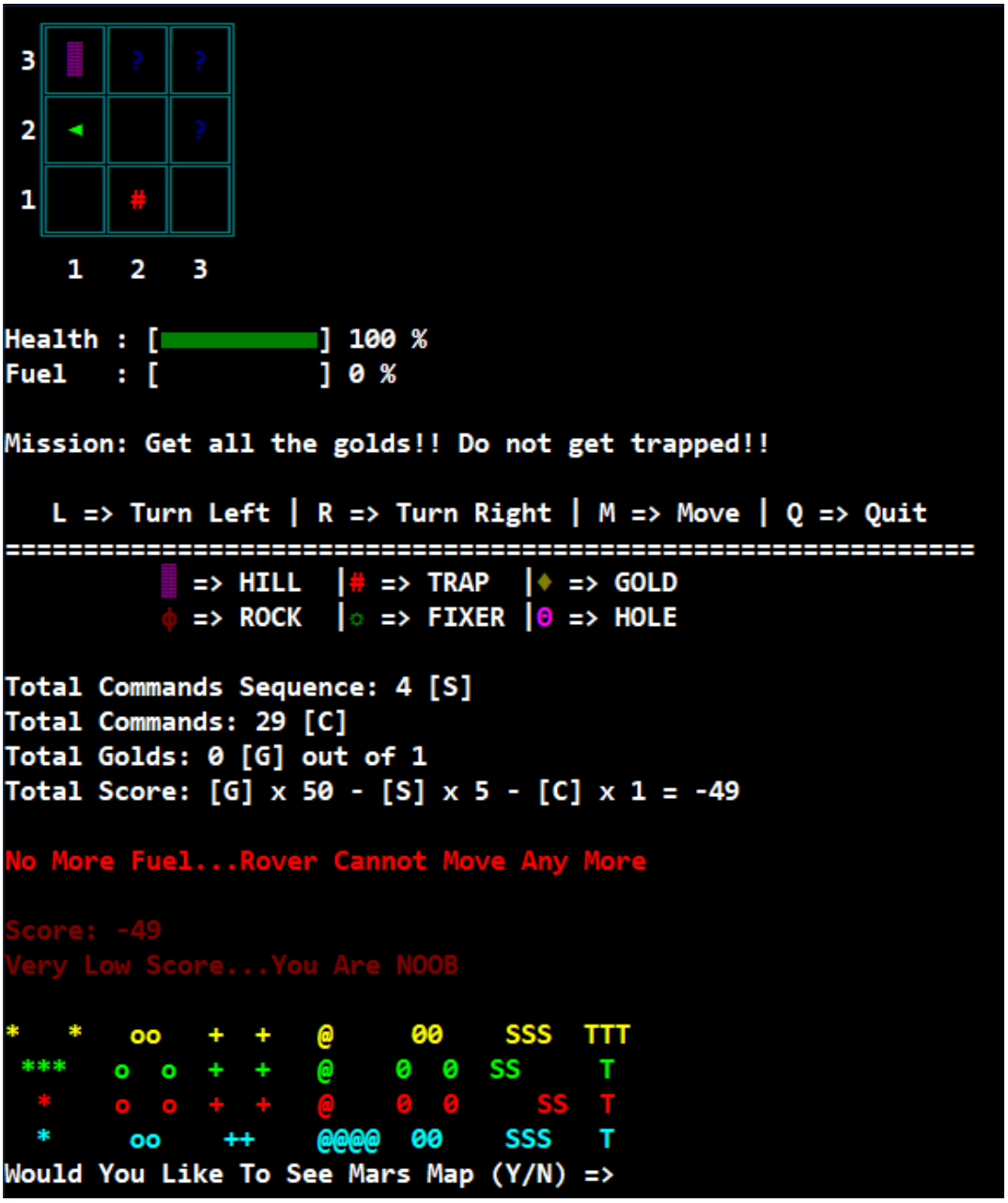


Fig 4.16 Shows how what will happen when the rover runs out of fuel. The player will not be able to move the rover anymore and a message will be displayed.

4.17 Run Out of Health

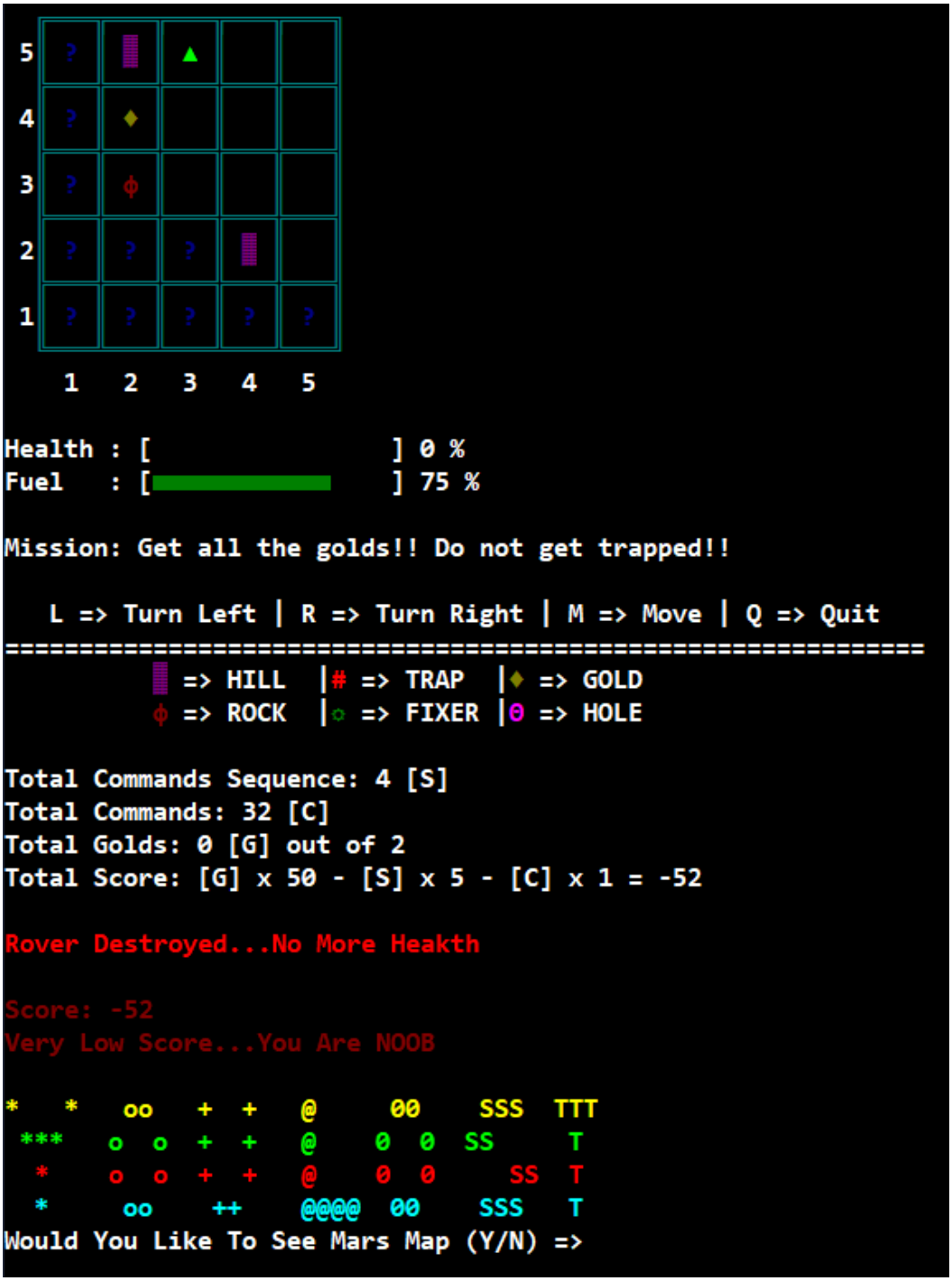


Fig 4.17 Shows that the rover is completely destroyed and has 0% health left, resulting in the player being told they have lost the game.

4.18 Score Levels

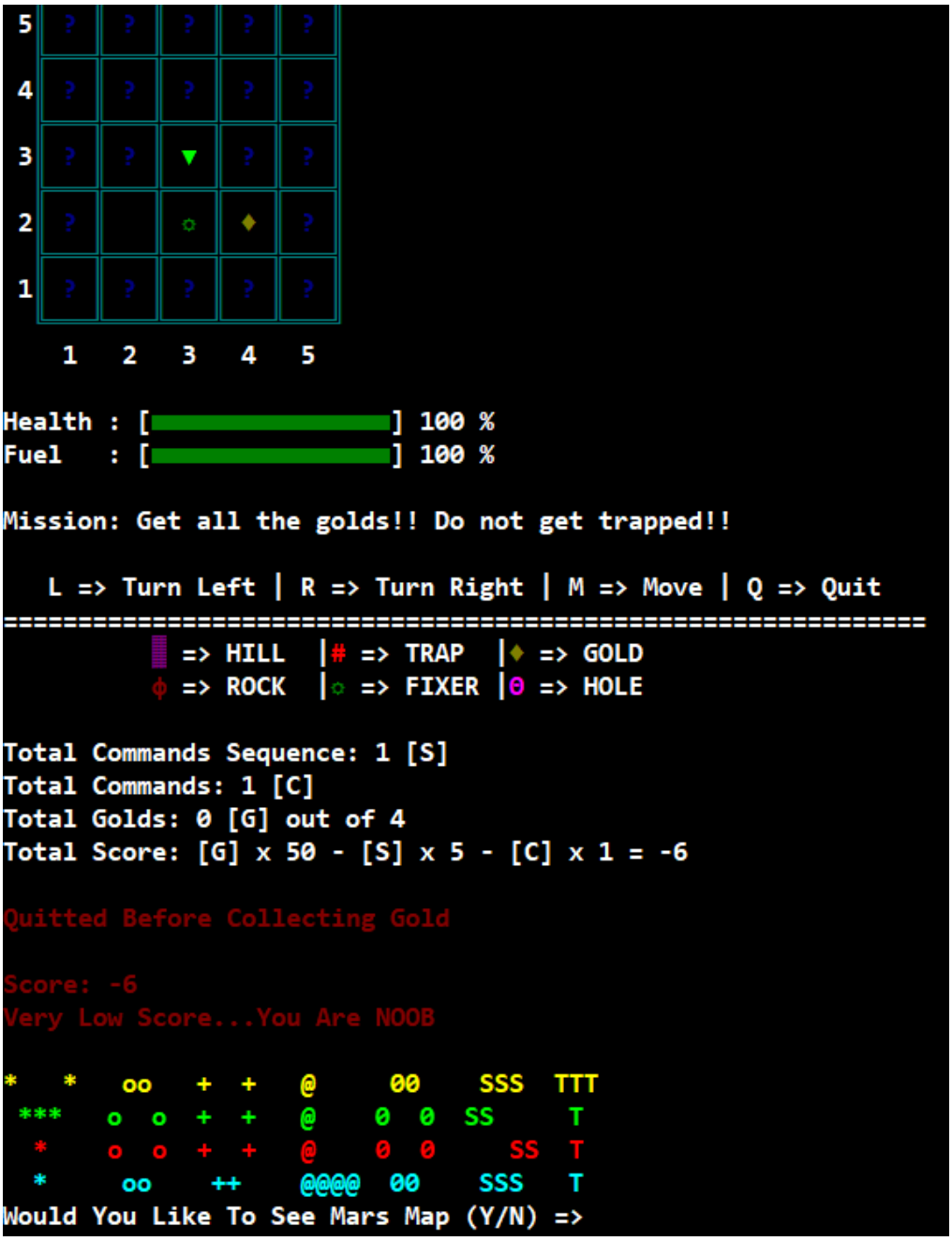


Fig 4.18.1 Shows the congratulatory message for successfully winning the game by collecting all the gold but also gave the player a bad rating of "Noob" for finishing the game with a bad score

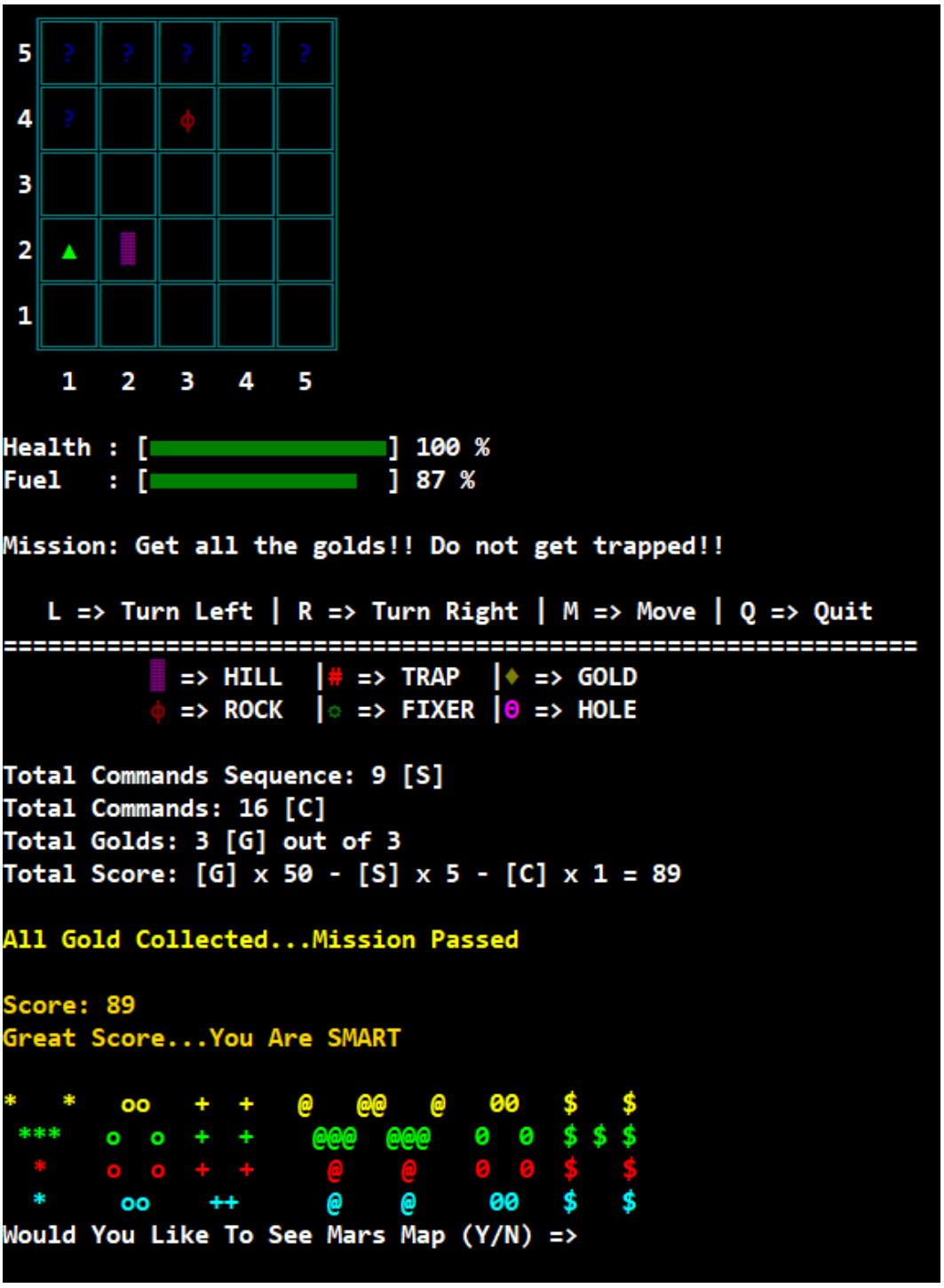


Fig 4.18.2 Shows the congratulatory message for successfully winning the game by collecting all the gold but also gave the player a good rating of "Smart" for finishing the game with an above average score

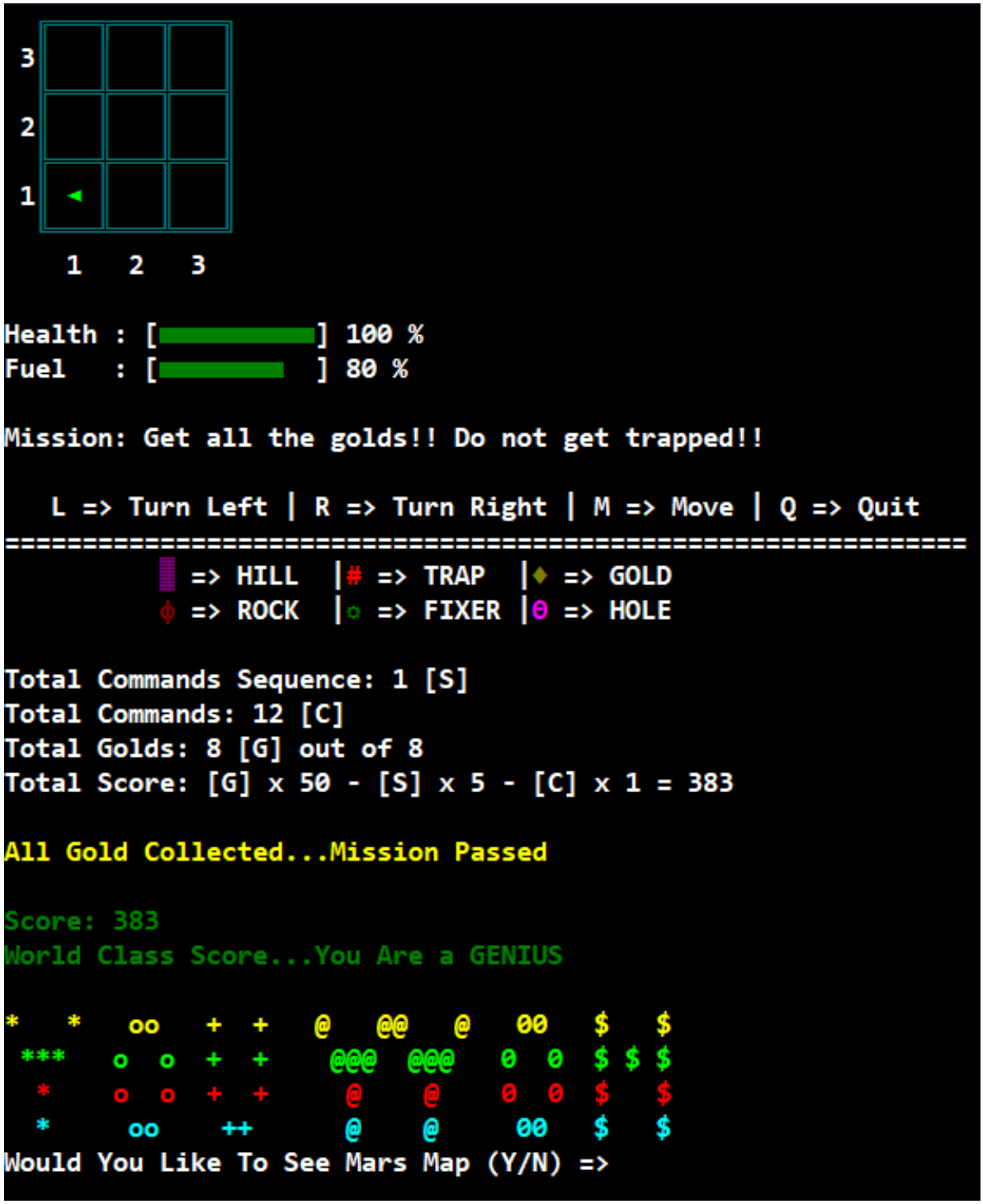


Fig 4.18.3 Shows the congratulatory message for successfully winning the game by collecting all the gold but also gave the player the best rating of "Genius" for finishing the game with a top score.

3 SUBMISSION DECLARATION

3.1 Student 1: Project Manager

TCP1101 Programming Fundamentals

Trimester 2, Session 2020/2021

To be Filled by Each Student

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Lecture Section	**TC1V**	**Tutorial Section**	**TT4V**
Names and IDs of students which I have discussed regarding this assignment			
Number of hours I spent in doing this assignment	**Approx. 40 hours**		

I hereby declare that this assignment represents the work done by myself. I declare that no part of my work has been copied from other persons or by means of professional assistance.

I hereby declare, and I fully understood that, if I have copied any parts from any other persons OR if any other persons have copied from my work, I will get a mark of ZERO and I am fully responsible to ensure this does not happen.

I also hereby declare that every works or materials/codes that I may have borrowed, copied or modified from other sources are properly acknowledged in the report and the sources are listed in the ACKNOWLEGEMENT or REFERENCES section. I will take full responsibility and understood that I would get a mark of ZERO if I failed to make proper acknowledgement.

Signature:  … Date: 3 / 2 / 2021**.....**

Note: No work shall be accepted unless it is accompanied by this submission declaration with all sections completed and it has been signed and dated. Please scan the document and include this to the softcopy of your report.

3.2 Student 2: Program Developer

TCP1101 Programming Fundamentals

Trimester 2, Session 2020/2021

To be Filled by Each Student

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ID	**1191102340**		
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Names and IDs of students which I have discussed regarding this assignment			
Number of hours I spent in doing this assignment	**Approx. 40 hours**		

I hereby declare that this assignment represents the work done by myself. I declare that no part of my work has been copied from other persons or by means of professional assistance.

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Signature:  … Date: 3 / 2 / 2021**.....**

Note: No work shall be accepted unless it is accompanied by this submission declaration with all sections completed and it has been signed and dated. Please scan the document and include this to the softcopy of your report.

3.3 Student 3: Program Developer

TCP1101 Programming Fundamentals

Trimester 2, Session 2020/2021

To be Filled by Each Student

Name	**Mohammad Wathiq Soualhi**		
ID	**1191102425**		
Lecture Section	**TC1V**	**Tutorial Section**	**TT4V**
Names and IDs of students which I have discussed regarding this assignment			
Number of hours I spent in doing this assignment	**Approx. 40 hours**		

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I also hereby declare that every works or materials/codes that I may have borrowed, copied or modified from other sources are properly acknowledged in the report and the sources are listed in the ACKNOWLEGEMENT or REFERENCES section. I will take full responsibility and understood that I would get a mark of ZERO if I failed to make proper acknowledgement.

Signature:  … Date: 3 / 2 / 2021**.....**

Note: No work shall be accepted unless it is accompanied by this submission declaration with all sections completed and it has been signed and dated. Please scan the document and include this to the softcopy of your report.