OUTPUTS FOR ROCKET LAUNCH SIMULATOR

***If the user chooses option 1, the program prompts the user to enter rocket launch parameters (initial velocity, gravity effect and initial height).**

- **The entered parameters are saved to "rocket_data.txt."**

***If the user chooses option 2, the program reads the launch parameters from "rocket_data.txt" and simulates the rocket's flight trajectory.**

- **The program displays the quadratic equation used for the simulation. → $h(t) = -0.5 * g * t^2 + V0 * t + h$**
- **The graph is displayed using ASCII characters, showing time on the X-axis and altitude on the Y-axis.**
- **The rocket's path is represented by "#" characters, with "|" and "-" used for the axes.**

***If the user chooses option 3, the program saves the trajectory graph, maximum altitude and total flight duration to "trajectory.txt."**

- **The maximum altitude and total flight time are also displayed on the screen.**

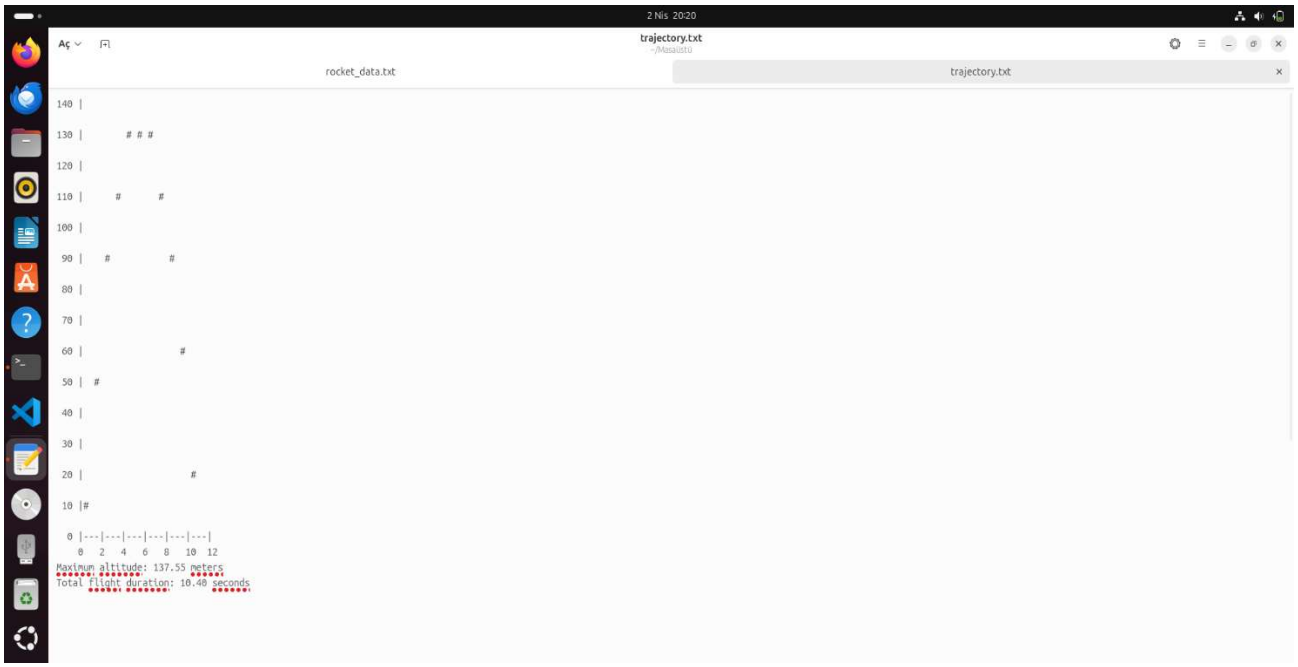
***If the user chooses option 4, the program terminates.**

Example 1

```
busra-gizem-yilmaz@busra-gizem-yilmaz-VirtualBox:~/Masaüstü$ ./busra_gizem_yilmaz
Welcome to the Rocket Launch Simulator!
--------------------------------------
1. Enter launch parameters
2. Simulate rocket trajectory
3. Save trajectory data
4. Exit
Choice: 1

Enter initial velocity (m/s): 50
Enter gravity (m/s^2, default 9.8): 9.8
Enter launch height (m): 10
Rocket parameters saved to rocket_data.txt!
```

```
Welcome to the Rocket Launch Simulator!
--------------------------------------
1. Enter launch parameters
2. Simulate rocket trajectory
3. Save trajectory data
4. Exit
Choice: 2
Reading rocket parameters from file...
Equation: h(t) = -4.9 * t^2 + 50 * t + 10
Simulating trajectory...
140 |
130 |        # # #
120 |
110 |      #       #
100 |
 90 |    #           #
 80 |
 70 |
 60 |                 #
 50 |  #
 40 |
 30 |
 20 |                   #
 10 |#
  0 |---|---|---|---|---|---|
    0   2   4   6   8   10  12
```

```
Welcome to the Rocket Launch Simulator!
--------------------------------------
1. Enter launch parameters
2. Simulate rocket trajectory
3. Save trajectory data
4. Exit
Choice: 3
Saving trajectory data...
Maximum altitude: 137.55 meters
Total flight duration: 10.40 seconds
Graph saved to trajectory.txt!

Welcome to the Rocket Launch Simulator!
--------------------------------------
1. Enter launch parameters
2. Simulate rocket trajectory
3. Save trajectory data
4. Exit
Choice: 4
Goodbye!
```

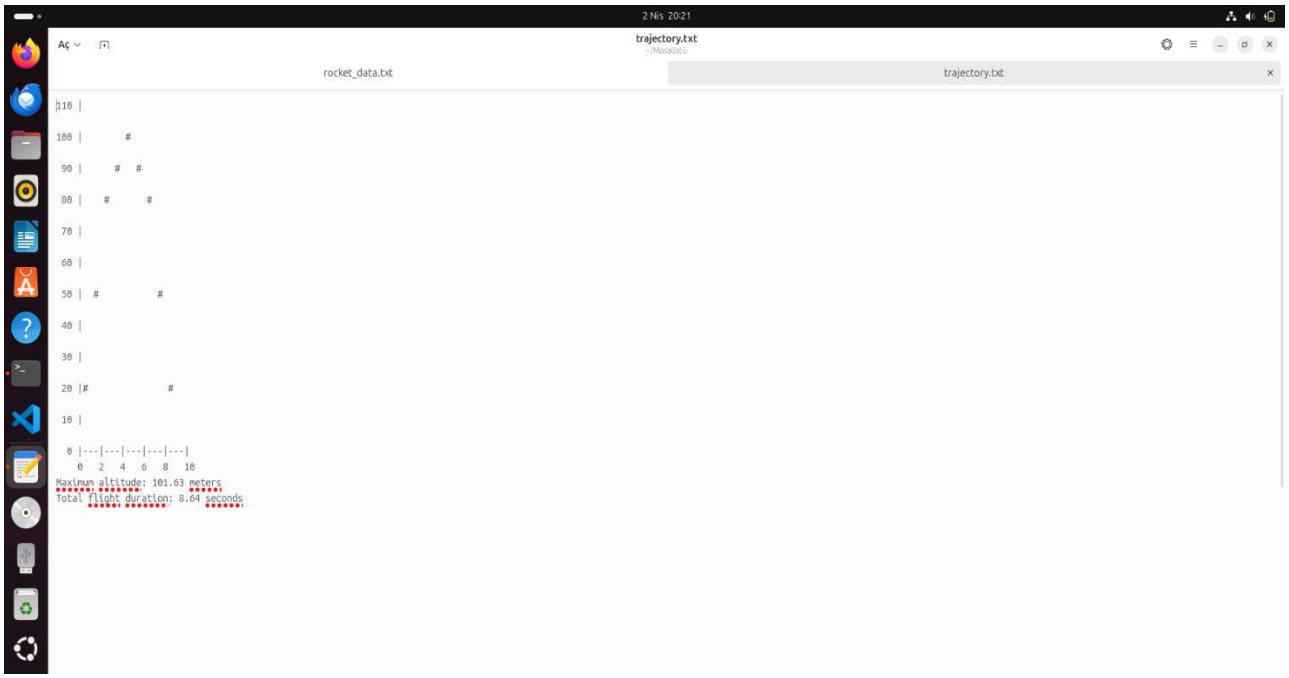


Example 2

```
busra-gizem-yilmaz@busra-gizem-yilmaz-VirtualBox:~/Masaüstü$ ./busra_gizem_yilmaz
Welcome to the Rocket Launch Simulator!
--------------------------------------
1. Enter launch parameters
2. Simulate rocket trajectory
3. Save trajectory data
4. Exit
Choice: 1

Enter initial velocity (m/s): 40
Enter gravity (m/s^2, default 9.8): 9.8
Enter launch height (m): 20
Rocket parameters saved to rocket_data.txt!
```

```
Welcome to the Rocket Launch Simulator!
---------------------------------------
1. Enter launch parameters
2. Simulate rocket trajectory
3. Save trajectory data
4. Exit
Choice: 2
Reading rocket parameters from file...
Equation: h(t) = -4.9 * t^2 + 40 * t + 20
Simulating trajectory...
110 |

100 |       #

 90 |      #   #

 80 |    #       #

 70 |

 60 |

 50 |  #           #

 40 |

 30 |

 20 |#               #

 10 |

  0 |---|---|---|---|---|
    0   2   4   6   8   10
```

```
Welcome to the Rocket Launch Simulator!
---------------------------------------
1. Enter launch parameters
2. Simulate rocket trajectory
3. Save trajectory data
4. Exit
Choice: 3
Saving trajectory data...
Maximum altitude: 101.63 meters
Total flight duration: 8.64 seconds
Graph saved to trajectory.txt!

Welcome to the Rocket Launch Simulator!
---------------------------------------
1. Enter launch parameters
2. Simulate rocket trajectory
3. Save trajectory data
4. Exit
Choice: 4
Goodbye!

busra-gizem-yilmaz@busra-gizem-yilmaz-VirtualBox:~/Masaüstü$
```



SOME ERRORS ABOUT ROCKET LAUNCH SIMULATOR

*** If the user enters a value other than an integer for the choice, an error message will be displayed and the program will prompt the user for a valid input again.**
*** If the user enters a choice outside the range of 1-4, an error message will be displayed and the menu will be shown again for the user to make a valid selection.**
*** If the parameters are not given valid values, an error message will be displayed and the program will request the user to input the correct values again.**

```
busra-gizem-yilmaz@busra-gizem-yilmaz-VirtualBox:~/Masaüstü$ ./busra_gizem_yilmaz
Welcome to the Rocket Launch Simulator!
-------------------------------------
1. Enter launch parameters
2. Simulate rocket trajectory
3. Save trajectory data
4. Exit
Choice: a
Invalid input! Please enter a integer number for choice: b
Invalid input! Please enter a integer number for choice: .
Invalid input! Please enter a integer number for choice: -
Invalid input! Please enter a integer number for choice: 1

Enter initial velocity (m/s): 50
Enter gravity (m/s^2, default 9.8): 9.8
Enter launch height (m): 10
Rocket parameters saved to rocket_data.txt!
```

```
Welcome to the Rocket Launch Simulator!
-------------------------------------
1. Enter launch parameters
2. Simulate rocket trajectory
3. Save trajectory data
4. Exit
Choice: 5
Invalid option! Please enter a valid option (1, 2, 3 or 4).

Welcome to the Rocket Launch Simulator!
-------------------------------------
1. Enter launch parameters
2. Simulate rocket trajectory
3. Save trajectory data
4. Exit
Choice: 0
Invalid option! Please enter a valid option (1, 2, 3 or 4).
```

```
Welcome to the Rocket Launch Simulator!
-------------------------------------
1. Enter launch parameters
2. Simulate rocket trajectory
3. Save trajectory data
4. Exit
Choice: 1

Enter initial velocity (m/s): a
Invalid input! Please enter a valid number for velocity: .
Invalid input! Please enter a valid number for velocity: 50
Enter gravity (m/s^2, default 9.8): a
Invalid input! Please enter a valid number for gravity (positive value): .
Invalid input! Please enter a valid number for gravity (positive value): -87
Invalid input! Please enter a valid number for gravity (positive value): 0
Invalid input! Please enter a valid number for gravity (positive value): 9.8
Enter launch height (m): b
Invalid input! Please enter a valid number for height (positive value): -
Invalid input! Please enter a valid number for height (positive value): 0
Rocket parameters saved to rocket_data.txt!
```