**Description:**

This project is a simple database for space missions. It allows user to add, remove, search, and display missions. The data is stored in a file called "missions.txt". The user can save changes to the file before quitting the program. The program uses a struct to store mission data and a few functions to interact with the data. The program also includes a few helper functions to validate user input and clear the input buffer. The program is menu-driven and uses a loop to keep running while the user chooses to remove, add, search or display missions until the user chooses to quit.

**Sample Run:**

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| --- |
| --------- SPACE MISSION DATABASE ---------  1. Display all missions  2. Add a new mission  3. Find a mission  4. Remove a mission  5. Quit  Enter your choice (1-6): 1  MISSION DATABASE:  -----------------------------------------------------------------------------------------  Name Launch Site Rocket Type Cost Status  -----------------------------------------------------------------------------------------  SpaceX LC-39A, USA Falcon 9 50.00 Success  CASC Site 9401 (SLS-2), China Long March 2D 29.75 Success  SpaceX Pad A-Boca Chica, USA Starship Prototype 0.00 Success  Roscosmos Site 200/39, Kazakhstan Proton-M/Briz-M 65.00 Success  ULA SLC-41, USA Atlas V 541 145.00 Success  CASC LC-9, China Long March 4B 64.68 Success  Roscosmos Site 31/6, Kazakhstan Soyuz 2.1a 48.50 Success  CASC LC-101, China Long March 5 0.00 Success  SpaceX SLC-40, USA Falcon 9 50.00 Success  JAXA LA-Y1, Japan H-IIA 202 90.00 Success  Northrop LP-0B, USA Minotaur IV 46.00 Success  ExPace Site 95, China Kuaizhou 11 28.30 Failure  CASC LC-3, China Long March 3B/E 29.15 Success  IAI Pad 1, Israel Shavit-2 0.00 Success  CASC Site 9401 (SLS-2), China Long March 2D 29.75 Success  Rocket Lab Rocket Lab LC-1A, New Zealand Electron/Curie 7.50 Failure  CASC LC-9, China Long March 4B 64.68 Success  SpaceX SLC-40, USA Falcon 9 50.00 Success  CASC LC-2, China Long March 3B/E 29.15 Success  CASC Site 9401 (SLS-2), China Long March 2D 29.75 Success  SpaceX SLC-40, USA Falcon 9 50.00 Success  Rocket Lab Rocket Lab LC-1A, New Zealand Electron/Curie 7.50 Success  CASC LC-9, China Long March 2C 30.80 Success  SpaceX SLC-40, USA Falcon 9 50.00 Success  CASC Site 9401 (SLS-2), China Long March 2D 29.75 Success  --------- SPACE MISSION DATABASE ---------  1. Display all missions  2. Add a new mission  3. Find a mission  4. Remove a mission  5. Quit  Enter your choice (1-6): 2  Enter mission name: MHI  Enter launch site: LA-Y2,Japan^[[D^[[D^[[D^  Enter rocket type: H-II  Enter mission cost: 112.5  Enter mission status (Success/Failure): Success  Mission added successfully!  --------- SPACE MISSION DATABASE ---------  1. Display all missions  2. Add a new mission  3. Find a mission  4. Remove a mission  5. Quit  Enter your choice (1-6): 1  MISSION DATABASE:  -----------------------------------------------------------------------------------------  Name Launch Site Rocket Type Cost Status  -----------------------------------------------------------------------------------------  SpaceX LC-39A, USA Falcon 9 50.00 Success  CASC Site 9401 (SLS-2), China Long March 2D 29.75 Success  SpaceX Pad A-Boca Chica, USA Starship Prototype 0.00 Success  Roscosmos Site 200/39, Kazakhstan Proton-M/Briz-M 65.00 Success  ULA SLC-41, USA Atlas V 541 145.00 Success  CASC LC-9, China Long March 4B 64.68 Success  Roscosmos Site 31/6, Kazakhstan Soyuz 2.1a 48.50 Success  CASC LC-101, China Long March 5 0.00 Success  SpaceX SLC-40, USA Falcon 9 50.00 Success  JAXA LA-Y1, Japan H-IIA 202 90.00 Success  Northrop LP-0B, USA Minotaur IV 46.00 Success  ExPace Site 95, China Kuaizhou 11 28.30 Failure  CASC LC-3, China Long March 3B/E 29.15 Success  IAI Pad 1, Israel Shavit-2 0.00 Success  CASC Site 9401 (SLS-2), China Long March 2D 29.75 Success  Rocket Lab Rocket Lab LC-1A, New Zealand Electron/Curie 7.50 Failure  CASC LC-9, China Long March 4B 64.68 Success  SpaceX SLC-40, USA Falcon 9 50.00 Success  CASC LC-2, China Long March 3B/E 29.15 Success  CASC Site 9401 (SLS-2), China Long March 2D 29.75 Success  SpaceX SLC-40, USA Falcon 9 50.00 Success  Rocket Lab Rocket Lab LC-1A, New Zealand Electron/Curie 7.50 Success  CASC LC-9, China Long March 2C 30.80 Success  SpaceX SLC-40, USA Falcon 9 50.00 Success  CASC Site 9401 (SLS-2), China Long March 2D 29.75 Success  MHI L H-II 112.50 Success  --------- SPACE MISSION DATABASE ---------  1. Display all missions  2. Add a new mission  3. Find a mission  4. Remove a mission  5. Quit  Enter your choice (1-6): 4  Enter mission name to remove: MHI  Mission "MHI" removed successfully!  --------- SPACE MISSION DATABASE ---------  1. Display all missions  2. Add a new mission  3. Find a mission  4. Remove a mission  5. Quit  Enter your choice (1-6): 1  MISSION DATABASE:  -----------------------------------------------------------------------------------------  Name Launch Site Rocket Type Cost Status  -----------------------------------------------------------------------------------------  SpaceX LC-39A, USA Falcon 9 50.00 Success  CASC Site 9401 (SLS-2), China Long March 2D 29.75 Success  SpaceX Pad A-Boca Chica, USA Starship Prototype 0.00 Success  Roscosmos Site 200/39, Kazakhstan Proton-M/Briz-M 65.00 Success  ULA SLC-41, USA Atlas V 541 145.00 Success  CASC LC-9, China Long March 4B 64.68 Success  Roscosmos Site 31/6, Kazakhstan Soyuz 2.1a 48.50 Success  CASC LC-101, China Long March 5 0.00 Success  SpaceX SLC-40, USA Falcon 9 50.00 Success  JAXA LA-Y1, Japan H-IIA 202 90.00 Success  Northrop LP-0B, USA Minotaur IV 46.00 Success  ExPace Site 95, China Kuaizhou 11 28.30 Failure  CASC LC-3, China Long March 3B/E 29.15 Success  IAI Pad 1, Israel Shavit-2 0.00 Success  CASC Site 9401 (SLS-2), China Long March 2D 29.75 Success  Rocket Lab Rocket Lab LC-1A, New Zealand Electron/Curie 7.50 Failure  CASC LC-9, China Long March 4B 64.68 Success  SpaceX SLC-40, USA Falcon 9 50.00 Success  CASC LC-2, China Long March 3B/E 29.15 Success  CASC Site 9401 (SLS-2), China Long March 2D 29.75 Success  SpaceX SLC-40, USA Falcon 9 50.00 Success  Rocket Lab Rocket Lab LC-1A, New Zealand Electron/Curie 7.50 Success  CASC LC-9, China Long March 2C 30.80 Success  SpaceX SLC-40, USA Falcon 9 50.00 Success  CASC Site 9401 (SLS-2), China Long March 2D 29.75 Success  --------- SPACE MISSION DATABASE ---------  1. Display all missions  2. Add a new mission  3. Find a mission  4. Remove a mission  5. Quit  Enter your choice (1-6): 6  Thank you for using the Space Mission Database. Goodbye! |

**Struct Mission**

Data Members:

1. char name[50] to hold the mission company name
2. char launchSite[100] to hold where the rocket was launched
3. char rocketType[100] to hold the type of rocket type
4. double cost to hold the launch cost
5. char status[20] to hold whether the launch was a success or a fail

**Main Program:**

1. The program reads the contents of the file using the loadMissions() function.
2. The data in mission.txt consists of name launching company, launch site, rocket type, launching cost, and status of the mission.
3. It then displays the menu and menu information from calling the displayMenu function
4. The program then chooses whether the choice of the user is valid and clears the buffer.
5. The program then calls the appropriate function in line with the user’s choice.
6. The program quits when the user chooses a quit option.

**Load missions from file(loadMissions):**

1. This function opens the file that contains the missions data
2. It returns an error message if the file cannot be opened
3. It initializes the first line as a header file and reads all the data from the file into the program.
4. It closes the file afterwards.

**Display the menu(displayMenu):**

It prints to the user choices for them to pick:

1. Display all missions
2. Add a new mission
3. Find a mission
4. Remove a mission
5. Save changes
6. Quit

**Display missions from file(displayMissions):**

1. The program checks whether there is any mission listed in the database and outputs an error message if none is found
2. If there exists a mission listed in the database, the program displays the name of the company, launch site, rocket type, cost, and mission status separated by tabs

**Add a mission into file(addMission):**

1. The program checks if the number of missions has reached a maximum number before attempting to add another mission.
2. Given the database is not full, the program clears the buffer, then prompts the user to input the name of the company, followed by the launch site, rocket type, cost and finally the mission status.
3. It then adds the mission count and outputs mission added successfully statement.

**Find a mission from file(findMissions):**

1. The program allows the user to search for the information of a certain mission / a group of missions from the data using any of the categories of the missions data.
2. The program outputs all missions with the search term the user inputs and if not found, the program outputs an error message

**Remove a mission from file(removeMission):**

This function removes a mission by asking the user to input the name of the mission and deducts the number of missions from the group.

**Validity of choice check(isValidChoice):**

This function checks if the user’s menu choice is valid.

**Clear buffer from all input(clearInputBuffer):**

Clears the buffer when called so as to allow for fresh input from the user.