Run your program and follow the sample run below. Input values are shown in **<u>bold underline</u>**. All headings and values in any report are aligned to the right.

```
Enter the movie catalog filename: movies
The catalog file (movies) is not found
The movie library management system starts without catalog

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 11
Invalid choice. Please try again.
Enter your selection: -1
Invalid choice. Please try again.
Enter your selection: 0
Would you like to update the catalog (yes/y, no/n)? No
Movie catalog has not been updated. Goodbye!
```

```
Enter the movie catalog filename: movies.csv

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 1
Enter search term: lovely
Finding (lovely) in title, director, or genre...
No matching movies found.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 1
Enter search term: the
Finding (the) in title, director, or genre...
    ID      Title                    Director           Genre      Availability     Price $     Rental Count
  ---------------------------------------------------------------------------------------------------------------
     2      The Dark Knight          Christopher Nolan  Action     Rented           6.99        0
     4      The Matrix               Lana Wachowski     Sci-Fi     Available        4.99        0
     6      The Shawshank Redemption Frank Darabont     Drama      Available        4.49        0
     8      The Lord of the Rings    Peter Jackson      Fantasy    Available        8.99        0
    10      The Avengers             Joss Whedon        Action     Available        6.49        0

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 1
Enter search term: chris
Finding (chris) in title, director, or genre...
    ID      Title              Director            Genre      Availability     Price $     Rental Count
  --------------------------------------------------------------------------------------------------------
     1      Inception          Christopher Nolan   Sci-Fi     Available        5.99        0
     2      The Dark Knight    Christopher Nolan   Action     Rented           6.99        0
     3      Interstellar       Christopher Nolan   Romance    Available        7.99        0
```

```
Movie Library - Main Menu
==========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 1
Enter search term: act
Finding (act) in title, director, or genre...
    ID       Title             Director           Genre       Availability       Price $       Rental Count
---------------------------------------------------------------------------------------------------------------
    2        The Dark Knight   Christopher Nolan  Action      Rented             6.99          0
    7        Pulp Fiction      Quentin Tarantino  Action      Available          5.49          0
    10       The Avengers      Joss Whedon        Action      Available          6.49          0
```

Test 3: Display library summary - option 10

```
Movie Library - Main Menu
==========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 10
Total movies: 10
Available movies: 10
Rented movies: 0
```

Test 4: Renting a movie — option 2

```
Movie Library - Main Menu
==========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 2
Enter the movie ID to rent: 12
Movie with ID 12 not found.

Movie Library - Main Menu
==========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 2
Enter the movie ID to rent: 9
You have successfully rented 'Toy Story'.

Movie Library - Main Menu
==========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 2
Enter the movie ID to rent: 9
'Toy Story' is already rented.
```

```
Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 3
Enter the movie ID to return: 12
Movie with ID 12 not found.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 3
Enter the movie ID to return: 7
'Pulp Fiction' was not rented.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 3
Enter the movie ID to return: 9
You have successfully returned 'Toy Story'.
```

```
Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 4
Enter movie ID: 10
Movie with ID 10 exists

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 4
Enter movie ID: 11
Enter title: Flight Risk
Enter director: Mel Gibson
Enter genre (0-9): 0
Enter price: 7.9
Movie 'Flight Risk' added successfully.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
```

```
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 1
Enter search term: flight
Finding (fligh) in title, director, or genre...
    ID        Title              Director          Genre      Availability     Price $      Rental Count
------------------------------------------------------------------------------------------------------------
    11        Flight Risk        Mel Gibson        Action     Available        7.90         0

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 4
Enter movie ID: 12
Enter title: Get Out
Enter director: Jordan Peele
Enter genre (0-9): 3
Enter price: 3.95
Movie 'Get Out' added successfully.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 1
Enter search term: Jordan Peele
Finding (jordan peele) in title, director, or genre...
    ID        Title              Director          Genre      Availability     Price $      Rental Count
------------------------------------------------------------------------------------------------------------
    12        Get Out            Jordan Peele      Horror     Available        3.95         0
```

Test 7: Removing a Movie — option 5

```
Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 5
Enter the movie ID to remove: 20
Movie with ID 20 not found.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 5
Enter the movie ID to remove: 12
Movie 'Get Out' has been removed.

Movie Library - Main Menu
=========================
1) Search for movies
```

```
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 1
Enter search term: Get
Finding (get) in title, director, or genre...
No matching movies found.
```

```
Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 6
Enter the movie ID to update: 12
Movie with ID 12 is not found.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 6
Enter the movie ID to update: 11
Leave fields blank to keep current values.
Enter new title (current: Flight Risk):
Enter new director (current: Mel Gibson):
Enter new genre (current: Action):
Enter new price (current: 7.9): 6.99
Movie with ID 11' is updated successfully.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 1
Enter search term: mel
Finding (mel) in title, director, or genre...
   ID         Title            Director        Genre      Availability     Price $    Rental Count
-----------------------------------------------------------------------------------------------------------
   11         Flight Risk      Mel Gibson      Action     Available        6.99       0
```

```
Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 7
Enter genre (0-9): -1
Invalid Genre: Enter a valid genre (0-9)

Movie Library - Main Menu
=========================
```

```
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 7
Enter genre (0-9): 0
    ID        Title           Director          Genre     Availability     Price $    Rental Count
---------------------------------------------------------------------------------------------------------
    2         The Dark Knight  Christopher Nolan  Action    Available        6.99       0
    7         Pulp Fiction     Quentin Tarantino  Action    Available        5.49       0
    10        The Avengers     Joss Whedon        Action    Available        6.49       0
    11        Flight Risk      Mel Gibson         Action    Available        6.99       0
```

<u>**Test 10: Top Rented Movies - Option 8**</u>
<u>**Before trying the option, you should rent and return movies**</u>

```
Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 2
Enter the movie ID to rent: 11
You have successfully rented 'Flight Risk'.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 3
Enter the movie ID to return: 11
You have successfully returned 'Flight Risk'.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 2
Enter the movie ID to rent: 11
You have successfully rented 'Flight Risk'.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 3
Enter the movie ID to return: 11
You have successfully returned 'Flight Risk'.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
```

```
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 2
Enter the movie ID to rent: 11
You have successfully rented 'Flight Risk'.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 2
Enter the movie ID to rent: 5
You have successfully rented 'Forrest Gump'.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 3
Enter the movie ID to return: 5
You have successfully returned 'Forrest Gump'.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 2
Enter the movie ID to rent: 5
You have successfully rented 'Forrest Gump'.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 3
Enter the movie ID to return: 5
You have successfully returned 'Forrest Gump'.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 2
Enter the movie ID to rent: 8
```

```
You have successfully rented 'The Lord of the Rings'.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 3
Enter the movie ID to return: 8
You have successfully returned 'The Lord of the Rings'.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 2
Enter the movie ID to rent: 6
You have successfully rented 'The Shawshank Redemption'.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 3
Enter the movie ID to return: 6
You have successfully returned 'The Shawshank Redemption'.

Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 8
Top 5 Rented Movies:
ID       Title               Director          Genre        Rentals
-------------------------------------------------------------------------------
11       Flight Risk         Mel Gibson        Action       3
5        Forrest Gump        Robert Zemeckis   Drama        2
6        The Shawshank Redemption  Frank Darabont  Drama     1
8        The Lord of the Rings  Peter Jackson   Fantasy      1
9        Toy Story           John Lasseter     Animation    1
```

Test 11: Check Availability by Genre - Option 9

```
Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 9
Enter genre (0-9): 4
```

```
    ID          Title          Director         Genre     Availability    Price $    Rental Count
---------------------------------------------------------------------------------------------------------------
    1           Inception      Christopher Nolan Sci-Fi    Available       5.99       0
    4           The Matrix     Lana Wachowski    Sci-Fi    Available       4.99       0
```

<div align="center">**Test 12: Exit the system - Option 0 with updating the catalog**</div>

```
Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 0
Would you like to update the catalog (yes/y, no/n)? Yes
Movie catalog has been updated. Goodbye!
```

<div align="center">**Test 13: Exit the system - Option 0 without updating the catalog**</div>

```
Movie Library - Main Menu
=========================
1) Search for movies
2) Rent a movie
3) Return a movie
4) Add a movie
5) Remove a movie
6) Update movie details
7) List movies by genre
8) Top rented movies
9) Check availability by genre
10) Display library summary
0) Exit the system
Enter your selection: 0
Would you like to update the catalog (yes/y, no/n)? n
Movie catalog has not been updated. Goodbye!
```