Part 4 - Test Cases

Test Cases Overview

This document contains test cases covering all system commands including create, modify, delete, query operations, and Undo/Redo functionality.
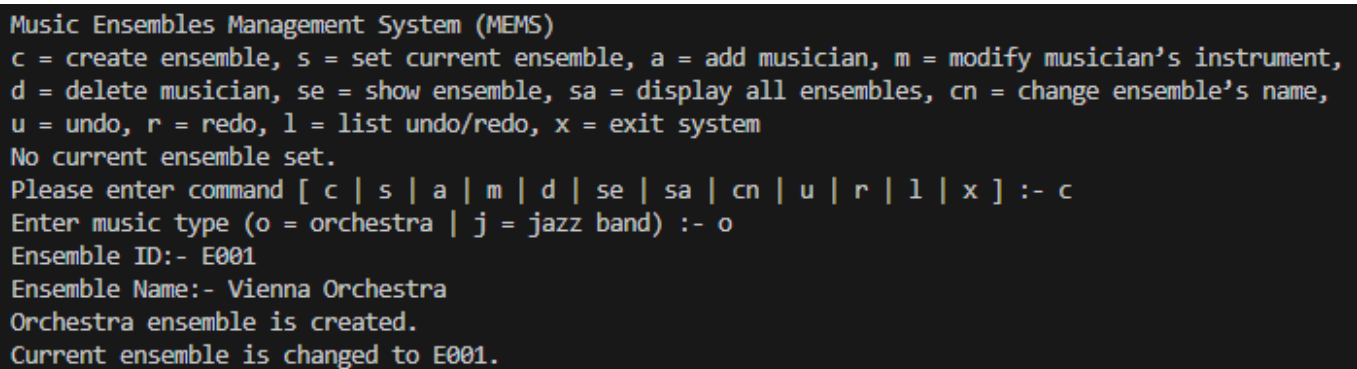
Test Case 1: Create Orchestra Ensemble

Input:

```
c
o
E001
Vienna Orchestra
```

Expected Output:

```
Orchestra ensemble is created.
Current ensemble is changed to E001.
```

Explanation: Create an orchestra ensemble with ID E001 and name Vienna Orchestra

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
No current ensemble set.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- c
Enter music type (o = orchestra | j = jazz band) :- o
Ensemble ID:- E001
Ensemble Name:- Vienna Orchestra
Orchestra ensemble is created.
Current ensemble is changed to E001.
```

Test Case 2: Create Jazz Band Ensemble

Input:

```
c
j
J001
Blue Note Band
```

Expected Output:

```
Jazz band ensemble is created.
Current ensemble is changed to J001.
```

Explanation: Create a jazz band ensemble with ID J001 and name Blue Note Band

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is E001 Vienna Orchestra.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- c
Enter music type (o = orchestra | j = jazz band) :- j
Ensemble ID:- J001
Ensemble Name:- Blue Note Band
Jazz band ensemble is created.
Current ensemble is changed to J001.
```

Test Case 3: Display All Ensembles

Input:

```
sa
```

Expected Output:

```
orchestra ensemble Vienna Orchestra (E001)
jazz band ensemble Blue Note Band (J001)
```

Explanation: List all ensembles in the system

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is J001 Blue Note Band.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- sa
orchestra ensemble Vienna Orchestra (E001)
jazz band ensemble Blue Note Band (J001)
```
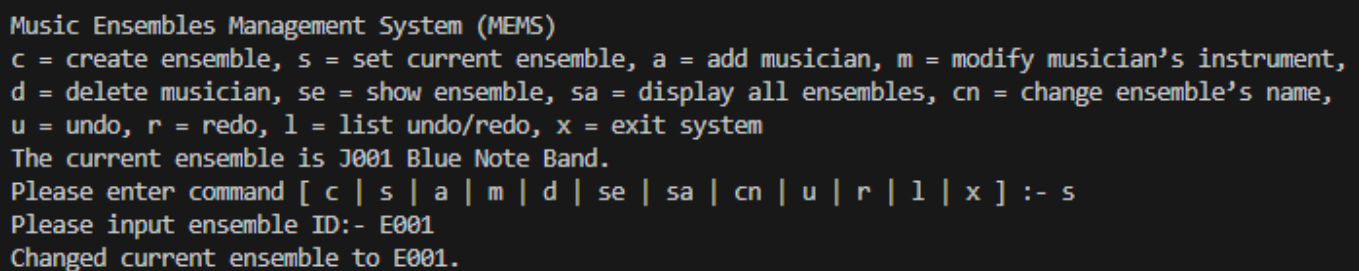
Test Case 4: Set Current Ensemble

Input:

```
s
E001
```

Expected Output:

```
Changed current ensemble to E001.
```

Explanation: Switch current working ensemble to E001

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is J001 Blue Note Band.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- s
Please input ensemble ID:- E001
Changed current ensemble to E001.
```

Test Case 5: Add Musician to Orchestra

Precondition: Current ensemble is E001 (Orchestra)

Input:

```
a
M001, John Smith
1
```

Expected Output:

```
Musician is added.
```

Explanation: Add violinist John Smith (ID: M001) to orchestra, role code 1 represents violinist

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is E001 Vienna Orchestra.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- a
Please input musician information (id, name):- M001, John Smith
Instrument (1 = violinist | 2 = cellist ):- 1
Musician is added.
```

Test Case 6: Add Musician to Jazz Band

Precondition: Current ensemble is J001 (Jazz Band)

Input:

```
s
J001
a
M002, Mary Johnson
1
```

Expected Output:

```
Changed current ensemble to J001.
Musician is added.
```

Explanation: Add saxophonist Mary Johnson (ID: M002) to jazz band, role code 1 represents saxophonist

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is E001 Vienna Orchestra.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- s
Please input ensemble ID:- J001
Changed current ensemble to J001.

Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is J001 Blue Note Band.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- a
Please input musician information (id, name):- M002, Mary Johnson
Instrument (1 = pianist | 2 = saxophonist | 3 = drummer):- 1
Musician is added.
```

Test Case 7: Show Ensemble Details

Precondition: Current ensemble has musicians

Input:

```
se
```

Expected Output:

```
Jazz Band Ensemble Blue Note Band (J001)
Pianist:
M002, Mary Johnson
Saxophonist:
NIL
Drummer:
NIL
```

Explanation: Display current ensemble details including all musicians and their roles

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is J001 Blue Note Band.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- se
Jazz Band Ensemble Blue Note Band (J001)
Pianist:
M002, Mary Johnson
Saxophonist:
NIL
Drummer:
NIL
```

Test Case 8: Modify Musician's Instrument

Precondition: Current ensemble is J001, has musician M002

Input:

```
m
M002
2
```

Expected Output:

```
  instrument is updated.
```

Explanation: Change musician M002's instrument from saxophonist to pianist (role code 2)

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is J001 Blue Note Band.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- m
Please input musician ID:- M002
Instrument (1 = pianist | 2 = saxophonist | 3 = drummer):- 2
instrument is updated.
```

Test Case 9: Change Ensemble Name

Precondition: Current ensemble is J001

Input:

```
cn
Blue Note Jazz Ensemble
```

Expected Output:

```
Ensemble's name is updated.
```

Explanation: Change ensemble J001's name from "Blue Note Band" to "Blue Note Jazz Ensemble"

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is J001 Blue Note Band.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- cn
Please input new name of the current ensemble:- Blue Note Jazz
Ensemble's name is updated.
```

Test Case 10: Delete Musician

Precondition: Current ensemble has musician M002

Input:

```
d
M002
```

Expected Output:

```
Musician is deleted.
```

Explanation: Delete musician with ID M002 from current ensemble

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is J001 Blue Note Jazz.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- d
Please input musician ID:- M002
Musician is deleted.
```

Test Case 11: List Undo/Redo History

Input:

```
l
```

Expected Output:

```
Undo List
Create orchestra ensemble, E001, Vienna Orchestra
Create jazz band ensemble, J001, Blue Note Band
Add musician, M001, John Smith, violinist
Add musician, M002, Mary Johnson, pianist
Modify musician's instrument, M002, saxophonist
Change ensemble's name, J001, Blue Note Jazz
Delete musician, M002
-- End of undo list --

Redo List
-- End of redo list --
```

Explanation: Display all undoable and redoable commands

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is J001 Blue Note Jazz.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- l
Undo List
Create orchestra ensemble, E001, Vienna Orchestra
Create jazz band ensemble, J001, Blue Note Band
Add musician, M001, John Smith, violinist
Add musician, M002, Mary Johnson, pianist
Modify musician's instrument, M002, saxophonist
Change ensemble's name, J001, Blue Note Jazz
Delete musician, M002
-- End of undo list --

Redo List
-- End of redo list --
```

Test Case 12: Undo Command

Precondition: At least one undoable command executed

Input:

```
u
```

Expected Output:

```
Command (Delete musician, M002) is undone.
```

Explanation: Undo the last executed command (delete musician)

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is J001 Blue Note Jazz.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- u
Command (Delete musician, M002) is undone.
```

Test Case 13: Redo Command

Precondition: Undo has been executed

Input:

```
    r
```

Expected Output:

```
    Command (Delete musician, M002) is redone.
```

Explanation: Redo the previously undone command

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is J001 Blue Note Jazz.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- r
Command (Delete musician, M002) is redone.
```

Test Case 14: Multiple Undo Operations

Input:

```
    u
    u
    u
```

Expected Output:

```
    Command (Delete musician, M002) is undone.
    Command (Change ensemble's name, J001, Blue Note Jazz) is undone.
    Command (Modify musician's instrument, M002, saxophonist) is undone.
```

Explanation: Undo multiple operations consecutively

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is J001 Blue Note Jazz.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- u
Command (Delete musician, M002) is undone.

Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is J001 Blue Note Jazz.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- u
Command (Change ensemble's name, J001, Blue Note Jazz) is undone.

Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
The current ensemble is J001 Blue Note Band.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- u
Command (Modify musician's instrument, M002, saxophonist) is undone.
```

Test Case 15: Error Handling - Add Musician Without Current Ensemble

Precondition: System just started, no current ensemble set

Input:

```
a
```

Expected Output:

```
No current ensemble set.
```

Explanation: Test error handling when trying to add musician without current ensemble

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
No current ensemble set.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- a
No current ensemble set.
```

Test Case 16: Error Handling - Set Non-existent Ensemble

Input:

```
s
E999
```

Expected Output:

```
Ensemble E999 is not found!!
```

Explanation: Test error handling when trying to set a non-existent ensemble ID

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
No current ensemble set.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- s
Please input ensemble ID:- E999
Ensemble E999 is not found!!
```

Test Case 17: Error Handling - Undo with Empty List

Precondition: System just started or undo list is empty

Input:

```
u
```

Expected Output:

```
Undo List is empty.
```

Explanation: Test error handling when undo list is empty

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
No current ensemble set.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- u
Undo List is empty.
```

Test Case 18: Error Handling - Redo with Empty List

Precondition: No undo has been executed

Input:

```
r
```

Expected Output:

```
Redo List is empty.
```

Explanation: Test error handling when redo list is empty

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
No current ensemble set.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- r
Redo List is empty.
```

Test Case 19: Exit System

Input:

```
x
```

Expected Output:

```
Exiting system.
```

Explanation: Normal system exit

Screenshot:

```
Music Ensembles Management System (MEMS)
c = create ensemble, s = set current ensemble, a = add musician, m = modify musician's instrument,
d = delete musician, se = show ensemble, sa = display all ensembles, cn = change ensemble's name,
u = undo, r = redo, l = list undo/redo, x = exit system
No current ensemble set.
Please enter command [ c | s | a | m | d | se | sa | cn | u | r | l | x ] :- x
Exiting system.
```