Collaborative Filtering

Movies = 15 and reviewers = 15

	Movie1	Movie2	Movie3	Movie4	Movie5	Movie6	Movie7	Movie8	Movie9	Movie10	Movie11	Movie12	Movie13	Movie14	Movie15
Reviewer1	10	9	8	4	5										
Reviewer2	10	9	8	4	5	6	7	6	6	7	6				10
Reviewer3	10	9	8	4		9	10	6	6	6	6				
Reviewer4	10	9	8		5	8	9	10	6	6	6				10
Reviewer5	10	9		4	5	7	8	9	10	6	6				10
Reviewer6	10		8	4	5	6	7	8	9	10	6				
Reviewer7		9	8	4	5	6	7	8	9	10					
Reviewer8	9	10	7	5	6						10	9	8	7	
Reviewer9	9	10	7	5							9	10	8	7	
Reviewer10	9	10	7		6						8	9	10	7	
Reviewer11	9	10		5	6						7	8	9	10	
Reviewer12	9		7	5	6							7	8	9	
Reviewer13	8	9	9	3	6									10	
Reviewer14	7	8	8	3	6										
Reviewer15	3	4	3	4	5	10									

Collaborative Filtering

Exercise 4 (Same Movie)

```
SAME RECOMMENDATIONS

========================================
REQUIREMENTS VERIFICATION
========================================

1. Number of reviewers: 15
   Required: 10 ≤ n ≤ 20
   Status: ✓ PASS

2. Number of movies: 15
   Required: 10 ≤ m ≤ 20
   Status: ✓ PASS

3. Rating range: [3.0, 10.0]
   Required: All ratings between 3 and 10
   Status: ✓ PASS

4. No identical reviewers: ✓ PASS

5. Target reviewer (Reviewer1) has seen:
   Movies: 5/15 (33.3%)
   Required: Less than 50% (< 7.5)
   Status: ✓ PASS

6. Empty cells: 44.44%
   Required: Between 40% and 70%
   Status: ✓ PASS
```

Collaborative Filtering

Reviewer1 likes: Movies 1-3 (rated 10, 9, 8)
Reviewer1 dislikes: Movies 4-5 (rated 4, 5)

Reviewers 2-7 have similar taste as Reviewer1, and as some of them give Movie15 a 10 score, this movie is selected as the best choice for Reviewer1.

Reviewer15 has different rating pattern so it does not influence the decision.

```
7. Testing recommendations for Reviewer1...
   Nearest Neighbor (Manhattan) : Movie15
   Manhattan Distance           : Movie15
   Euclidean Distance           : Movie15
   Exponential Weighting        : Movie15
   Pearson Correlation          : Movie15
   Cosine Similarity            : Movie15
```

	Movie1	Movie2	Movie3	Movie4	Movie5
Reviewer1	10	9	8	4	5
Reviewer2	10	9	8	4	5
Reviewer3	10	9	8	4	
Reviewer4	10	9	8		5
Reviewer5	10	9		4	5
Reviewer6	10		8	4	5
Reviewer7		9	8	4	5
Reviewer8	9	10	7	5	6
Reviewer9	9	10	7	5	
Reviewer10	9	10	7		6
Reviewer11	9	10		5	6
Reviewer12	9		7	5	6
Reviewer13	8	9	9	3	6
Reviewer14	7	8	8	3	6
Reviewer15	3	4	3	4	5

Collaborative Filtering

Movies = 16 and reviewers = 16

	Movie1	Movie2	Movie3	Movie4	Movie5	Movie6	Movie7	Movie8	Movie9	Movie10	Movie11	Movie12	Movie13	Movie14	Movie15	Movie16
Reviewer1	10	9	9	4	5											
Reviewer2	10			3	3				3	3	6	6	3		3	
Reviewer3	8	8	8	7	6		6	3			3		6	8		
Reviewer4		10	6													6
Reviewer5		10			3	6	6				6	3				
Reviewer6	3		10					3					6	3	6	
Reviewer7			10													
Reviewer8	6			10	3		3	3	3		3		6			
Reviewer9	3			10			6			3	6			6	6	
Reviewer10	3		6	3	10	3	6			6	6		3		3	3
Reviewer11	3				10	3					6		6			6
Reviewer12	6		6	6		10										
Reviewer13	6			3		10			3			6	6			6
Reviewer14						3									6	
Reviewer15	6	6	3	6	6	6	6	3	6							3
Reviewer16				3	6		6			6	3				3	6

Collaborative Filtering

Exercise 5 (Different Movie)

```
DIFFERENT RECOMMENDATIONS

========================================
REQUIREMENTS VERIFICATION
========================================

1. Number of reviewers: 16
   Required: 10 ≤ n ≤ 20
   Status: √ PASS

2. Number of movies: 16
   Required: 10 ≤ m ≤ 20
   Status: √ PASS

3. Rating range: [3.0, 10.0]
   Required: All ratings between 3 and 10
   Status: √ PASS

4. No identical reviewers: √ PASS

5. Target reviewer (Reviewer1) has seen:
   Movies: 5/16 (31.2%)
   Required: Less than 50% (< 8.0)
   Status: √ PASS

6. Empty cells: 60.16%
   Required: Between 40% and 70%
   Status: √ PASS
```

Collaborative Filtering

Reviewer1 likes: Movies 1-3 (rated 10, 9, 9)
Reviewer1 dislikes: Movies 4-5 (rated 4, 5)

```
Testing recommendations for Reviewer1...
Nearest Neighbor (Manhattan)  : Movie15
Manhattan Distance            : Movie7
Euclidean Distance            : Movie14
Exponential Weighting         : Movie16
Pearson Correlation           : Movie12
Cosine Similarity             : Movie6
```

- Nearest Neighbor (Reviewer 14) -> rates movie15 the highest
- Manhattan Distance -> Movie7
    - Top helper: Reviewer16 (closest, rates Movie7 as 6)
    - 7 neighbors contribute, most rate it 6
- Euclidean Distance -> Movie14
    - Top helper: Reviewer3 (rates Movie14 as 8)
    - Euclidean squares differences, ranks Reviewer3 closer than Manhattan does
- Exponential -> Movie16
    - Heavily favors the VERY closest neighbor (Reviewer16 and Reviewer4)
    - Both rates movie16 at 6
- Pearson Correlation -> Movie12
    - Top helpers: Reviewer13 & Reviewer2 (perfect pattern match)
    - Ignores rating values, focuses on ups/downs matching Reviewer1
- Cosine Similarity -> Movie6
    - Top helpers: Reviewer13 & Reviewer12 (both rate movie6 it 10)