**a) Find neighbors of 3712 and their correlation scores. These are as follows:**

user neighbors correlations

**neighbor  correlation**

 2824     0.4629100

 3867      0.4002745

 5062      0.2476933

 442        0.2271299

3853       0.1936596

**b) Extract all movie ratings for each of these neighbors. These are as follows (NAs represent the ones where that neighbor has NOT rated the movie):**

2824 ratings: [1] 4.5 NA 5.0 NA 4.5 4.0 NA NA 5.0 NA 5.0 NA 5.0 NA 4.0 4.0 4.0 NA NA NA NA 5.0 NA

[24] 4.5 NA NA NA NA NA NA 4.0 NA NA 5.0 NA NA 4.0 NA NA 4.0 NA 3.5 NA NA NA NA

[47] NA NA NA NA 5.0 5.0 3.0 NA 3.0 NA NA 4.0 3.0 3.0 NA 4.0 NA NA 4.0 3.0 4.0 2.5 NA

[70] NA NA NA NA 3.5 NA NA NA 4.0 4.5 4.0 NA NA NA NA NA NA NA NA NA NA NA 3.5

[93] NA NA NA NA NA NA NA NA

3867 ratings: [1] 4.0 4.0 4.5 NA 4.0 3.0 NA NA NA 4.5 4.0 NA NA 4.0 5.0 5.0 5.0 NA NA NA NA 5.0 4.0

[24] 3.5 NA NA NA 3.0 NA 2.5 4.0 NA NA 3.0 3.5 3.5 3.0 2.5 NA 3.0 3.5 4.5 4.0 4.0 NA NA

[47] 3.5 2.0 3.0 3.0 5.0 2.5 4.0 NA 4.0 NA NA 4.0 4.5 5.0 4.0 5.0 NA 2.5 NA 5.0 3.5 3.0 3.5

[70] 3.5 3.0 NA NA 3.0 5.0 3.5 2.0 4.5 4.0 3.5 NA NA NA 3.5 4.0 2.5 3.0 NA NA NA 1.0 4.0

[93] NA NA NA 3.0 4.0 4.0 3.5 3.0

5062 ratings: [1] 4.0 4.0 4.5 4.5 4.0 4.0 4.0 NA 4.0 4.0 4.0 4.5 4.0 NA 4.5 4.5 5.0 4.0 4.5 3.5 4.5 4.5 4.5

[24] 4.0 4.0 4.0 NA NA 3.5 NA NA NA NA 4.5 3.5 4.0 3.5 NA NA 4.5 NA 5.0 NA 3.5 3.5 NA

[47] 4.0 3.5 3.5 3.5 4.5 3.0 3.5 3.5 4.0 NA 3.5 2.0 2.0 4.5 NA NA NA 3.5 NA 3.5 NA 3.5 4.0

[70] NA 3.5 4.0 3.5 NA 4.0 4.0 3.5 4.5 4.5 3.0 NA NA NA 4.0 4.0 NA 3.5 NA 3.5 NA 4.0 NA

[93] NA NA NA 3.5 2.0 4.0 NA NA

442 ratings: [1] 3 NA 3 4 1 5 3 2 4 5 4 5 NA NA 5 5 5 NA 3 NA 3 3 NA 5 3 4 4 4 NA 3 3

[32] 4 NA NA 4 4 5 3 4 4 NA 4 3 2 4 NA NA 4 NA 4 5 5 2 NA NA 5 NA 4 3 5 4 3

[63] NA NA 3 3 3 NA 1 2 NA 4 4 4 4 NA NA 3 3 3 3 3 5 5 5 1 NA NA 3 3 NA 3 NA

[94] NA 2 NA NA 4 4 NA

3853 ratings: [1] NA NA 3.5 NA NA 5.0 5.0 4.0 4.5 4.0 3.0 NA NA NA 5.0 5.0 4.0 NA 4.0 NA 4.5 5.0 3.5

[24] 3.5 NA 4.5 2.5 5.0 NA NA 4.0 4.0 NA 4.0 3.0 2.0 5.0 NA 4.5 3.5 NA NA NA NA NA NA

[47] NA NA NA 2.0 4.5 1.5 4.5 5.0 NA NA NA NA NA 4.0 3.0 3.5 NA 1.5 4.0 4.0 NA NA 3.5

[70] 3.0 NA 2.0 2.5 NA NA NA NA NA NA NA 4.5 NA 3.0 NA NA NA NA 2.0 NA NA NA NA

[93] NA NA NA NA NA 3.0 NA NA

**c) Multiply each of these ratings by their respective correlation scores**

2824 ratings: [1] 2.083095 NA 2.314550 NA 2.083095 1.851640 NA NA 2.314550 NA 2.314550

[12] NA 2.314550 NA 1.851640 1.851640 1.851640 NA NA NA NA 2.314550

[23] NA 2.083095 NA NA NA NA NA NA 1.851640 NA NA

[34] 2.314550 NA NA 1.851640 NA NA 1.851640 NA 1.620185 NA NA

[45] NA NA NA NA NA NA 2.314550 2.314550 1.388730 NA 1.388730

[56] NA NA 1.851640 1.388730 1.388730 NA 1.851640 NA NA 1.851640 1.388730

[67] 1.851640 1.157275 NA NA NA NA NA 1.620185 NA NA NA

[78] 1.851640 2.083095 1.851640 NA NA NA NA NA NA NA NA

[89] NA NA NA 1.620185 NA NA NA NA NA NA NA

[100] NA

3867 ratings: [1] 1.6010980 1.6010980 1.8012353 NA 1.6010980 1.2008235 NA NA NA 1.8012353

[11] 1.6010980 NA NA 1.6010980 2.0013725 2.0013725 2.0013725 NA NA NA

[21] NA 2.0013725 1.6010980 1.4009608 NA NA NA 1.2008235 NA 1.0006863

[31] 1.6010980 NA NA 1.2008235 1.4009608 1.4009608 1.2008235 1.0006863 NA 1.2008235

[41] 1.4009608 1.8012353 1.6010980 1.6010980 NA NA 1.4009608 0.8005490 1.2008235 1.2008235

[51] 2.0013725 1.0006863 1.6010980 NA 1.6010980 NA NA 1.6010980 1.8012353 2.0013725

[61] 1.6010980 2.0013725 NA 1.0006863 NA 2.0013725 1.4009608 1.2008235 1.4009608 1.4009608

[71] 1.2008235 NA NA 1.2008235 2.0013725 1.4009608 0.8005490 1.8012353 1.6010980 1.4009608

[81] NA NA NA 1.4009608 1.6010980 1.0006863 1.2008235 NA NA NA

[91] 0.4002745 1.6010980 NA NA NA 1.2008235 1.6010980 1.6010980 1.4009608 1.2008235

5062 ratings: [1] 0.9907731 0.9907731 1.1146197 1.1146197 0.9907731 0.9907731 0.9907731 NA 0.9907731 0.9907731

[11] 0.9907731 1.1146197 0.9907731 NA 1.1146197 1.1146197 1.2384664 0.9907731 1.1146197 0.8669265

[21] 1.1146197 1.1146197 1.1146197 0.9907731 0.9907731 0.9907731 NA NA 0.8669265 NA

[31] NA NA NA 1.1146197 0.8669265 0.9907731 0.8669265 NA NA 1.1146197

[41] NA 1.2384664 NA 0.8669265 0.8669265 NA 0.9907731 0.8669265 0.8669265 0.8669265

[51] 1.1146197 0.7430798 0.8669265 0.8669265 0.9907731 NA 0.8669265 0.4953865 0.4953865 1.1146197

[61] NA NA NA 0.8669265 NA 0.8669265 NA 0.8669265 0.9907731 NA

[71] 0.8669265 0.9907731 0.8669265 NA 0.9907731 0.9907731 0.8669265 1.1146197 1.1146197 0.7430798

[81] NA NA NA 0.9907731 0.9907731 NA 0.8669265 NA 0.8669265 NA

[91] 0.9907731 NA NA NA NA 0.8669265 0.4953865 0.9907731 NA NA

442 ratings:[1] 0.6813896 NA 0.6813896 0.9085195 0.2271299 1.1356493 0.6813896 0.4542597 0.9085195 1.1356493

[11] 0.9085195 1.1356493 NA NA 1.1356493 1.1356493 1.1356493 NA 0.6813896 NA

[21] 0.6813896 0.6813896 NA 1.1356493 0.6813896 0.9085195 0.9085195 0.9085195 NA 0.6813896

[31] 0.6813896 0.9085195 NA NA 0.9085195 0.9085195 1.1356493 0.6813896 0.9085195 0.9085195

[41] NA 0.9085195 0.6813896 0.4542597 0.9085195 NA NA 0.9085195 NA 0.9085195

[51] 1.1356493 1.1356493 0.4542597 NA NA 1.1356493 NA 0.9085195 0.6813896 1.1356493

[61] 0.9085195 0.6813896 NA NA 0.6813896 0.6813896 0.6813896 NA 0.2271299 0.4542597

[71] NA 0.9085195 0.9085195 0.9085195 0.9085195 NA NA 0.6813896 0.6813896 0.6813896

[81] 0.6813896 0.6813896 1.1356493 1.1356493 1.1356493 0.2271299 NA NA 0.6813896 0.6813896

[91] NA 0.6813896 NA NA 0.4542597 NA NA 0.9085195 0.9085195 NA

3853 ratings: [1] NA NA 0.6778086 NA NA 0.9682980 0.9682980 0.7746384 0.8714682 0.7746384

[11] 0.5809788 NA NA NA 0.9682980 0.9682980 0.7746384 NA 0.7746384 NA

[21] 0.8714682 0.9682980 0.6778086 0.6778086 NA 0.8714682 0.4841490 0.9682980 NA NA

[31] 0.7746384 0.7746384 NA 0.7746384 0.5809788 0.3873192 0.9682980 NA 0.8714682 0.6778086

[41] NA NA NA NA NA NA NA NA NA 0.3873192

[51] 0.8714682 0.2904894 0.8714682 0.9682980 NA NA NA NA NA 0.7746384

[61] 0.5809788 0.6778086 NA 0.2904894 0.7746384 0.7746384 NA NA 0.6778086 0.5809788

[71] NA 0.3873192 0.4841490 NA NA NA NA NA NA NA

[81] 0.8714682 NA 0.5809788 NA NA NA NA 0.3873192 NA NA

[91] NA NA NA NA NA NA NA 0.5809788 NA NA

**d) Compute sum of all these ratings (by ignoring any NAs). This is the numerator**

[1] 5.3563559 2.5918711 6.5896034 2.0231392 4.9020962 6.1471841 2.6404607 1.2288981 5.0853110

[10] 4.7022961 6.3959196 2.2502690 3.3053233 1.6010980 7.0715798 7.0715798 7.0017668 0.9907731

[19] 2.5706477 0.8669265 2.6674775 7.0802301 3.3935263 6.2882870 1.6721627 2.7707608 1.3926685

[28] 3.0776410 0.8669265 1.6820759 4.9087662 1.6831579 0.0000000 5.4046319 3.7573855 3.6875725

[37] 6.0233375 1.6820759 1.7799877 5.7534115 1.4009608 5.5684063 2.2824876 2.9222842 1.7754459

[46] 0.0000000 2.3917339 2.5759949 2.0677500 3.3635886 7.4376600 5.4844551 5.1824826 1.8352245

[55] 3.9806013 1.1356493 0.8669265 4.8566442 4.3667416 6.4150101 3.0905963 5.2122109 0.0000000

[64] 2.1581021 3.3076682 5.7130571 3.9339906 3.2250251 3.2966723 2.4361993 2.0677500 2.2866118

[73] 2.2595949 3.7295281 3.9006651 2.3917339 1.6674755 5.4488848 5.4802026 4.6770704 1.5528578

[82] 0.6813896 1.7166281 3.5273832 3.7275204 1.2278161 2.0677500 0.3873192 1.5483160 0.6813896

[91] 1.3910476 3.9026728 0.0000000 0.0000000 0.4542597 2.0677500 2.0964846 4.0813694 2.3094802

[100] 1.2008235

**e) Compute sum of correlations of all five neighbors. This is the denominator. The result is as follows:**

1.531667

**f) Divide numerator (result from d) by denominator (result from e) and sort in descending order. Following is the result**

movie ratings

603: The Matrix (1999) 4.855924

155: The Dark Knight (2008) 4.622564

120: The Lord of the Rings: The Fellowship of the Ring (2001) 4.616916

121: The Lord of the Rings: The Two Towers (2002) 4.616916

122: The Lord of the Rings: The Return of the King (2003) 4.571337

13: Forrest Gump (1994) 4.302242