**2. Use the Amazon approach to calculate which the 3 new games to recommend to Toby using renting data (which you have to create out of the ratings data), but not the ratings data. In order to create the renting data, transform the ratings data into 0/1 renting data. Example, if a game has been rated, it must have been rented, so assign a 1. If no rating is available, assume the game has not been rented and assign a 0. Use the Amazon approach calculate which pairs of games are most popular given the games Toby has already rented in the past and recommend one.**

**Renting Data Table:**

This table is formed as per the instruction, assigning 1 to all the cells with values and 0 to the cells with NA.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Super Mario 3D World** | **The Last of US** | **GTA 5 - San Andreas** | **NBA 2K14** | **Gran Turismo 6** | **TitanFall** | **Lego Movie Game** |
| Toby | 1 | 1 | 1 | 1 |  |  |  |
| Michael | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Ethan | 1 | 0 | 1 | 1 | 1 | 1 | 0 |
| Emily | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| Ava | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| Anthony | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| William | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Matthew | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| Elizabeth | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| Sophia | 1 | 0 | 1 | 1 | 0 | 1 | 1 |
| Isabella | 0 | 1 | 1 | 1 | 1 | 1 | 0 |

**Recommendation List Table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Super Mario 3D World** | **The Last of US** | **GTA 5 - San Andreas** | **NBA 2K14** |
| Gran Turismo 6 | 0.824957911 | 0.801783726 | 0.75 | 0.894427191 |
| TitanFall | 0.755928946 | 0.571428571 | 0.935414347 | 0.836660027 |
| Lego Movie Game | 0.881917104 | 0.714285714 | 0.668153105 | 0.836660027 |

This table is formed using the formula **nAB/SQRT(nAnB)** where,

**nAB** = Number of persons who rented both games together (For example, for the first cell highlighted in yellow, it’s the number persons who rented Gran Turismo 6 and Super Mario 3D World together, which is 7)

**nA** = Number of times the game A is rented (For example, for the first cell highlighted in yellow, it’s the number of persons who rented Gran Turismo 6, which is 8)

**nB** = Number of times the game B is rented (For example, for the first cell highlighted in yellow, it’s the number of persons who rented Super Mario 3D World, which is 9)

**Combined List Table:**

Pairs of games that are popular are highlighted in blue in the Recommendation list table and those are Gran Turismo 6/NBA 2K14, TitanFall/GTA 5 - San Andreas, Lego Movie Game/Super Mario 3D World. Among them all, **TitanFall/ GTA 5 - San Andreas** is the most popular pair of games.

This list is formed by picking up the highest value from each row(popular pair of games).

|  |  |
| --- | --- |
| **Game to be recommended** | **Highest score** |
| Gran Turismo 6 | 0.894427191 |
| TitanFall | 0.935414347 |
| Lego Movie Game | 0.881917104 |

As the TitanFall has the highest lift, **TitanFall** is to be recommended to Toby.