**影音管理軟體**

**HW# 7**

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1. **Requirement Document**
   1. **Change History**

|  |  |  |
| --- | --- | --- |
| **Iteration I** | | |
| **Version** | **Description** | **Date** |
| 1 | Cover Page  Problem Statement  The Development Language | 2016.2.28 |
| 2.1 | Change History  System Feature  Use Case 1 | 2016.3.10 |
| 2.2 | Modify Use Case 1  Add Use Case 2 & 3 | 2016.3.15 |
| 2.3 | Add Use Case 4 | 2016.3.17 |
| 3.1 | Domain Diagram Design | 2016.3.29 |
| 4.1 | Logic Architecture & SSD | 2016.4.12 |
| 4.2 | Contract & Operation Sequence Diagram  SSD modified | 2016.4.26 |
| 4.3 | Class Diagram | 2016.4.27 |
| 5.1 | Add Initialize Seq and Destructor Seq and Implementation Class Diagram | 2016.5.03 |
| 5.2 | Add the difference between implementation and design and the information of source code | 2016.5.05 |
| 6.1 | Modify Use Case 1 and Use Case 2  Modify Domain Model Design  Add SSD of Use Case 2 | 2016.5.17 |
| 7.1 | Update Domain Model, Sequence Diagrams, Contract, and Design Class Diagram of Use Case 1 | 2016.5.31 |
| 7.2 | Add Contracts of Use Case 2 | 2016.6.02 |
| 7.3 | Edit Document | 2016.6.13 |

* 1. **Problem Statement**

日前電視劇風靡各年齡層，每周推出的新集數與每季上映的新劇，往往令那些電視劇觀賞者眼花撩亂，也讓那些想嘗試新劇的人不知如何下手，於是我們想到利用一套軟體記錄使用者的觀賞進度與喜好程度，同時管理使用者的影集，並可利用軟體推薦使用者可能喜歡的新劇，而使用者可在自家使用任意設備、平台進行記錄。

因為電視劇眾多且集數與觀賞記錄個不同，因此使用者容易遺失自己的影集進度，也不容易清楚究竟哪些新劇符合自己的胃口，透過此軟體，在每一次觀看前便可查詢先前的進度，而觀看後做上記錄與評論，就可以避免進度的遺失，也可藉評論讓軟體歸納使用者可能喜歡的類型，進而推薦新劇給有需要的人。

本軟體提供GUI，讓使用者快速、簡便、直覺地操作，並記錄影集的觀看進度，也讓使用者可清楚自己喜好的類別與觀看歷史。

* 1. **System Context Diagram**



* 1. **System Features**

1. 管理影集資訊
2. 追蹤影集
3. 撰寫觀後心得
4. 推薦影集
   1. **Use Case Diagram**



* 1. **Use Case**

1. **Use Case 1 (New)**

|  |  |
| --- | --- |
| Use Case Name | 管理影集資訊 |
| Scope | 影音管理軟體 |
| Level | User Goal |
| Prime Actor | 觀看者 |
| Stakeholder and Interests | 觀看者：管理影集的資訊，包含取得、新增、修改、刪除影集資訊 |
| Preconditions | 觀看者已安裝軟體 |
| Success Guarantee | 觀看者能成功管理影集資訊，並看見結果 |
| Main Success Scenario | 1. 觀看者啟動軟體 2. 軟體讀取local的存檔 3. 軟體告訴使用者正在更新資訊 4. 軟體自server抓取最新資訊 5. 軟體顯示更新完成 6. 觀看者手動對影集資訊進行管理 7. 顯示正確結果 |
| Extensions | 2a. 若local沒有存檔，建立空的影集資訊列表  2b. 若檔案讀取失敗，通知觀看者，檔案損毀  4a. 沒有網路的情況下，通知觀看者，目前裝置尚未連接網路  4b. 如果沒有新的影集資訊，通知觀看者  6a. 若觀看者要新增影集資訊   1. 觀看者使用新增功能 2. 觀看者輸入影集資訊 3. 觀看者完成新增   6b. 若觀看者要匯入影集資訊   1. 觀看者使用匯入功能 2. 觀看者選擇要匯入的檔案 3. 軟體完成匯入   6c. 若觀看者要修改影集資訊   1. 觀看者選擇影集並修改 2. 觀看者輸入修改的資訊 3. 觀看者完成修改   6d. 若觀看者要刪除影集資訊   1. 觀看者選擇影集並刪除 2. 軟體再次確認影集的刪除   2a. 若觀看者確認刪除，軟體刪除影集資訊  6e. 若觀看者要手動更新網路資訊   1. 觀看者使用更新功能 2. 跳到步驟二   7a. 若觀看者想繼續管理影音資訊，回到步驟六  7b. 若觀看者關閉軟體，軟體把目前的影集資訊儲存到local中 |
| Special Requirements | NFR-01、NFR-02、NFR-03 |
| Technology and Data Variations List | 網路影集資訊與私人影集資訊擁有個別的獨立編號。  影集資訊中，包含描述與類別。 |
| Frequency of Occurrence | 每次啟動後一定會發生至少一次 |
| Open Issue | 1. 影集資料格式尚未決定 2. 各部影集的獨立編號產生方式尚未決定 3. 伺服器是要租用還要自己架設 4. 匯入的資料格式尚未決定 |

1. **Use Case 2**

|  |  |
| --- | --- |
| Use Case Name | 追蹤影集 |
| Scope | 影音管理軟體 |
| Level | User Goal |
| Prime Actor | 觀看者 |
| Stakeholder and Interests | 觀看者：對影集進行追縱，包含新增追蹤的影集、修改追蹤進度、取消追蹤 |
| Preconditions | 觀看者已安裝軟體 |
| Success Guarantee | 觀看者能成功追蹤影集，並看見結果 |
| Main Success Scenario | 1. 觀看者選擇影集 2. 軟體顯示影集資訊 3. 觀看者使用追蹤功能 4. 顯示正確結果 |
| Extensions | 3a. 若觀看者要追蹤新的影集，軟體紀錄開始追蹤  3b. 若觀看者要新增已追蹤的影集集數   1. 觀看者使用新增集數功能 2. 觀看者輸入集數資訊 3. 軟體顯示該影集的集數資訊   重複2、3步驟，直到觀看者不再新增集數  3c. 若觀看者要修改已追蹤的影集進度   1. 觀看者使用修改進度功能 2. 觀看者紀錄觀看的集數   2a. 若集數不存在，觀看者新增集數   1. 軟體要求輸入評論   3a. 若觀看者取消輸入，則不新增評論  3b. 若觀看者輸入評論，則新增一筆評論  3d. 若觀看者要取消已追蹤的影集   1. 觀看者使用取消追蹤的功能 2. 軟體再去確認影集取消追蹤   2a. 若觀看這確認，軟體取消影集的追蹤  3e. 若觀看者要恢復已取消追蹤的影集   1. 軟體恢復開始追蹤 2. 軟體讀取先前的集數資訊，並顯示 |
| Special Requirements | NFR-03、NFR-01 |
| Technology and Data Variations List | NA |
| Frequency of Occurrence | 經常發生 |
| Open Issue | NA |

1. **Use Case 3**

|  |  |
| --- | --- |
| Use Case Name | 撰寫觀後心得 |
| Scope | 影音管理軟體 |
| Level | User Goal |
| Prime Actor | 觀看者 |
| Stakeholder and Interests | 觀看者：可以記錄自己的觀後心得 |
| Preconditions | 觀看者至少有一部已追蹤的影集 |
| Success Guarantee | 觀看者能成功紀錄下觀後心得 |
| Main Success Scenario | 1. 觀看者選擇影集 2. 軟體顯示影集資訊 3. 觀看者開始撰寫心得 4. 軟體定期儲存當前的心得資訊 5. 觀看者結束心得的撰寫 |
| Extensions | 3a. 若軟體發現上次沒有正確儲存的心得資料   1. 軟體詢問觀看者是否重新載入上次的心得   1a. 若觀看者確認，則軟體顯示上次心得  1b. 若觀看者取消，則軟體清除上次心得  5a. 若觀看者取消心得撰寫   1. 軟體詢問觀看者是否保留目前的心得   1a. 若觀看者確認，軟體保留當前心得記錄  1b. 若觀看者取消，軟體清除定期儲存的心得資訊  5b. 若觀看者完成心得   1. 軟體詢問觀看者是否儲存心得   1a. 若觀看者確認，軟體儲存並完成心得  1b. 若觀看者取消，觀看者可以繼續編輯心得 |
| Special Requirements | NFR-03、NFR-01 |
| Technology and Data Variations List | NA |
| Frequency of Occurrence | 經常發生 |
| Open Issue | NA |

1. **Use Case 4**

|  |  |
| --- | --- |
| Use Case Name | 推薦影集 |
| Scope | 影音管理軟體 |
| Level | User Goal |
| Prime Actor | 軟體 |
| Stakeholder and Interests | 觀看者：希望可以看見軟體所推薦的影集  軟體：推薦影集給觀看者 |
| Preconditions | 觀看者可以有過去影集的追蹤紀錄 |
| Success Guarantee | 影集被推薦給觀看者 |
| Main Success Scenario | 1. 觀看者使用推薦功能 2. 軟體顯示數個推薦影集 3. 觀看者對推薦影集操作 |
| Extensions | 2a, 若軟體無法取得觀看者的資料   1. 軟體通知觀看者，無法推薦影集   2b. 若軟體的推薦影集皆被觀看者列入黑名單   1. 軟體通知觀看者，無非黑名單的推薦影集   3a. 若觀看者對某推薦影集有興趣   1. 觀看者對該部影集進行追蹤   3b. 若觀看者對某推薦影集不感興趣   1. 觀看者取消推薦該影集 2. 軟體將該影集列入黑名單   3c. 若觀看者希望再次推薦   1. 觀看者使用再次推薦功能 2. 回到步驟二   3d. 若觀看者不進行任何操作，直接離開 |
| Special Requirements | NFR-01、NFR-03 |
| Technology and Data Variations List | 依照影集類別，軟體一次最多推薦5部影集 |
| Frequency of Occurrence | 偶爾發生 |
| Open Issue | NA |

* 1. **Non-Functional Requirement and Constraints**

|  |  |  |
| --- | --- | --- |
| NFR ID | Category | Description |
| NFR-01 | Performance | 資料讀寫需要在一秒內完成 |
| NFR-02 | Performance | 伺服器要在0.5秒內回應 |
| NFR-03 | Usability | 通知要夠大夠清楚 |
| NFR-04 | Usability | UI 要足夠友善 |
| NFR-05 | Reliability | 資料讀寫必須正確無誤 |

* 1. **Glossary**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Term | Definition and Information | Format | Validation Rules | Aliases |
| 影集 | 以單集為播放單位而長期放映的影片 |  |  | 影劇、Series |
| 集數 | 一部影集的最小單位 |  |  | Episode |

* 1. **Software Environments**

The program will be written in C# language with Visual Studio.

1. **Domain Class Model**
   1. **Domain Class Diagram Showing Only Concepts**
      1. **Class Identified (New)**

* Business Transaction : Series、Episode、Blacklist、Tracing\_List、Abandoned\_List
* Products : Review、Command
* Description : Series\_Description、Episode\_Description
* Catalogs : Catalog
* Collaborating System : Server、Software、FileManager

P.S. 以上為使用類別清單 (Catalog List) 所找出來的Concepts，其中有些Concepts並沒有劃入Domain Model中。

* + 1. **Bad Class**

以Attribute的方式取代：

Series\_Description, Episode\_Description, BlackList, Tracing\_List, Abandoned\_List

* + 1. **Good Class (New)**

Series, Episode：Domain基礎物件

Review, Command：功能之一

Category：分類影音的物件

Server：負責外部連結的物件

Software：Root Object

FileManager：負責管理軟體的存讀檔

* 1. **Add Associations (New)**
     + **Software uses FileManager**
     + **Software uses SeriesManager**
     + **Software uses ServerHelper**
     + **SeriesManager contains Series**
     + **Series contains Episode**
     + **Episode contains Command**



* 1. **Add Attributes (New)**



1. **Design**
   1. **Logic Architecture (New)**
   2. **Use-Case Realizations with GRASP Patterns**
      1. **System Sequence Diagram**
         1. **管理影集資訊(Use Case 1)**





* + - 1. **追蹤影集(Use Case 2) (New)**



* + 1. **Contract**

|  |  |
| --- | --- |
| Contract ID | Operation Name |
| CO-01 | AddSeries |
| CO-02 | ImportFile |
| CO-03 | SelectSeries |
| CO-04 | ModifySeries |
| CO-05 | RemoveSeries |
| CO-06 | OpenSoftware |
| CO-07 | CloseSoftware |
| CO-08 | RefreshServerData |
| CO-09 | FollowSeries |
| CO-10 | AddEpisode |
| CO-11 | Record |
| CO-12 | UnfollowSeries |
| CO-13 | RecoverSeries |

* + - 1. **AddSeries**

|  |  |
| --- | --- |
| Operation | AddSeries(name:string, description:string) |
| Cross Reference | Use Case1 |
| Preconditions | Software was opened |
| Postconditions | A new series instance s was created.(instance creation)  S was added into series list of series manager. (association formed) |

* + - 1. **ImportFile**

|  |  |
| --- | --- |
| Operation | ImportFile(filePath:string) |
| Cross Reference | Use Case1 |
| Preconditions | Software was opened |
| Postconditions | A list of new series sl was created.(instance creation)  Sl was added into series list of series manager. (association formed) |

* + - 1. **SelectSeries**

|  |  |
| --- | --- |
| Operation | SelectSeries(sid: int) |
| Cross Reference | Use Case1 |
| Preconditions | Software was opened |
| Postconditions | SeriesManager.selectedSeries became a series s. (attribute modification) |

* + - 1. **ModifySeries**

|  |  |
| --- | --- |
| Operation | ModifySeries (name: string, description: string) |
| Cross Reference | Use Case1 |
| Preconditions | A series s has been selected. |
| Postconditions | s.name was modified.(instance creation)  s.description was modified.(attribute modification) |

* + - 1. **RemoveSeries**

|  |  |
| --- | --- |
| Operation | RemoveSeries (sid: int) |
| Cross Reference | Use Case1 |
| Preconditions | Software was opened |
| Postconditions | A series s was removed from the list of series of series manager. (attribute modification) |

* + - 1. **OpenSoftware**

|  |  |
| --- | --- |
| Operation | OpenSoftware () |
| Cross Reference | Use Case1 |
| Preconditions | None |
| Postconditions | A serverHelper sh was created (instance creation)  A fileManger fm was created (instance creation)  A software s was created by sh and fm (instance creation & association informed)  A seriesManager sm was created (instance creation)  sm was associated by s (association informed)  Server data and local data was added into sm (attribute modification) |

* + - 1. **CloseSoftware**

|  |  |
| --- | --- |
| Operation | CloseSoftware () |
| Cross Reference | Use Case1 |
| Preconditions | Software was opened |
| Postconditions | Data was saved into local file system |

* + - 1. **RefreshServerData**

|  |  |
| --- | --- |
| Operation | RefreshServerData () |
| Cross Reference | Use Case1 |
| Preconditions | Software was opened |
| Postconditions | Data from Server was added into series manager (attribute modification) |

* + - 1. **FollowSeries**

|  |  |
| --- | --- |
| Operation | FollowSeries() |
| Cross Reference | Use Case2 |
| Preconditions | Series has been selected |
| Postconditions | The selected series was added into the following list (attribute modification) |

* + - 1. **AddEpisode**

|  |  |
| --- | --- |
| Operation | AddEpisode(name : string, description : string) |
| Cross Reference | Use Case2 |
| Preconditions | Series has been selected |
| Postconditions | An episode ep was created (instance cteation)  Ep was added into the selected series (attribute modification) |

* + - 1. **Record**

|  |  |
| --- | --- |
| Operation | Record(name : string, command : string) |
| Cross Reference | Use Case2 |
| Preconditions | Series has been selected |
| Postconditions | A command c was created (instance creation)  A episode ep was found by name. (instance found)  ep.isRead became true (attribute modification) |

* + - 1. **UnfollowSeries**

|  |  |
| --- | --- |
| Operation | UnfollowSeries() |
| Cross Reference | Use Case2 |
| Preconditions | Series has been selected |
| Postconditions | The selected series was moved into unfollowing list (attribute modification) |

* + - 1. **RecoverSeries**

|  |  |
| --- | --- |
| Operation | FollowSeries() |
| Cross Reference | Use Case2 |
| Preconditions | Series has been selected |
| Postconditions | The selected series was moved into following list from unfollowing list (attribute modification) |

* + 1. **Operation Sequence Diagram**
       1. **AddSeries**

****

* + - 1. **ImportFile**



* + - 1. **SelectSeries**

****

* + - 1. **ModifySeries**

****

* + - 1. **RemoveSeries**

****

* + - 1. **OpenSoftware**

****

* + - 1. **CloseSoftware**



* + - 1. **RefreshServerData**



* + - 1. **FollowSeries**



* + - 1. **AddEpisode**

****

* + - 1. **Record**

****

* + - 1. **UnfollowSeries**

****

* + - 1. **RecoverSeries**

****

* 1. **Design Class Diagram**

****

1. **Implementation Class Model (New)**
   1. **Implementation Class Diagram (New)**



* 1. **The Difference between Implementation and Design Class Model (New)**
     1. **Comparison with Design and Implementation Class (New)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Class** | **Method** | **Design** | **Imp.** |
| **Software(New)** | **AddSeries** | **Yes** | **Yes** |
| **ImportFile** | **Yes** | **Yes** |
| **SelectSeries** | **Yes** | **Yes** |
| **ModifySeries** | **Yes** | **Yes** |
| **RemoveSeries** | **Yes** | **Yes** |
| **(New)FollowSeries** | **Yes** | **Yes** |
| **(New)AddEpisode** | **Yes** | **Yes** |
| **(New)Record** | **Yes** | **Yes** |
| **(New)UnfollowSeries** | **Yes** | **Yes** |
| **(New)RecoverSeries** | **Yes** | **Yes** |
| **FileManager** | **ImportFile** | **Yes** | **Yes** |
| **GetList** | **Yes** | **Yes** |
| **SaveFile** | **No** | **Yes** |
| **Series(New)** | **SetName** | **Yes** | **Yes** |
| **SetDescription** | **Yes** | **Yes** |
| **SetSeriesID** | **No** | **Yes** |
| **GetName** | **Yes** | **Yes** |
| **GetDescription** | **Yes** | **Yes** |
| **GetSeriesID** | **Yes** | **Yes** |
| **(New)GetEpisodeList** | **Yes** | **Yes** |
| **(New)AddEpisode** | **Yes** | **Yes** |
| **(New)Record** | **Yes** | **Yes** |
| **SeriesManager**  **(New)** | **GetSeriesList** | **No** | **Yes** |
| **GetSelectedSeries** | **No** | **Yes** |
| **AddSeries** | **No** | **Yes** |
| **AddList** | **No** | **Yes** |
| **SelectSeries** | **No** | **Yes** |
| **ModifySelectedSeries** | **No** | **Yes** |
| **RemoveSeries** | **No** | **Yes** |
| **InitializeCount** | **No** | **Yes** |
| **(New)GetFollowingList** | **Yes** | **Yes** |
| **(New)GetUnfollowingList** | **Yes** | **Yes** |
| **(New)FollowSeries** | **Yes** | **Yes** |
| **(New)AddEpisode** | **Yes** | **Yes** |
| **(New)Record** | **Yes** | **Yes** |
| **(New)UnfollowSeries** | **Yes** | **Yes** |
| **(New)RecoverSeries** | **Yes** | **Yes** |
| **ServerHelper** | **DownloadData** | **No** | **Yes** |
| **Command(New)** | **(New)GetContent** | **Yes** | **Yes** |
| **Episode (New)** | **(New)GetName** | **Yes** | **Yes** |
| **(New)GetCommandList** | **Yes** | **Yes** |
| **(New)Record** | **Yes** | **Yes** |
| **(New)GetDescription** | **Yes** | **Yes** |
| **(New)SetName** | **Yes** | **Yes** |
| **(New)SetDescription** | **Yes** | **Yes** |
| **(New)GetIsRead** | **Yes** | **Yes** |

* + 1. **Summary of Implementation Class / Method Changed (New)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Number of Added** | **Number of Removed** | **Number of Modified** |
| **Class** | **0** | **0** | **0** |
| **Method** | **0** | **0** | **0** |

* 1. **The Lines of Code (New)**

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Class Name** | **Number of Methods** | **Line of codes without comment** |
| **1** | **Software** | **10** | **44** |
| **2** | **FileManger** | **3** | **13** |
| **3** | **Series** | **9** | **22** |
| **4** | **SeriesManager** | **15** | **54** |
| **5** | **ServerHelper** | **1** | **11** |
| **6** | **Episode** | **1** | **18** |
| **7** | **Command** | **7** | **4** |

1. **Programing**
   1. **Snapshot of System Execution**



* 1. **Source Code Listing**
     1. **Softeware**

**using Newtonsoft.Json;**

**using SeriesManagementSystem.Foundation;**

**using System;**

**using System.Collections.Generic;**

**using System.Net;**

**namespace SeriesManagementSystem.Domain**

**{**

**public class Software**

**{**

**private SeriesManager \_seriesManager;**

**private IFileSystem \_fileManager;**

**private IServerHelper \_serverHelper;**

**private bool \_isNoInternet = false;**

**private bool \_isImportFail = false;**

**private bool \_isLoadFail = false;**

**private const string LOCAL\_STOREAGE = "./dat/data.dat";**

**public Software(IServerHelper serverHelper, IFileSystem fileManager)**

**{**

**\_serverHelper = serverHelper;**

**\_fileManager = fileManager;**

**LoadFile();**

**RefreshServerData();**

**}**

**private void LoadFile()**

**{**

**\_isLoadFail = false;**

**try**

**{**

**\_fileManager.LoadFile(LOCAL\_STOREAGE);**

**\_seriesManager = JsonConvert.DeserializeObject<SeriesManager>(\_fileManager.Content);**

**}**

**catch (Exception)**

**{**

**\_seriesManager = new SeriesManager();**

**\_isLoadFail = true;**

**}**

**}**

**public void RefreshServerData()**

**{**

**\_isNoInternet = false;**

**try**

**{**

**\_seriesManager.AddServerData(\_serverHelper.DownloadData());**

**}**

**catch (WebException)**

**{**

**\_isNoInternet = true;**

**}**

**}**

**// Add a new series with name and description.**

**public void AddSeries(string name, string description)**

**{**

**\_seriesManager.AddSeries(name, description);**

**}**

**//Import series data from a file.**

**public void ImportFile(string filePath)**

**{**

**\_isImportFail = false;**

**\_fileManager.ImportFile(filePath);**

**try**

**{**

**string content = \_fileManager.Content;**

**\_seriesManager.AddList(content);**

**}**

**catch**

**{**

**\_isImportFail = true;**

**}**

**}**

**public void SelectSeries(int sid)**

**{**

**\_seriesManager.SelectSeries(sid);**

**}**

**public void ModifySeries(string newName, string newDescription)**

**{**

**\_seriesManager.ModifySelectedSeries(newName, newDescription);**

**}**

**public void RemoveSeries(int sid)**

**{**

**\_seriesManager.RemoveSeries(sid);**

**}**

**public void FollowSeries()**

**{**

**\_seriesManager.FollowSeries();**

**}**

**public void UnfollowSeries()**

**{**

**\_seriesManager.UnfollowSeries();**

**}**

**public void RecoverSeries()**

**{**

**\_seriesManager.RecoverSeries();**

**}**

**public void AddEpisode(string name, string description)**

**{**

**\_seriesManager.AddEpisode(name, description);**

**}**

**public void Record(string name, string command)**

**{**

**\_seriesManager.Record(name, command);**

**}**

**~Software()**

**{**

**string list = \_seriesManager.SeriesListString;**

**\_fileManager.SaveFile(LOCAL\_STOREAGE, list);**

**}**

**public SeriesManager SeriesManager**

**{**

**get**

**{**

**return \_seriesManager;**

**}**

**}**

**public bool IsNoInternet**

**{**

**get**

**{**

**return \_isNoInternet;**

**}**

**}**

**public bool IsImportFail**

**{**

**get**

**{**

**return \_isImportFail;**

**}**

**}**

**public bool IsLoadFail**

**{**

**get**

**{**

**return \_isLoadFail;**

**}**

**}**

**}**

**}**

* + 1. **SeriesManager**

**using System;**

**using System.Collections.Generic;**

**using Newtonsoft.Json;**

**using System.Runtime.Serialization;**

**namespace SeriesManagementSystem.Domain**

**{**

**[JsonObject(MemberSerialization.OptIn)]**

**public class SeriesManager**

**{**

**[JsonProperty]**

**private List<Series> \_series = new List<Series>();**

**[JsonProperty]**

**private List<Series> \_followingList = new List<Series>();**

**[JsonProperty]**

**private List<Series> \_unfollowingList = new List<Series>();**

**private Series \_selectedSeries;**

**private int \_count = 0;**

**private bool \_isExistNewOne = false;**

**#region Public Object**

**public List<Series> SeriesList**

**{**

**get**

**{**

**return \_series;**

**}**

**}**

**public List<Series> FollowingList**

**{**

**get**

**{**

**return \_followingList;**

**}**

**}**

**public List<Series> UnfollowingList**

**{**

**get**

**{**

**return \_unfollowingList;**

**}**

**}**

**public Series SelectedSeries**

**{**

**get**

**{**

**return \_selectedSeries;**

**}**

**}**

**public string SeriesListString**

**{**

**get**

**{**

**return JsonConvert.SerializeObject(this);**

**}**

**}**

**public bool IsExistNewOne**

**{**

**get**

**{**

**return \_isExistNewOne;**

**}**

**}**

**#endregion**

**public void AddSeries(String name, String description)**

**{**

**Series series = new Series(name, description, \_count++);**

**\_series.Add(series);**

**}**

**public void AddList(string content)**

**{**

**List<Series> list = JsonConvert.DeserializeObject<List<Series>>(content) as List<Series>;**

**foreach (Series series in list)**

**{**

**series.SeriesID = \_count++;**

**}**

**\_series.AddRange(list);**

**}**

**public void AddServerData(string content)**

**{**

**List<Series> list = JsonConvert.DeserializeObject<List<Series>>(content);**

**\_isExistNewOne = false;**

**foreach (Series series in list)**

**{**

**if (\_series.Find((s) => s.SeriesID == series.SeriesID) == null)**

**{**

**\_series.Add(series);**

**\_isExistNewOne = true;**

**}**

**}**

**}**

**public void SelectSeries(int sid)**

**{**

**\_selectedSeries = \_series.Find((x) => x.SeriesID == sid);**

**}**

**public void ModifySelectedSeries(string newName, string newDescription)**

**{**

**\_selectedSeries.Name = newName;**

**\_selectedSeries.Description = newDescription;**

**}**

**public void RemoveSeries(int sid)**

**{**

**Series series = \_series.Find((s) => s.SeriesID == sid);**

**\_series.Remove(series);**

**}**

**public void FollowSeries()**

**{**

**\_followingList.Add(\_selectedSeries);**

**}**

**public void UnfollowSeries()**

**{**

**\_followingList.Remove(\_selectedSeries);**

**\_unfollowingList.Add(\_selectedSeries);**

**}**

**public void RecoverSeries()**

**{**

**\_unfollowingList.Remove(\_selectedSeries);**

**\_followingList.Add(\_selectedSeries);**

**}**

**public void AddEpisode(string name, string description)**

**{**

**\_selectedSeries.AddEpisode(name, description);**

**}**

**public void Record(string name, string command)**

**{**

**\_selectedSeries.Record(name, command);**

**}**

**[OnDeserialized]**

**private void InitializeCount(StreamingContext context)**

**{**

**if (\_series.Count != 0)**

**{**

**\_series.Sort((s1, s2) =>**

**{**

**return s1.SeriesID - s2.SeriesID;**

**});**

**int count = \_series[\_series.Count - 1].SeriesID + 1;**

**if (count > 0)**

**\_count = count;**

**}**

**}**

**}**

**}**

* + 1. **FileManager**

**using System;**

**using System.IO;**

**using System.Text;**

**namespace SeriesManagementSystem.Foundation**

**{**

**public class FileManager : IFileSystem**

**{**

**private string \_content = "{\"\_series\":[],\"\_followingList\":[],\"\_unfollowingList\":[]}";**

**public void ImportFile(string filePath)**

**{**

**String fileContext;**

**using (var streamReader = new StreamReader(filePath, Encoding.UTF8))**

**{**

**fileContext = streamReader.ReadToEnd();**

**}**

**\_content = fileContext;**

**}**

**public void LoadFile(string localStorage)**

**{**

**try { ImportFile(localStorage); }**

**catch (Exception e)**

**{**

**if (e is FileNotFoundException | e is DirectoryNotFoundException)**

**\_content = "{\"\_series\":[],\"\_followingList\":[],\"\_unfollowingList\":[]}";**

**}**

**}**

**public void SaveFile(string localStorage, string content)**

**{**

**using (var streamReader = new StreamWriter(localStorage, false))**

**{**

**streamReader.Write(content);**

**}**

**}**

**public string Content**

**{**

**get { return \_content; }**

**}**

**}**

**}**

* + 1. **ServerHelper**

**using SeriesManagementSystem.Properties;**

**using System;**

**using System.Collections.Generic;**

**using System.IO;**

**using System.Linq;**

**using System.Net;**

**using System.Text;**

**using System.Threading.Tasks;**

**namespace SeriesManagementSystem.Foundation**

**{**

**public class ServerHelper : IServerHelper**

**{**

**const string SERVER\_URL = @"https://script.google.com/macros/s/";**

**public string DownloadData()**

**{**

**string data;**

**string url = SERVER\_URL + Resources.GoogleWebAppID;**

**HttpWebRequest request = (HttpWebRequest)HttpWebRequest.Create(url);**

**request.Method = "GET";**

**using (WebResponse wr = request.GetResponse())**

**{**

**using (StreamReader sr = new StreamReader(wr.GetResponseStream(), Encoding.UTF8))**

**{**

**data = sr.ReadToEnd();**

**}**

**}**

**return data;**

**}**

**}**

**}**

* + 1. **Series**

**using Newtonsoft.Json;**

**using System.Collections.Generic;**

**namespace SeriesManagementSystem.Domain**

**{**

**public class Series**

**{**

**private int \_seriesID;**

**private string \_name;**

**private string \_description;**

**private List<Episode> \_episodes;**

**public Series(string name, string description)**

**{**

**\_name = name;**

**\_description = description;**

**\_episodes = new List<Episode>();**

**}**

**[JsonConstructor]**

**public Series(string name, string description, int seriesID) :**

**this(name, description)**

**{**

**\_seriesID = seriesID;**

**}**

**#region Public Properties**

**public string Name**

**{**

**get**

**{**

**return \_name;**

**}**

**set**

**{**

**\_name = value;**

**}**

**}**

**public string Description**

**{**

**get**

**{**

**return \_description;**

**}**

**set**

**{**

**\_description = value;**

**}**

**}**

**public int SeriesID**

**{**

**get**

**{**

**return \_seriesID;**

**}**

**set**

**{**

**\_seriesID = value;**

**}**

**}**

**public List<Episode> Episodes**

**{**

**get**

**{**

**return \_episodes;**

**}**

**}**

**#endregion**

**public void AddEpisode(string episodeName, string episodeDescription)**

**{**

**\_episodes.Add(new Episode(episodeName, episodeDescription));**

**}**

**public void Record(string name, string command)**

**{**

**Episode episode = \_episodes.Find((e) => e.Name == name);**

**episode.Record(command);**

**}**

**}**

**}**

* + 1. **Episode**

**using Newtonsoft.Json;**

**using System;**

**using System.Collections.Generic;**

**using System.Linq;**

**using System.Text;**

**using System.Threading.Tasks;**

**namespace SeriesManagementSystem.Domain**

**{**

**[JsonObject(MemberSerialization.OptIn)]**

**public class Episode**

**{**

**[JsonProperty]**

**private string \_name;**

**[JsonProperty]**

**private string \_description;**

**[JsonProperty]**

**private bool \_isRead;**

**[JsonProperty]**

**private List<Command> \_commandList = new List<Command>();**

**[JsonConstructor]**

**public Episode(string name, string description)**

**{**

**\_name = name;**

**\_description = description;**

**}**

**#region Public Properties**

**public string Name**

**{**

**get**

**{**

**return \_name;**

**}**

**set**

**{**

**\_name = value;**

**}**

**}**

**public string Description**

**{**

**get**

**{**

**return \_description;**

**}**

**set**

**{**

**\_description = value;**

**}**

**}**

**public bool IsRead**

**{**

**get**

**{**

**//return \_commandList.Count != 0;**

**return \_isRead;**

**}**

**}**

**public List<Command> CommandList**

**{**

**get**

**{**

**return \_commandList;**

**}**

**}**

**#endregion**

**public void Record(string command)**

**{**

**\_isRead = true;**

**if (command != String.Empty)**

**{**

**Command c = new Command(command);**

**\_commandList.Add(c);**

**}**

**}**

**}**

**}**

* + 1. **Command**

**using System;**

**using System.Collections.Generic;**

**using System.Linq;**

**using System.Text;**

**using System.Threading.Tasks;**

**namespace SeriesManagementSystem.Domain**

**{**

**public class Command**

**{**

**private string \_content;**

**public Command(string content)**

**{**

**\_content = content;**

**}**

**public String Content**

**{**

**get**

**{**

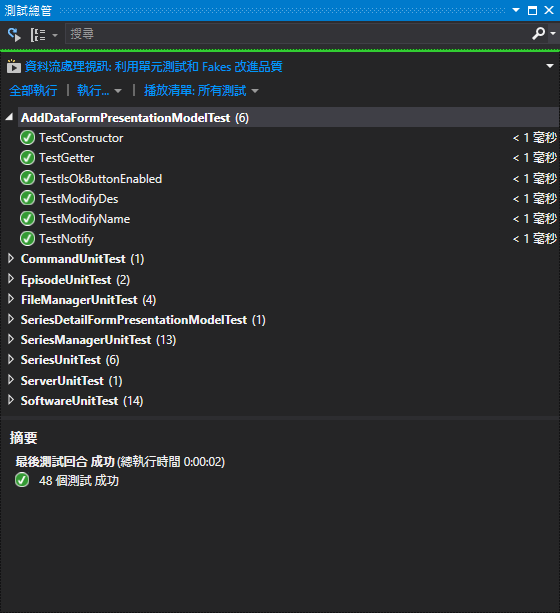
**return \_content;**

**}**

**}**

**}**

**}**

1. **Unit Test**
   1. **Snapshot of Testing Result**
   2. 
   3. **Unit Test Code Listing**
      1. **Softeware**

**using System;**

**using Microsoft.VisualStudio.TestTools.UnitTesting;**

**using SeriesManagementSystem.Domain;**

**using System.IO;**

**using System.Text;**

**using System.Collections.Generic;**

**using SeriesManagementSystemUnitTest.FakeItem;**

**namespace SeriesManagementSystemUnitTest**

**{**

**[TestClass]**

**public class SoftwareUnitTest**

**{**

**Software \_software;**

**PrivateObject \_privateObject;**

**FakeFileSystem \_fakeFileSystem;**

**FakeServer \_fakeServer;**

**const string SeriesName = "Test Series";**

**const string SeriesDescription = "This is a test description";**

**const string ModifiedSeriesName = "modifiedSeries";**

**const string ModifiedSeriesDescription = "this is a modified description";**

**const string FILE\_PATH = "./dat/data.dat";**

**[TestInitialize()]**

**public void Initialize()**

**{**

**\_fakeFileSystem = new FakeFileSystem();**

**\_fakeServer = new FakeServer();**

**\_software = new Software(\_fakeServer, \_fakeFileSystem);**

**\_privateObject = new PrivateObject(\_software, new PrivateType(typeof(Software)));**

**for (int i = 0; i < 3; i++)**

**{**

**\_software.AddSeries(SeriesName + i.ToString(), SeriesDescription + i.ToString());**

**}**

**}**

**[TestMethod]**

**public void TestAddSeries()**

**{**

**String name = "First Movie";**

**String description = "The first movie in the world.";**

**\_software.AddSeries(name, description);**

**Series s = GetLastSeries();**

**Assert.AreEqual(name, s.Name);**

**Assert.AreEqual(description, s.Description);**

**}**

**[TestMethod]**

**public void TestImportFile()**

**{**

**String name = "First Movie";**

**String description = "The first movie in the world.";**

**int seriesID = 1;**

**String fileContext = "[{ \"Name\":\"" + name + "\", \"Description\":\"" + description + "\", \"SeriesID\":" + seriesID + "}]";**

**\_fakeFileSystem.PrepareImportFile(fileContext);**

**\_software.ImportFile(FILE\_PATH);**

**Series s = GetLastSeries();**

**Assert.AreEqual(name, s.Name);**

**Assert.AreEqual(description, s.Description);**

**// Fail route.**

**\_fakeFileSystem.PrepareImportFile("[{\"Name\"");**

**Assert.IsFalse(\_software.IsImportFail);**

**\_software.ImportFile(FILE\_PATH);**

**Assert.IsTrue(\_software.IsImportFail);**

**}**

**[TestMethod]**

**public void TestSelectSeries()**

**{**

**\_software.SelectSeries(1);**

**Assert.AreEqual(SeriesName + 1, GetSeriesManager().SelectedSeries.Name);**

**Assert.AreEqual(SeriesDescription + 1, GetSeriesManager().SelectedSeries.Description);**

**}**

**[TestMethod]**

**public void TestModifySeries()**

**{**

**\_software.SelectSeries(1);**

**Assert.AreEqual(SeriesName + 1, GetSeriesManager().SelectedSeries.Name);**

**Assert.AreEqual(SeriesDescription + 1, GetSeriesManager().SelectedSeries.Description);**

**\_software.ModifySeries(ModifiedSeriesName, ModifiedSeriesDescription);**

**Assert.AreEqual(ModifiedSeriesName, GetSeriesManager().SelectedSeries.Name);**

**Assert.AreEqual(ModifiedSeriesDescription, GetSeriesManager().SelectedSeries.Description);**

**}**

**[TestMethod]**

**public void TestRemoveSeries()**

**{**

**SeriesManager seriesManager = GetSeriesManager();**

**List<Series> seriesList = seriesManager.SeriesList;**

**Assert.AreEqual(4, seriesList.Count);**

**\_software.RemoveSeries(1);**

**Assert.AreEqual(3, seriesList.Count);**

**Assert.IsNull(seriesList.Find((s) => s.Name == SeriesName + 1));**

**}**

**[TestMethod]**

**public void TestGetSeriesManager()**

**{**

**SeriesManager seriesManager = GetSeriesManager();**

**Assert.AreEqual(seriesManager, \_software.SeriesManager);**

**}**

**[TestMethod]**

**public void TestDestructor()**

**{**

**string seriesListString = GetSeriesManager().SeriesListString;**

**string expected = FILE\_PATH + seriesListString;**

**\_software = null;**

**\_privateObject = null;**

**GC.Collect();**

**GC.WaitForPendingFinalizers();**

**Assert.AreEqual(expected, \_fakeFileSystem.Content);**

**}**

**[TestMethod]**

**public void TestAddServerData()**

**{**

**Assert.IsFalse(\_software.IsNoInternet);**

**\_fakeServer.IsDownloadFail = true;**

**\_software.RefreshServerData();**

**Assert.IsTrue(\_software.IsNoInternet);**

**\_fakeServer.IsDownloadFail = false;**

**\_software.RefreshServerData();**

**Assert.IsFalse(\_software.IsNoInternet);**

**}**

**[TestMethod]**

**public void TestLoadFile()**

**{**

**Assert.IsFalse(\_software.IsLoadFail);**

**\_fakeFileSystem.IsLoadFail = true;**

**\_privateObject.Invoke("LoadFile");**

**Assert.IsTrue(\_software.IsLoadFail);**

**\_fakeFileSystem.IsLoadFail = false;**

**\_privateObject.Invoke("LoadFile");**

**Assert.IsFalse(\_software.IsLoadFail);**

**}**

**[TestMethod]**

**public void TestFollowSeries()**

**{**

**GetSeriesManager().SelectSeries(2);**

**\_software.FollowSeries();**

**Series s = GetLastFollowingSeries();**

**Assert.AreEqual(1, GetSeriesManager().FollowingList.Count);**

**Assert.AreEqual(SeriesName + 2, s.Name);**

**Assert.AreEqual(SeriesDescription + 2, s.Description);**

**}**

**[TestMethod]**

**public void TestUnfollowSeries()**

**{**

**GetSeriesManager().SelectSeries(2);**

**GetSeriesManager().FollowSeries();**

**\_software.UnfollowSeries();**

**Assert.AreEqual(1, GetSeriesManager().UnfollowingList.Count);**

**Assert.AreEqual(0, GetSeriesManager().FollowingList.Count);**

**Series s = GetLastUnfollowingSeries();**

**Assert.AreEqual(SeriesName + 2, s.Name);**

**Assert.AreEqual(SeriesDescription + 2, s.Description);**

**int index = GetSeriesManager().FollowingList.IndexOf(s);**

**Assert.AreEqual(-1, index);**

**}**

**[TestMethod]**

**public void TestRecoverSeries()**

**{**

**GetSeriesManager().SelectSeries(2);**

**GetSeriesManager().FollowSeries();**

**GetSeriesManager().UnfollowSeries();**

**\_software.RecoverSeries();**

**Assert.AreEqual(0, GetSeriesManager().UnfollowingList.Count);**

**Assert.AreEqual(1, GetSeriesManager().FollowingList.Count);**

**Series s = GetLastFollowingSeries();**

**Assert.AreEqual(SeriesName + 2, s.Name);**

**Assert.AreEqual(SeriesDescription + 2, s.Description);**

**int index = GetSeriesManager().UnfollowingList.IndexOf(s);**

**Assert.AreEqual(-1, index);**

**}**

**[TestMethod]**

**public void TestAddEpisode()**

**{**

**GetSeriesManager().SelectSeries(2);**

**Series s = GetSeriesManager().SelectedSeries;**

**string eName = "e1", eDesc = "how it is going?";**

**Assert.AreEqual(0, s.Episodes.Count);**

**\_software.AddEpisode(eName, eDesc);**

**Assert.AreEqual(1, s.Episodes.Count);**

**Episode e = s.Episodes[s.Episodes.Count - 1];**

**Assert.AreEqual(eName, e.Name);**

**Assert.AreEqual(eDesc, e.Description);**

**}**

**[TestMethod]**

**public void TestRecord()**

**{**

**string eName = "goodEp", eDesc = "Hero is dead.";**

**string command = "So suprise!";**

**GetSeriesManager().SelectSeries(1);**

**Series s = GetSeriesManager().SelectedSeries;**

**s.AddEpisode(eName, eDesc);**

**Episode e = s.Episodes[0];**

**\_software.Record(eName, command);**

**Assert.AreEqual(1, e.CommandList.Count);**

**Assert.IsTrue(e.IsRead);**

**}**

**#region Get Private Object**

**private Series GetLastSeries()**

**{**

**SeriesManager seriesManager = GetSeriesManager();**

**Assert.IsNotNull(seriesManager.SeriesList);**

**Assert.IsTrue(seriesManager.SeriesList.Count > 0, "No any series in the list!");**

**return seriesManager.SeriesList[seriesManager.SeriesList.Count - 1];**

**}**

**private Series GetLastFollowingSeries()**

**{**

**SeriesManager seriesManager = GetSeriesManager();**

**Assert.IsNotNull(seriesManager.FollowingList);**

**Assert.IsTrue(seriesManager.FollowingList.Count > 0, "No any series in the following list!");**

**return seriesManager.FollowingList[seriesManager.FollowingList.Count - 1];**

**}**

**private Series GetLastUnfollowingSeries()**

**{**

**SeriesManager seriesManager = GetSeriesManager();**

**Assert.IsNotNull(seriesManager.UnfollowingList);**

**Assert.IsTrue(seriesManager.UnfollowingList.Count > 0, "No any series in the following list!");**

**return seriesManager.UnfollowingList[seriesManager.UnfollowingList.Count - 1];**

**}**

**private SeriesManager GetSeriesManager()**

**{**

**return \_privateObject.GetField("\_seriesManager") as SeriesManager;**

**}**

**#endregion**

**}**

**}**

* + 1. **SeriesManager**

**using Microsoft.VisualStudio.TestTools.UnitTesting;**

**using Newtonsoft.Json;**

**using SeriesManagementSystem.Domain;**

**using System;**

**using System.Collections.Generic;**

**using System.Linq;**

**using System.Runtime.Serialization;**

**namespace SeriesManagementSystemUnitTest**

**{**

**[TestClass]**

**public class SeriesManagerUnitTest**

**{**

**SeriesManager \_seriesManager;**

**Series[] \_series;**

**const int SeriesID = 0;**

**const string SeriesName = "manager's series";**

**const string SeriesDescription = "it is a series' description of manager";**

**const string ModifiedSeriesName = "modifiedSeries";**

**const string ModifiedSeriesDescription = "this is a modified description";**

**[TestInitialize]**

**public void Initialize()**

**{**

**\_seriesManager = new SeriesManager();**

**\_series = new Series[3];**

**for (int i = 0; i < 3; i++)**

**{**

**\_series[i] = new Series(SeriesName + i.ToString(), SeriesDescription + i.ToString(), SeriesID + i);**

**}**

**}**

**[TestMethod]**

**public void TestInitializeCount()**

**{**

**PrivateObject privateObject = new PrivateObject(\_seriesManager);**

**Assert.AreEqual(0, privateObject.GetFieldOrProperty("\_count"));**

**privateObject.SetField("\_series", new List<Series>(\_series));**

**privateObject.Invoke("InitializeCount", new StreamingContext());**

**Assert.AreEqual(3, privateObject.GetFieldOrProperty("\_count"));**

**}**

**/// <summary>**

**/// Test function of AddSeries**

**/// </summary>**

**[TestMethod]**

**public void TestAdd()**

**{**

**// test AddSeries function with one parameter, series**

**\_seriesManager.AddSeries(\_series[0].Name, \_series[0].Description);**

**List<Series> seriesList = GetSeriesList();**

**Series series = seriesList.Last();**

**Assert.AreEqual(series.Name, \_series[0].Name);**

**Assert.AreEqual(series.Description, \_series[0].Description);**

**// test AddSeries function with two parameter, name ,and description**

**Initialize();**

**\_seriesManager.AddSeries(SeriesName, SeriesDescription);**

**seriesList = GetSeriesList();**

**series = seriesList.Last();**

**Assert.AreEqual(series.Name, SeriesName);**

**Assert.AreEqual(series.Description, SeriesDescription);**

**}**

**/// <summary>**

**/// test the function of AddRange with a parameter, List<Series>**

**/// </summary>**

**[TestMethod]**

**public void TestAddRange()**

**{**

**List<Series> content = GetSeriesList();**

**Assert.IsTrue(content.Count == 0, "the initialized series list is not empty");**

**List<Series> seriesList = new List<Series>(\_series);**

**string contentString = JsonConvert.SerializeObject(seriesList);**

**\_seriesManager.AddList(contentString);**

**content = GetSeriesList();**

**Assert.IsTrue(content.Count != 0, "the series list is still empty after adding a list of series");**

**}**

**/// <summary>**

**/// Test function of SelectSeries**

**/// </summary>**

**[TestMethod]**

**public void TestSelectSeries()**

**{**

**// add series into series manager**

**List<Series> seriesList = GetSeriesList();**

**seriesList.AddRange(new List<Series>(\_series));**

**// test initialization of selected series is empty**

**Assert.IsNull(\_seriesManager.SelectedSeries);**

**// test selected series after selecting the series**

**\_seriesManager.SelectSeries(2);**

**Assert.AreEqual(\_series[2], \_seriesManager.SelectedSeries);**

**\_seriesManager.SelectSeries(1);**

**Assert.AreEqual(\_series[1], \_seriesManager.SelectedSeries);**

**// test if manager does not find the series in the list, it returns null**

**\_seriesManager.SelectSeries(10);**

**Assert.IsNull(\_seriesManager.SelectedSeries);**

**}**

**[TestMethod]**

**public void TestModifiedSelectedSeries()**

**{**

**GetSeriesList().AddRange(new List<Series>(\_series));**

**\_seriesManager.SelectSeries(2);**

**Assert.AreEqual(\_series[2], \_seriesManager.SelectedSeries);**

**\_seriesManager.ModifySelectedSeries(ModifiedSeriesName, ModifiedSeriesDescription);**

**Assert.AreEqual(ModifiedSeriesName, \_seriesManager.SelectedSeries.Name);**

**Assert.AreEqual(ModifiedSeriesDescription, \_seriesManager.SelectedSeries.Description);**

**Assert.AreEqual(ModifiedSeriesName, GetSeriesList().Find((x) => x.SeriesID == 2).Name);**

**Assert.AreEqual(ModifiedSeriesDescription, GetSeriesList().Find((x) => x.SeriesID == 2).Description);**

**}**

**[TestMethod]**

**public void TestRemoveSeries()**

**{**

**List<Series> seriesList = GetSeriesList();**

**seriesList.AddRange(new List<Series>(\_series));**

**Assert.AreEqual(3, seriesList.Count);**

**\_seriesManager.RemoveSeries(1);**

**Assert.AreEqual(2, seriesList.Count);**

**Assert.AreEqual(-1, seriesList.IndexOf(\_series[1]));**

**}**

**[TestMethod]**

**public void TestAddServerData()**

**{**

**List<Series> seriesList = GetSeriesList();**

**string content = "[{\"Name\":\"ServerSeries1\",\"Description\":\"This is on the server.\",\"SeriesID\":-256}]";**

**Assert.IsFalse(\_seriesManager.IsExistNewOne);**

**\_seriesManager.AddServerData(content);**

**Assert.IsTrue(\_seriesManager.IsExistNewOne);**

**Assert.AreEqual(1, seriesList.Count);**

**\_seriesManager.AddServerData(content);**

**Assert.IsFalse(\_seriesManager.IsExistNewOne);**

**Assert.AreEqual(1, seriesList.Count);**

**}**

**[TestMethod]**

**public void TestFollowSeries()**

**{**

**PrivateObject privateObject = new PrivateObject(\_seriesManager);**

**privateObject.SetField("\_series", new List<Series>(\_series));**

**privateObject.SetField("\_selectedSeries", \_series[2]);**

**\_seriesManager.FollowSeries();**

**List<Series> followingList = privateObject.GetField("\_followingList") as List<Series>;**

**Series s = followingList[followingList.Count - 1];**

**Assert.AreEqual(1, followingList.Count);**

**Assert.AreEqual(SeriesName + 2, s.Name);**

**Assert.AreEqual(SeriesDescription + 2, s.Description);**

**}**

**[TestMethod]**

**public void TestUnfollowSeries()**

**{**

**PrivateObject privateObject = new PrivateObject(\_seriesManager);**

**List<Series> followingList = privateObject.GetField("\_followingList") as List<Series>;**

**List<Series> unfollowingList = privateObject.GetField("\_unfollowingList") as List<Series>;**

**followingList.AddRange(new List<Series>(\_series));**

**privateObject.SetField("\_selectedSeries", \_series[2]);**

**Assert.AreEqual(0, unfollowingList.Count);**

**Assert.AreEqual(3, followingList.Count);**

**\_seriesManager.UnfollowSeries();**

**Assert.AreEqual(1, unfollowingList.Count);**

**Assert.AreEqual(2, followingList.Count);**

**Series s = unfollowingList[unfollowingList.Count - 1];**

**Assert.AreEqual(SeriesName + 2, s.Name);**

**Assert.AreEqual(SeriesDescription + 2, s.Description);**

**int index = followingList.IndexOf(s);**

**Assert.AreEqual(-1, index);**

**}**

**[TestMethod]**

**public void TestRecoverSeries()**

**{**

**PrivateObject privateObject = new PrivateObject(\_seriesManager);**

**List<Series> followingList = privateObject.GetField("\_followingList") as List<Series>;**

**List<Series> unfollowingList = privateObject.GetField("\_unfollowingList") as List<Series>;**

**unfollowingList.AddRange(new List<Series>(\_series));**

**privateObject.SetField("\_selectedSeries", \_series[2]);**

**Assert.AreEqual(3, unfollowingList.Count);**

**Assert.AreEqual(0, followingList.Count);**

**\_seriesManager.RecoverSeries();**

**Assert.AreEqual(2, unfollowingList.Count);**

**Assert.AreEqual(1, followingList.Count);**

**Series s = followingList[followingList.Count - 1];**

**Assert.AreEqual(SeriesName + 2, s.Name);**

**Assert.AreEqual(SeriesDescription + 2, s.Description);**

**int index = unfollowingList.IndexOf(s);**

**Assert.AreEqual(-1, index);**

**}**

**[TestMethod]**

**public void TestAddEpisode()**

**{**

**PrivateObject privateObject = new PrivateObject(\_seriesManager);**

**List<Series> followingList = privateObject.GetField("\_followingList") as List<Series>;**

**Series s = \_series[2];**

**string eName = "e1", eDesc = "how it is going?";**

**followingList.AddRange(\_series);**

**privateObject.SetField("\_selectedSeries", s);**

**Assert.AreEqual(0, s.Episodes.Count);**

**\_seriesManager.AddEpisode(eName, eDesc);**

**Assert.AreEqual(1, s.Episodes.Count);**

**Episode e = s.Episodes[s.Episodes.Count - 1];**

**Assert.AreEqual(eName, e.Name);**

**Assert.AreEqual(eDesc, e.Description);**

**}**

**[TestMethod]**

**public void TestRecord()**

**{**

**string eName = "goodEp", eDesc = "Hero is dead.";**

**string command = "So suprise!";**

**PrivateObject privateObject = new PrivateObject(\_seriesManager);**

**List<Series> followingList = privateObject.GetField("\_followingList") as List<Series>;**

**Series s = \_series[1];**

**s.AddEpisode(eName, eDesc);**

**Episode e = s.Episodes[0];**

**followingList.Add(s);**

**privateObject.SetField("\_selectedSeries", s);**

**\_seriesManager.Record(eName, command);**

**Assert.AreEqual(1, e.CommandList.Count);**

**Assert.IsTrue(e.IsRead);**

**}**

**[TestMethod]**

**public void TestToJson()**

**{**

**Series s = new Series("s1", "456");**

**s.AddEpisode("e1", "sad");**

**\_seriesManager.SeriesList.Add(s);**

**var jSetting = new JsonSerializerSettings();**

**jSetting.Formatting = Formatting.Indented;**

**String json = JsonConvert.SerializeObject(\_seriesManager, jSetting);**

**SeriesManager sm = JsonConvert.DeserializeObject<SeriesManager>(json);**

**Assert.AreEqual("s1", sm.SeriesList[0].Name);**

**Assert.AreEqual("456", sm.SeriesList[0].Description);**

**Assert.AreEqual("e1", sm.SeriesList[0].Episodes[0].Name);**

**Assert.AreEqual("sad", sm.SeriesList[0].Episodes[0].Description);**

**}**

**/// <summary>**

**/// get the series list of series manager**

**/// </summary>**

**/// <returns></returns>**

**private List<Series> GetSeriesList()**

**{**

**return \_seriesManager.SeriesList;**

**}**

**}**

**}**

* + 1. **FileManager**

**using Microsoft.VisualStudio.TestTools.UnitTesting;**

**using SeriesManagementSystem.Foundation;**

**using System;**

**using System.IO;**

**using System.Text;**

**namespace SeriesManagementSystemUnitTest**

**{**

**[TestClass]**

**public class FileManagerUnitTest**

**{**

**private FileManager \_fileManager;**

**private PrivateObject \_privateObject;**

**private const string LOCAL\_STORAGE = "./testFileManager.txt";**

**private const string EMPTY\_CONTENT = "{\"\_series\":[],\"\_followingList\":[],\"\_unfollowingList\":[]}";**

**[TestInitialize()]**

**public void Initialize()**

**{**

**\_fileManager = new FileManager();**

**\_privateObject = new PrivateObject(\_fileManager, new PrivateType(typeof(FileManager)));**

**Assert.AreEqual(EMPTY\_CONTENT, \_privateObject.GetField("\_content"));**

**}**

**[TestCleanup]**

**public void CleanUp()**

**{**

**if (File.Exists(LOCAL\_STORAGE))**

**File.Delete(LOCAL\_STORAGE);**

**}**

**[TestMethod]**

**public void TestLoadFile()**

**{**

**string testString = "Gorira parrrrrrty";**

**\_fileManager.LoadFile(LOCAL\_STORAGE);**

**Assert.AreEqual(EMPTY\_CONTENT, \_privateObject.GetField("\_content"));**

**PrepareFile(LOCAL\_STORAGE, testString);**

**\_fileManager.LoadFile(LOCAL\_STORAGE);**

**Assert.AreEqual(testString, \_privateObject.GetField("\_content"));**

**}**

**[TestMethod]**

**public void TestGetContent()**

**{**

**string testString = "Banana usually drop.";**

**\_privateObject.SetField("\_content", testString);**

**Assert.AreEqual(testString, \_fileManager.Content);**

**}**

**[TestMethod]**

**public void TestImportFile()**

**{**

**string testString = "Why monkey can't talk?";**

**PrepareFile(LOCAL\_STORAGE, testString);**

**\_fileManager.ImportFile(LOCAL\_STORAGE);**

**Assert.AreEqual(testString, \_privateObject.GetField("\_content"));**

**}**

**[TestMethod]**

**public void TestSaveFile()**

**{**

**string testString = "Super monkey fly bat.";**

**PrepareFile(LOCAL\_STORAGE, "[]");**

**\_fileManager.SaveFile(LOCAL\_STORAGE, testString);**

**// test the file contains the string**

**String fileContext;**

**using (var streamReader = new StreamReader(LOCAL\_STORAGE, Encoding.UTF8))**

**{**

**fileContext = streamReader.ReadToEnd();**

**}**

**Assert.AreEqual(testString, fileContext);**

**}**

**/// <summary>**

**/// this function is used to prepare a file with some setting**

**/// </summary>**

**/// <param name="path">the file's location</param>**

**/// <param name="content">file's content</param>**

**private void PrepareFile(string path, string content)**

**{**

**using (var streamReader = new StreamWriter(path, false))**

**{**

**streamReader.Write(content);**

**}**

**}**

**}**

**}**

* + 1. **ServerHelper**

**using Microsoft.VisualStudio.TestTools.UnitTesting;**

**using Newtonsoft.Json;**

**using SeriesManagementSystem.Domain;**

**using SeriesManagementSystem.Foundation;**

**using System;**

**using System.Collections.Generic;**

**using System.Linq;**

**using System.Text;**

**using System.Threading.Tasks;**

**namespace SeriesManagementSystemUnitTest**

**{**

**[TestClass]**

**public class ServerHelperUnitTest**

**{**

**ServerHelper \_server;**

**[TestInitialize]**

**public void Initialize()**

**{**

**\_server = new ServerHelper();**

**}**

**[TestMethod]**

**public void TestGetData()**

**{**

**string data;**

**data = \_server.DownloadData();**

**List<Series> series = JsonConvert.DeserializeObject<List<Series>>(data);**

**Series s = series[0];**

**Assert.IsTrue(series.Count > 0);**

**Assert.AreEqual(-20, s.SeriesID);**

**}**

**}**

**}**

* + 1. **Series**

**using Microsoft.VisualStudio.TestTools.UnitTesting;**

**using SeriesManagementSystem.Domain;**

**using System;**

**using System.Collections.Generic;**

**namespace SeriesManagementSystemUnitTest**

**{**

**[TestClass]**

**public class SeriesUnitTest**

**{**

**Series \_series;**

**List<Episode> \_episodes;**

**const int SeriesID = 10;**

**const string SeriesName = "testSeries";**

**const string SeriesDescription = "this is a test Series Description";**

**const string ModifiedSeriesName = "modifiedSeries";**

**const string ModifiedSeriesDescription = "this is a modified description";**

**static readonly string[] EPISODE\_NAMES = new string[] { "episode 0", "episode 1" };**

**static readonly string[] EPISODE\_DESCRIPTIONS = new string[] { "episode description 0", "episode description 1" };**

**[TestInitialize]**

**public void Initialize()**

**{**

**\_series = new Series(SeriesName, SeriesDescription);**

**\_episodes = new List<Episode>();**

**\_episodes.Add(new Episode(EPISODE\_NAMES[0], EPISODE\_DESCRIPTIONS[0]));**

**\_episodes.Add(new Episode(EPISODE\_NAMES[1], EPISODE\_DESCRIPTIONS[1]));**

**}**

**[TestMethod]**

**public void TestName()**

**{**

**Assert.AreEqual(SeriesName, \_series.Name);**

**}**

**[TestMethod]**

**public void TestDescription()**

**{**

**Assert.AreEqual(SeriesDescription, \_series.Description);**

**}**

**[TestMethod]**

**public void TestSetName()**

**{**

**Assert.AreEqual(SeriesName, \_series.Name);**

**\_series.Name = ModifiedSeriesName;**

**Assert.AreEqual(ModifiedSeriesName, \_series.Name);**

**}**

**[TestMethod]**

**public void TestSetDescription()**

**{**

**Assert.AreEqual(SeriesDescription, \_series.Description);**

**\_series.Description = ModifiedSeriesDescription;**

**Assert.AreEqual(ModifiedSeriesDescription, \_series.Description);**

**}**

**[TestMethod]**

**public void TestAddEpisode()**

**{**

**Assert.AreEqual(0, GetEpisodes().Count);**

**\_series.AddEpisode(EPISODE\_NAMES[0], EPISODE\_DESCRIPTIONS[0]);**

**Assert.AreEqual(1, GetEpisodes().Count);**

**}**

**[TestMethod]**

**public void TestRecord()**

**{**

**string command = "Very well.";**

**GetEpisodes().AddRange(\_episodes);**

**\_series.Record(EPISODE\_NAMES[0], command);**

**Assert.AreEqual(1, \_episodes[0].CommandList.Count);**

**Assert.IsTrue(\_episodes[0].IsRead);**

**command = "";**

**\_series.Record(EPISODE\_NAMES[1], command);**

**Assert.AreEqual(0, \_episodes[1].CommandList.Count);**

**Assert.IsTrue(\_episodes[1].IsRead);**

**}**

**private List<Episode> GetEpisodes()**

**{**

**return new PrivateObject(\_series).GetFieldOrProperty("\_episodes") as List<Episode>;**

**}**

**}**

**}**

* + 1. **Episode**

**using System;**

**using Microsoft.VisualStudio.TestTools.UnitTesting;**

**using SeriesManagementSystem.Domain;**

**namespace SeriesManagementSystemUnitTest**

**{**

**[TestClass]**

**public class EpisodeUnitTest**

**{**

**Episode \_episode;**

**const string EPISODE\_NAME = "episode name";**

**const string EPISODE\_DESCRIPTION = "epispode description";**

**const string MODIFIED\_NAME = "modified name";**

**const string MODIFIED\_DESCRIPTION = "modified description";**

**[TestInitialize]**

**public void Initialize()**

**{**

**\_episode = new Episode(EPISODE\_NAME, EPISODE\_DESCRIPTION);**

**}**

**[TestMethod]**

**public void TestProperties()**

**{**

**Assert.AreEqual(EPISODE\_NAME, \_episode.Name);**

**Assert.AreEqual(EPISODE\_DESCRIPTION, \_episode.Description);**

**\_episode.Name = MODIFIED\_NAME;**

**\_episode.Description = MODIFIED\_DESCRIPTION;**

**Assert.AreEqual(MODIFIED\_NAME, \_episode.Name);**

**Assert.AreEqual(MODIFIED\_DESCRIPTION, \_episode.Description);**

**}**

**[TestMethod]**

**public void TestRecord()**

**{**

**string command = "So suprise!";**

**\_episode.Record(command);**

**Assert.AreEqual(1, \_episode.CommandList.Count);**

**Assert.IsTrue(\_episode.IsRead);**

**command = "";**

**\_episode.Record(command);**

**Assert.AreEqual(1, \_episode.CommandList.Count);**

**}**

**}**

**}**

* + 1. **Command**

**using System;**

**using Microsoft.VisualStudio.TestTools.UnitTesting;**

**using SeriesManagementSystem.Domain;**

**namespace SeriesManagementSystemUnitTest**

**{**

**[TestClass]**

**public class CommandUnitTest**

**{**

**private Command \_command;**

**private const string DEFAULT\_CONTENT = "It's good.";**

**[TestInitialize()]**

**public void Initialize()**

**{**

**\_command = new Command(DEFAULT\_CONTENT);**

**}**

**[TestMethod]**

**public void TestGetContent()**

**{**

**Assert.AreEqual(DEFAULT\_CONTENT, \_command.Content);**

**}**

**}**

**}**

**Measurement**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **101820302 施帛辰** | | **101820340 鄒令業** | | **備註** |
| **HW #1** | | | | |
| 16/02/23 14:10~15:15 | **65 min** | 16/02/23 14:10~15:15 | **65 min** | **Meeting** |
|  |  | 16/02/28 13:30~14:00 | **30 min** | **Doc. Writing** |
| **Total** | **65 min** | **Total** | **95 min** |  |
| **HW #2** | | | | |
| 16/03/10 10:10~12:10 | **120 min** | 16/03/10 10:10~12:10 | **120 min** | **Meeting & Discussion** |
| 16/03/15 14:15~17:05 | **170 min** | 16/03/15 14:15~17:05 | **170 min** | **Meeting & Discussion** |
| 16/03/17 10:10~11:30 | **80 min** | 16/03/17 10:10~11:30 | **80 min** | **Meeting & Discussion** |
| **Total** | **370 min** | **Total** | **370 min** |  |
| **HW #3** | | | | |
| 16/03/29 14:10~15:30 | **80 min** | 16/03/29 14:10~15:30 | **80 min** | **Meeting** |
| **Total** | **80 min** | **Total** | **80 min** |  |
| **HW #4** | | | | |
| 16/04/26 14:20~17:10 | **170 min** | 16/04/26 14:20~17:10 | **170 min** | **Meeting** |
|  |  | 16/04/27 13:00~14:00 | **60 min** | **Coding** |
| 16/04/27 16:10~17:20 | **70 min** | 16/04/27 16:10~17:20 | **70 min** | **Meeting** |
| **Total** | **240 min** | **Total** | **300 min** |  |
| **HW #5** | | | | |
| 16/05/01  19:00~20:30 | **90 min** | 16/05/02  12:00~12:30 | **30 min** | **Coding** |
| 16/05/03  14:00~17:00 | **180 min** | 16/05/03  14:00~17:00 | **180 min** | **Meeting** |
|  |  | 16/05/04  11:00~11:30 | **30 min** | **Coding** |
| 16/05/05  15:10~17:00 | **110 min** | 16/05/05  15:10~17:00 | **110 min** | **Meeting** |
| 16/05/05  19:00~19:30 | **30 min** |  |  | **Coding** |
| **Total** | **410 min** | **Total** | **350 min** |  |
| **HW #6** | | | | |
| 16/05/17  14:10~17:00 | **170 min** | 16/05/17  14:10~17:00 | **170 min** | **Discussion** |
| **Total** | **170 min** | **Total** | **170 min** |  |
| **HW #7** |  |  |  |  |
| 16/05/31  14:10~18:00 | **230 min** | 16/05/31  14:10~18:00 | **230 min** | **Discussion** |
| 16/06/02  15:00~17:30 | **150 min** | 16/06/02  15:00~17:30 | **150 min** | **Discussion & Coding** |
| 16/06/11  9:00~12:00 | **180 min** | 16/06/12  20:00~22:00 | **120 min** | **Coding** |
| 16/06/13  1:00~3:00 | **120 min** |  |  | **Coding** |
|  |  | 16/06/12  22:00~22:30 | **30 min** | **Edit Document** |
| 16/06/13  14:00~16:00 | **120 min** | 16/06/13  14:00~16:00 | **120 min** | **Discussion & Edit Doc.** |
| **Total** | **800 min** | **Total** | **650 min** |  |
| **All Efforts** | **2135 min** | **All Efforts** | **2015 min** |  |