A coupon management system stores a definition of a coupon and also every time a user redeems a coupon. A coupon consists of an id, a title, a start date, end date, maximum number of coupons per user and also a maximum number of coupons across all users. When a user redeems a coupon the system keeps track of the users identifier, the datetime when the redemption occurred and a unique code that is generated by the application.

The coupon management system is required to provide the following capabilities:

* Provide an active list of coupons.
* Determine if a consumer can redeem a coupons.
* Store redemptions as they occur.
* Provide reporting on the redemptions for a specific offer.

The coupon management system is expected to have the following capacity:

* Coupons up to 50000 unique coupons. Generally 100-500 active at any point in time.
* Redemptions – Upwards of 1 billion rows. Expect at least 1 million redemptions per day.

Requirements:

* Create a data model to represent the data in the above scenario. You are free to choose any storage mechanism you feel appropriate. The model should take into account the volume and expected operations into account.
* Define additional optimizations that you would apply to the basic data model. (For example if you were to choose SQL you might want indexes on certain columns) Note: Implementation/Code is not required.

SOLUTION:

Consider the following SQL Database tables.

**USE** **[**COURSE\_DBIDX**]**

**GO**

/\*\*\*\*\*\* Object: Table [dbo].[Coupon] Script Date: 19/01/2020 4:52:00 PM \*\*\*\*\*\*/

**SET** ANSI\_NULLS **ON**

**GO**

**SET** QUOTED\_IDENTIFIER **ON**

**GO**

**CREATE** **TABLE** **[**dbo**].[**Coupon**](**

**[**Id**]** **[bigint]** **NOT** **NULL,**

**[**title**]** **[nvarchar](**50**)** **NOT** **NULL,**

**[**startdate**]** **[datetime]** **NOT** **NULL,**

**[**enddate**]** **[datetime]** **NULL,**

**[**maxperuser**]** **[int]** **NULL,**

**[**maxall**]** **[int]** **NULL,**

**[**status**]** **[nchar](**10**)** **NULL,**

**CONSTRAINT** **[**PK\_Coupon**]** **PRIMARY** **KEY** CLUSTERED

**(**

**[**Id**]** **ASC**

**)WITH** **(**PAD\_INDEX **=** **OFF,** STATISTICS\_NORECOMPUTE **=** **OFF,** IGNORE\_DUP\_KEY **=** **OFF,** ALLOW\_ROW\_LOCKS **=** **ON,** ALLOW\_PAGE\_LOCKS **=** **ON)** **ON** **[PRIMARY]**

**)** **ON** **[PRIMARY]**

**GO**

/\*\*\*\*\*\* Object: Table [dbo].[Redemption\_Week\_1] Script Date: 19/01/2020 4:52:00 PM \*\*\*\*\*\*/

**SET** ANSI\_NULLS **ON**

**GO**

**SET** QUOTED\_IDENTIFIER **ON**

**GO**

**CREATE** **TABLE** **[**dbo**].[**Redemption\_Week\_1**](**

**[**id**]** **[bigint]** **IDENTITY(**1**,**1**)** **NOT** **NULL,**

**[**userid**]** **[bigint]** **NOT** **NULL,**

**[**couponid**]** **[bigint]** **NOT** **NULL,**

**[**redemptiondate**]** **[datetime]** **NOT** **NULL,**

**[**uniquecode**]** **[nvarchar](max)** **NOT** **NULL,**

**CONSTRAINT** **[**PK\_Redemption\_Week\_1**]** **PRIMARY** **KEY** CLUSTERED

**(**

**[**id**]** **ASC**

**)WITH** **(**PAD\_INDEX **=** **OFF,** STATISTICS\_NORECOMPUTE **=** **OFF,** IGNORE\_DUP\_KEY **=** **OFF,** ALLOW\_ROW\_LOCKS **=** **ON,** ALLOW\_PAGE\_LOCKS **=** **ON)** **ON** **[PRIMARY]**

**)** **ON** **[PRIMARY]** TEXTIMAGE\_ON **[PRIMARY]**

**GO**

/\*\*\*\*\*\* Object: Table [dbo].[User] Script Date: 19/01/2020 4:52:00 PM \*\*\*\*\*\*/

**SET** ANSI\_NULLS **ON**

**GO**

**SET** QUOTED\_IDENTIFIER **ON**

**GO**

**CREATE** **TABLE** **[**dbo**].[User](**

**[**Id**]** **[bigint]** **NOT** **NULL,**

**[**Name**]** **[nvarchar](**500**)** **NOT** **NULL,**

**[**Status**]** **[nchar](**10**)** **NOT** **NULL,**

**CONSTRAINT** **[**PK\_User**]** **PRIMARY** **KEY** CLUSTERED

**(**

**[**Id**]** **ASC**

**)WITH** **(**PAD\_INDEX **=** **OFF,** STATISTICS\_NORECOMPUTE **=** **OFF,** IGNORE\_DUP\_KEY **=** **OFF,** ALLOW\_ROW\_LOCKS **=** **ON,** ALLOW\_PAGE\_LOCKS **=** **ON)** **ON** **[PRIMARY]**

**)** **ON** **[PRIMARY]**

**GO**

/\*\*\*\*\*\* Object: Index [NonClusteredIndex-20200119-164827] Script Date: 19/01/2020 4:52:00 PM \*\*\*\*\*\*/

**CREATE** NONCLUSTERED **INDEX** **[**NonClusteredIndex-20200119**-**164827**]** **ON** **[**dbo**].[**Redemption\_Week\_1**]**

**(**

**[**couponid**]** **ASC,**

**[**redemptiondate**]** **ASC**

**)WITH** **(**PAD\_INDEX **=** **OFF,** STATISTICS\_NORECOMPUTE **=** **OFF,** SORT\_IN\_TEMPDB **=** **OFF,** DROP\_EXISTING **=** **OFF,** **ONLINE** **=** **OFF,** ALLOW\_ROW\_LOCKS **=** **ON,** ALLOW\_PAGE\_LOCKS **=** **ON)** **ON** **[PRIMARY]**

**GO**

**ALTER** **TABLE** **[**dbo**].[User]** **ADD** **CONSTRAINT** **[**DF\_User\_Status**]** **DEFAULT** **(**N'A'**)** **FOR** **[**Status**]**

**GO**

**ALTER** **TABLE** **[**dbo**].[**Redemption\_Week\_1**]** **WITH** **CHECK** **ADD** **CONSTRAINT** **[**FK\_Redemption\_Week\_1\_Coupon**]** **FOREIGN** **KEY([**couponid**])**

**REFERENCES** **[**dbo**].[**Coupon**]** **([**Id**])**

**GO**

**ALTER** **TABLE** **[**dbo**].[**Redemption\_Week\_1**]** **CHECK** **CONSTRAINT** **[**FK\_Redemption\_Week\_1\_Coupon**]**

**GO**

**ALTER** **TABLE** **[**dbo**].[**Redemption\_Week\_1**]** **WITH** **CHECK** **ADD** **CONSTRAINT** **[**FK\_Redemption\_Week\_1\_User**]** **FOREIGN** **KEY([**userid**])**

**REFERENCES** **[**dbo**].[User]** **([**Id**])**

**GO**

**ALTER** **TABLE** **[**dbo**].[**Redemption\_Week\_1**]** **CHECK** **CONSTRAINT** **[**FK\_Redemption\_Week\_1\_User**]**

**GO**

**USE** **[**master**]**

**GO**

**ALTER** DATABASE **[**COURSE\_DBIDX**]** **SET** READ\_WRITE

**GO**

This database has 3 tables. Coupon, User and Redemption\_Week\_1.

Coupon will have the columns specified in the problem and an additional status column to indicate active, inactive, deleted, archived… etc. For future proofing. Maybe a changeddate might also come in handy.

User is just typical Id, Name and status. Can have more informational columns like address, loyalty number etc.

Redemption\_Week\_1 represents just 1 week of redemption transactions. Given the huge amount of transactions on a table it should be broken down this way and can even go as granular as Redemption\_Day\_1. This is a many to many table containing userId and couponed. When transactions are recorded as 1 table per week, 57 tables will be created. For Days it can be 366.

A nonclustered index is also created for Redemption\_Week\_1. It will have couponId and date to support reporting.