

# Database Design

## University Alumni Association

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## Introduction

This report outlines the design process of a database system intended to be used for managing data for a university alumni association. The system is designed to track alumni and their club memberships as well as club information, event occurrences, and donations made by alumni. The details regarding each end user segment are outlined in the report which includes a final conceptual ERD of the modelled system. Sample data and reports that could be generated from the system are also provided to demonstrate the feasibility of implementing this database system.

## Assumptions

- All members and events are located in Canada, therefore country is not tracked.
- In order to register for a membership or an event the associated fees have to have already been paid.
- Membership status is recalculated everyday based on the current date and join date.
- Clubs do not have a dedicated physical location/address/phone number.
- An event hosted by multiple clubs can lead to multiple special invitations being sent to one person, if he or she has multiple recently expired memberships.
- A member who belongs to multiple clubs that are co-hosting an event will only receive one invitation via email from the latest co-hosting club that they joined.
- If all club memberships expire after having registered for an event, the person can still attend.
- If all club memberships expire before registering for an event, the person must rejoin at least one of the club that is hosting the event.
- A person receiving the special invitation can choose to rejoin the club without registering for the event.
- The alumnus who makes the donation is the one who decides the dollar amount that will be split amongst the various clubs that he or she chooses.

## Limitations

- The system doesn't account for event scheduling conflicts; therefore, members can register for concurrent events.
- The system can only accommodate same-fee-for-all membership model, i.e. no price discrimination.
- Maximum capacity is not considered for each event.
- Events and donations are treated as one-off, i.e. no recurring events or donations.
- An event that takes places in multiple locations needs to be recorded as separate events.
- Only the club director is tracked, other positions and roles are not tracked.
- Only current membership fees are tracked whereas historical membership fees are not tracked.
- Membership and event payments and refunds are not modelled.

# Process Description

## **April 30, 2017**

Met up to go over the project description and decided to work on the business rules individually.

## **May 3, 2017**

Met up to come up with the initial set of business rules based on individual work and also determined the possible entities.

Over the weekend each member contributed to the possible attributes for each entity on Google Doc. Other observations and notes were made on Google Docs as well.

## **May 9, 2017**

Met up to go over the attributes and decided on the four functional segments. Each member was assigned to work on a separate functional segment and all of its components for part 1.

## **May 14, 2017**

Met up to go over the functional segments and discussed ways to account for the special invitations to recently expired members. A new entity was introduced for the special invitations and revisions were made where necessary.

## **May 15, 2017**

Met up to put all the functional segments together. Went over to finalize business rules, attributes, and ERDs, changes were made where necessary. Went over assumptions and limitations briefly. Assigned work to be done regarding ERDs, sample data, ERM components, and complex reports.

## **May 16, 2017**

Met up to finalize assumptions, limitations, normalizations, and the overall contents of the report.

## **May 18, 2017**

Report was compiled with all the required sections and components.

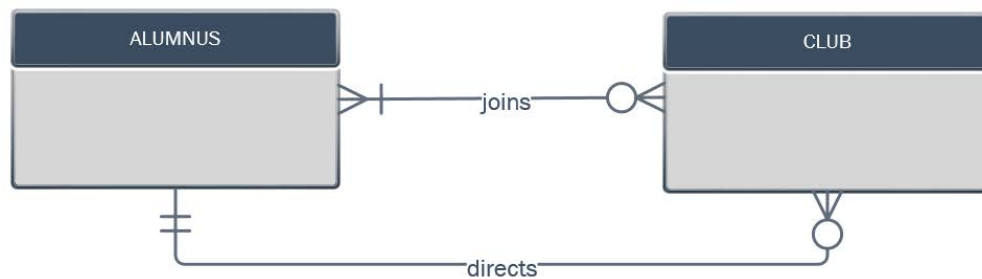
# 1. External User Segments

## 1.1 Membership Segment

### Business Rules

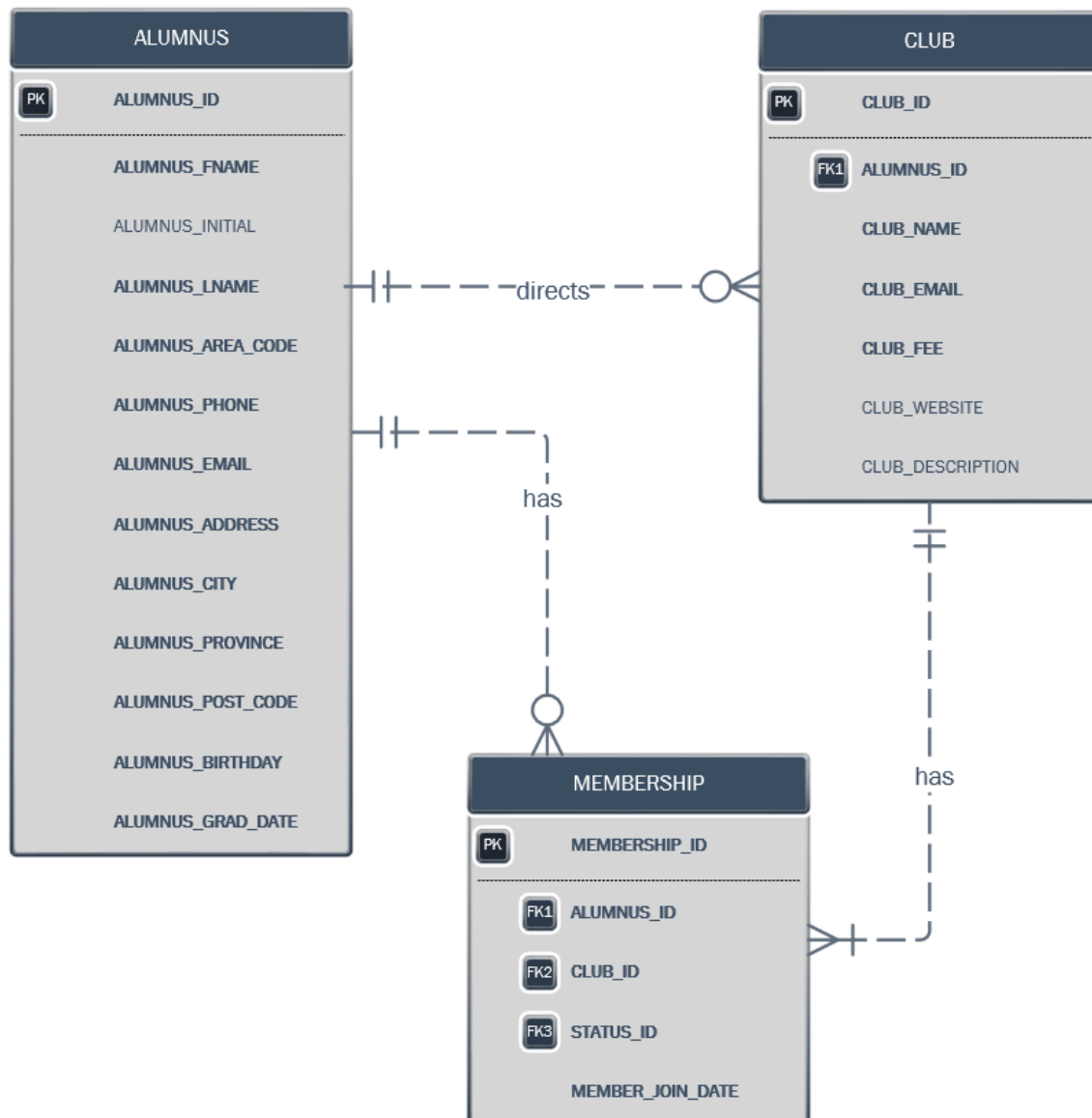
- An alumnus is a former graduate of the college.
- An alumnus may join zero or many clubs.
- A club may have one or many members.
- A club is directed by one and only one alumnus.
- An alumnus can direct zero or many clubs.

## Initial ERD



## Extended ERD and Expanded Business Rules

Due to the inability to implement a M:N relationship in the relational model, a bridge entity must be introduced between the ALUMNUS ↔ CLUB relationship. Below is the extended ERD and resulting expanded business rules for all relationships:

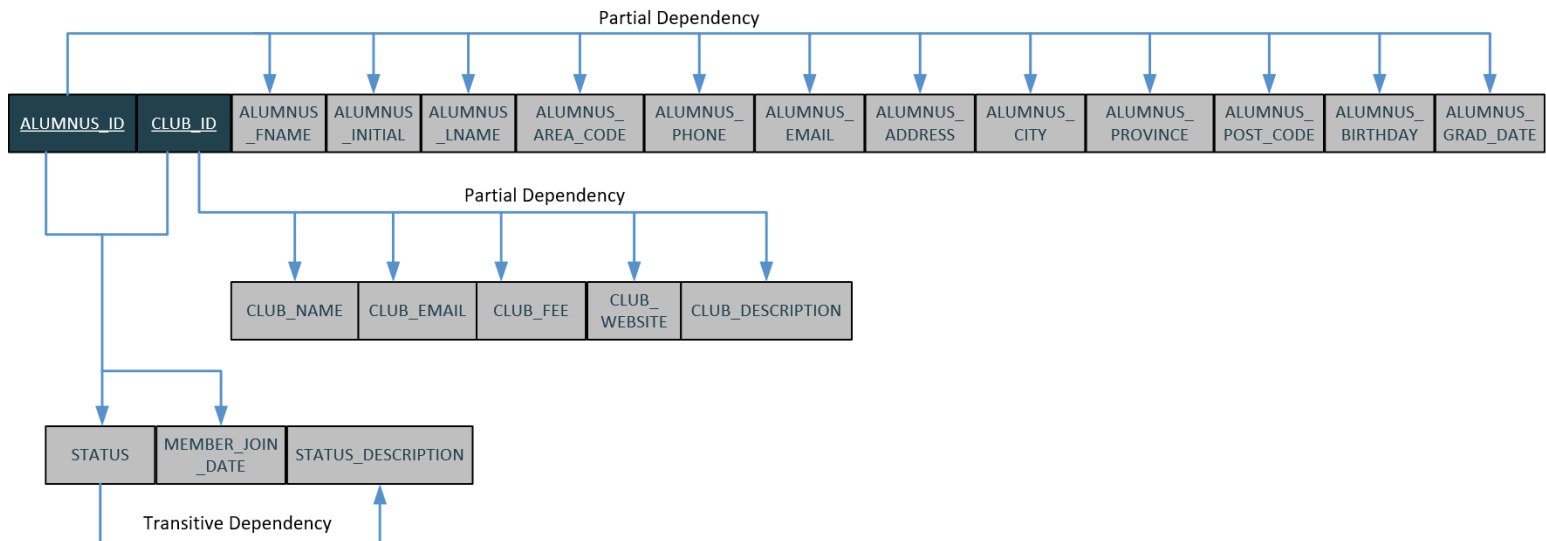


- An alumnus is a former graduate of the college.
- An alumnus may have zero or many memberships.
- A membership belongs to one and only one alumnus.
- A club may have one or many memberships.
- A membership is associated with one and only one club.
- A club is directed by one and only one alumnus.
- An alumnus can direct zero or many clubs.

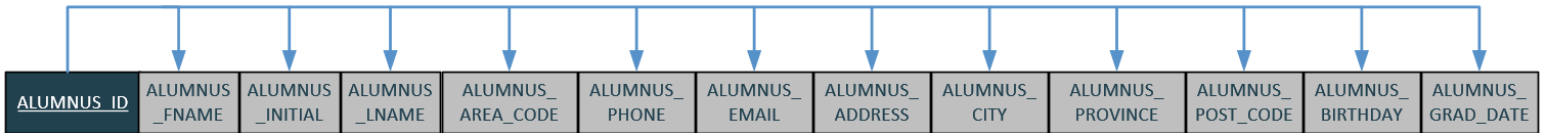
## Normalization Process to 3NF

The normalization process is mapped below for the membership end user segment. It began in 1NF with multiple partial dependencies and one occurrence of transitive dependency. During conversion to 2NF these partial dependencies were removed with the creation of three entities, ALUMNUS, CLUB, and MEMBERSHIP. Finally, with the conversion to 3NF, the transitive dependency was resolved with the addition of a fourth entity, STATUS. The following dependency diagrams illustrate the process:

### First Normal Form (1NF) Dependency Diagram

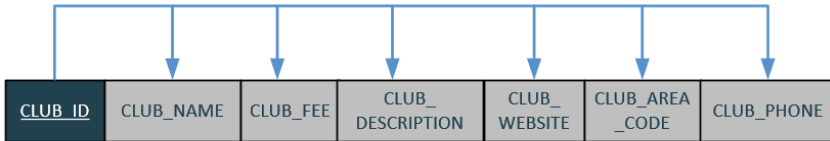


## Second Normal Form (2NF) Conversion Results



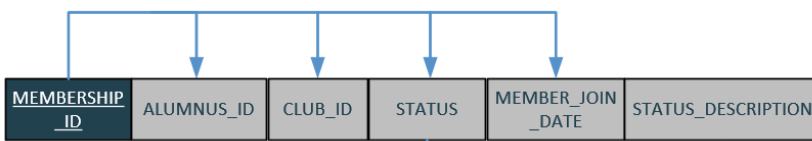
<u>ALUMNUS_ID</u>	ALUMNUS_FNAME	ALUMNUS_INITIAL	ALUMNUS_LNAME	ALUMNUS_AREA_CODE	ALUMNUS_PHONE	ALUMNUS_EMAIL	ALUMNUS_ADDRESS	ALUMNUS_CITY	ALUMNUS_PROVINCE	ALUMNUS_POST_CODE	ALUMNUS_BIRTHDAY	ALUMNUS_GRAD_DATE
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Table Name: ALUMNUS



<u>CLUB_ID</u>	CLUB_NAME	CLUB_FEE	CLUB_DESCRIPTION	CLUB_WEBSITE	CLUB_AREA_CODE	CLUB_PHONE
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Table Name: CLUB



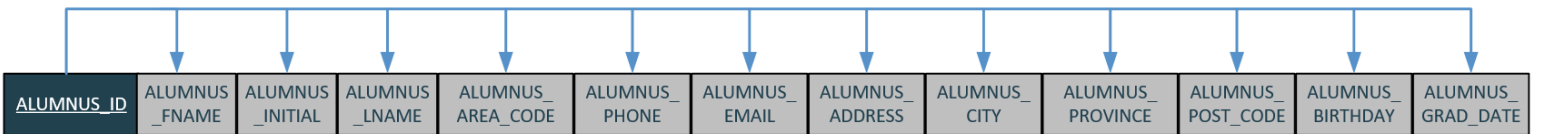
<u>MEMBERSHIP_ID</u>	ALUMNUS_ID	CLUB_ID	STATUS	MEMBER_JOIN_DATE	STATUS_DESCRIPTION
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Table Name: MEMBERSHIP

Transitive  
Dependency

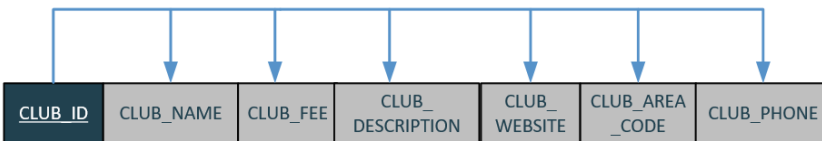


## Third Normal Form (3NF) Conversion Results



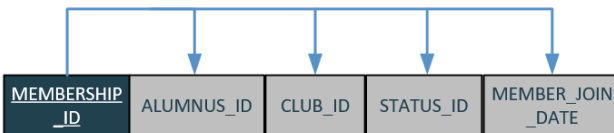
<u>ALUMNUS_ID</u>	ALUMNUS_FNAME	ALUMNUS_INITIAL	ALUMNUS_LNAME	ALUMNUS_AREA_CODE	ALUMNUS_PHONE	ALUMNUS_EMAIL	ALUMNUS_ADDRESS	ALUMNUS_CITY	ALUMNUS_PROVINCE	ALUMNUS_POST_CODE	ALUMNUS_BIRTHDAY	ALUMNUS_GRAD_DATE
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Table Name: ALUMNUS



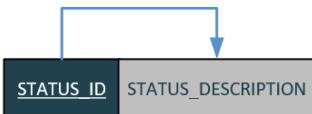
<u>CLUB_ID</u>	CLUB_NAME	CLUB_FEE	CLUB_DESCRIPTION	CLUB_WEBSITE	CLUB_AREA_CODE	CLUB_PHONE
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Table Name: CLUB



<u>MEMBERSHIP_ID</u>	ALUMNUS_ID	CLUB_ID	STATUS_ID	MEMBER_JOIN_DATE
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Table Name: MEMBERSHIP

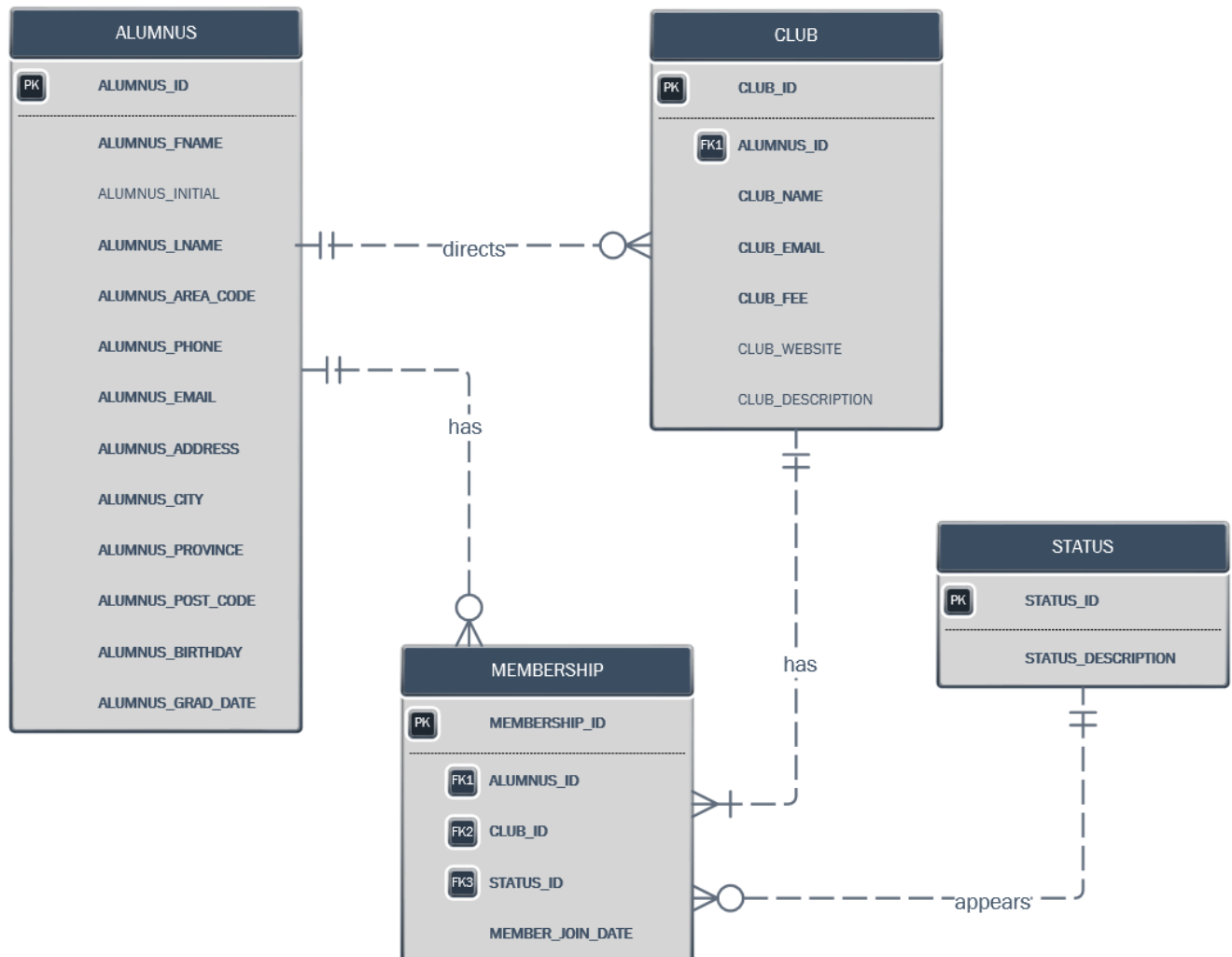


<u>STATUS_ID</u>	STATUS_DESCRIPTION
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Table Name: STATUS

## Final Extended ERD and Expanded Business Rules for Membership Segment

With the entities normalized to 3NF, the final ERD and associated business rules governing the new relationships are shown below:



- An alumnus is a former graduate of the college.
- An alumnus may have zero or many memberships.
- A membership belongs to one and only one alumnus.
- A club may have one or many memberships.
- A membership is associated with one and only one club.
- A club is directed by one and only one alumnus.
- An alumnus can direct zero or many clubs.
- A status appears zero or many times in memberships.
- A membership has one and only one status at one time.



## Business Rules Not Reflected in ERD

- Membership tracks the status of each club membership.
- A club membership has one status at any given time (Current, Recently Expired, Former).
  - *Current* means the membership end date is greater than or equal to today.
  - *Recently Expired* means the end date is 12 months or less from today.
  - *Former* means the end date is more than 12 months from today.
- Clubs have associated fees for a one-year term.
- An alumnus must have a current GAC membership in order to join other clubs.
- An alumnus may join the GAC at any time.
- The start and end dates of memberships for both the activity clubs and the GAC may be different.

## Relational Schema

ALUMNUS (ALUMNUS\_ID, ALUMNUS\_FNAME, ALUMNUS\_INITIAL, ALUMNUS\_LNAME, ALUMNUS\_AREA\_CODE, ALUMNUS\_PHONE, ALUMNUS\_EMAIL, ALUMNUS\_ADDRESS, ALUMNUS\_CITY, ALUMNUS\_PROVINCE, ALUMNUS\_POST\_CODE, ALUMNUS\_BIRTHDAY, ALUMNUS\_GRAD\_DATE)

CLUB (CLUB\_ID, CLUB\_NAME, CLUB\_EMAIL, CLUB\_FEE, CLUB\_WEBSITE, CLUB\_DESCRIPTION)

MEMBERSHIP (MEMBERSHIP\_ID, ALUMNUS\_ID, CLUB\_ID, STATUS\_ID, MEMBER\_JOIN\_DATE)

STATUS (STATUS\_ID, STATUS\_DESCRIPTION)

## Attribute List

ALUMNUS	
ALUMNUS_ID	Primary Key
ALUMNUS_FNAME	First Name
ALUMNUS_INITIAL	Middle Initial
ALUMNUS_LNAME	Last Name
ALUMNUS_AREA_CODE	Area code part of a phone number
ALUMNUS_PHONE	Last 7 digits of a phone number
ALUMNUS_EMAIL	Email address
ALUMNUS_ADDRESS	House number/apartment + room number and street name
ALUMNUS_CITY	City of address
ALUMNUS_PROVINCE	Province of address
ALUMNUS_POST_CODE	Postal code of address
ALUMNUS_BIRTHDAY	Date of birth
ALUMNUS_GRAD_DATE	Date of graduation

CLUB	
CLUB_ID	Primary Key
ALUMNUS_ID	Foreign Key, director of the club
CLUB_NAME	Name of the club
CLUB_EMAIL	Email address of the club
CLUB_FEE	The annual membership fee to join the club
CLUB_WEBSITE	Website of the club
CLUB_DESCRIPTION	A description about the club

MEMBERSHIP	
MEMBERSHIP_ID	Primary Key
ALUMNUS_ID	Foreign Key, to ALUMNUS entity
CLUB_ID	Foreign Key, to CLUB entity
STATUS_ID	Foreign Key, to STATUS entity
MEMBER_JOIN_DATE	Date the alumnus joined the club

STATUS	
STATUS_ID	Primary Key {C, R, F}
STATUS_DESCRIPTION	Current, Recently Expired, Former

## Validation Process

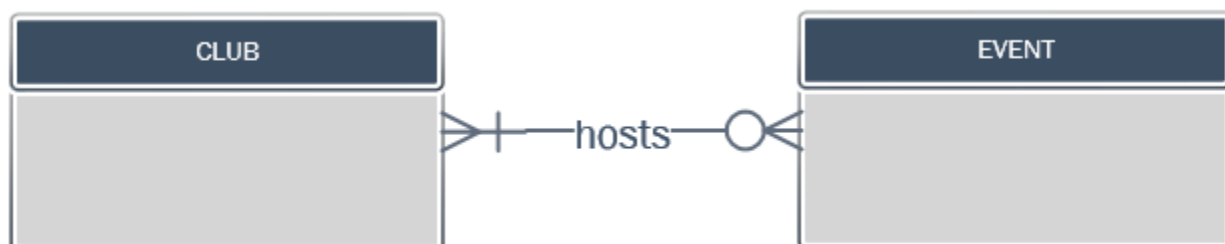
Before an alumnus can join an activity club they must be an active member of the GAC. Before a club can be started an alumnus must first be identified as the director.

## 1.2 Event Hosting Segment

### Business Rules

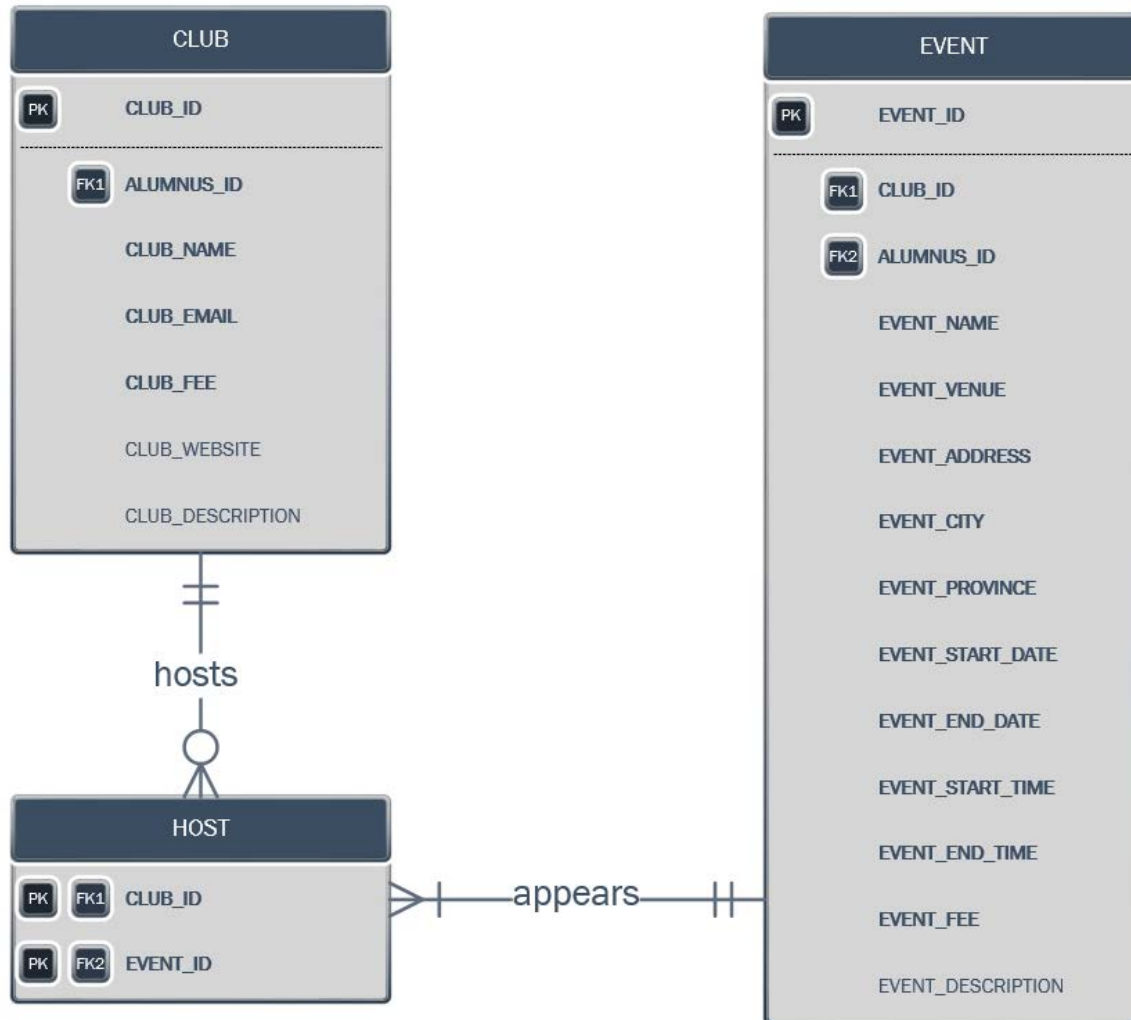
- A club (including GAC) may host zero or more events.
- An event may be hosted by one or more clubs.

### Initial ERD



### Extended ERD and Expanded Business Rules

Due to the occurrence of a M:N relationship in this segment, a bridge entity must be introduced between the CLUB ↔ EVENT relationship. Below is the extended ERD and resulting expanded business rules for all relationships:



- A club (including GAC) may host zero or more events.
- An event may be hosted by one or more clubs.
- A club (including GAC) can host zero or more hosted events.
- A hosted activity can only be hosted by one club.
- An event appears in one or more hosted events.
- A hosted activity contains only one event.

## Relational Schema

Please refer to page 7 for CLUB.

HOST (CLUB\_ID, EVENT\_ID)

EVENT (EVENT\_ID, CLUB\_ID, ALUMNUS\_ID, EVENT\_NAME, EVENT\_VENUE, EVENT\_ADDRESS, EVENT\_CITY, EVENT\_PROVINCE, EVENT\_START\_DATE, EVENT\_END\_DATE, EVENT\_START\_TIME, EVENT\_END\_TIME, EVENT\_FEE, EVENT\_DESCRIPTION)

## Attribute List

Please refer to page 8 for CLUB.

HOST	
CLUB_ID	Primary Key and Foreign Key, tracks which club is hosting the event
EVENT_ID	Primary Key and Foreign Key, tracks which event is hosted by the club

EVENT	
EVENT_ID	Primary Key
CLUB_ID	Foreign Key, to CLUB entity
ALUMNUS_ID	Foreign Key, to ALUMNUS entity
EVENT_NAME	Name of the event
EVENT_VENUE	Venue of the event
EVENT_ADDRESS	Address of the event
EVENT_CITY	City of the event
EVENT_PROVINCE	Province of the event
EVENT_START_DATE	Start date of the event
EVENT_END_DATE	End date of the event
EVENT_START_TIME	Start time of the event
EVENT_END_TIME	End time of the event
EVENT_FEE	Fee to the event
EVENT_DESCRIPTION	Description of the event

## Validation Process

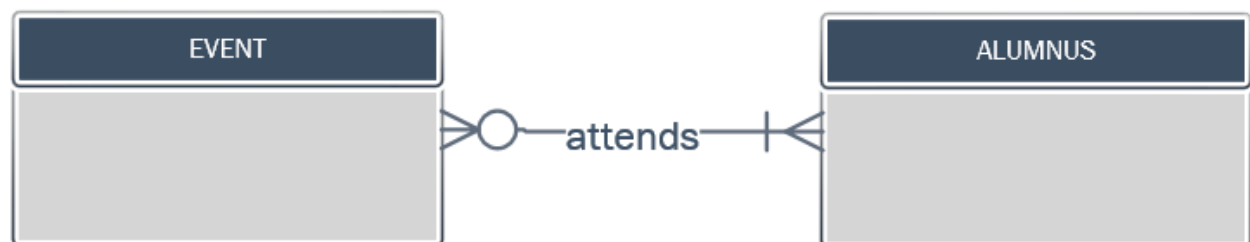
An event cannot be created without being associated with at least one hosting club.

## 1.3 Event Invitation/Registration Segment

### Business Rules

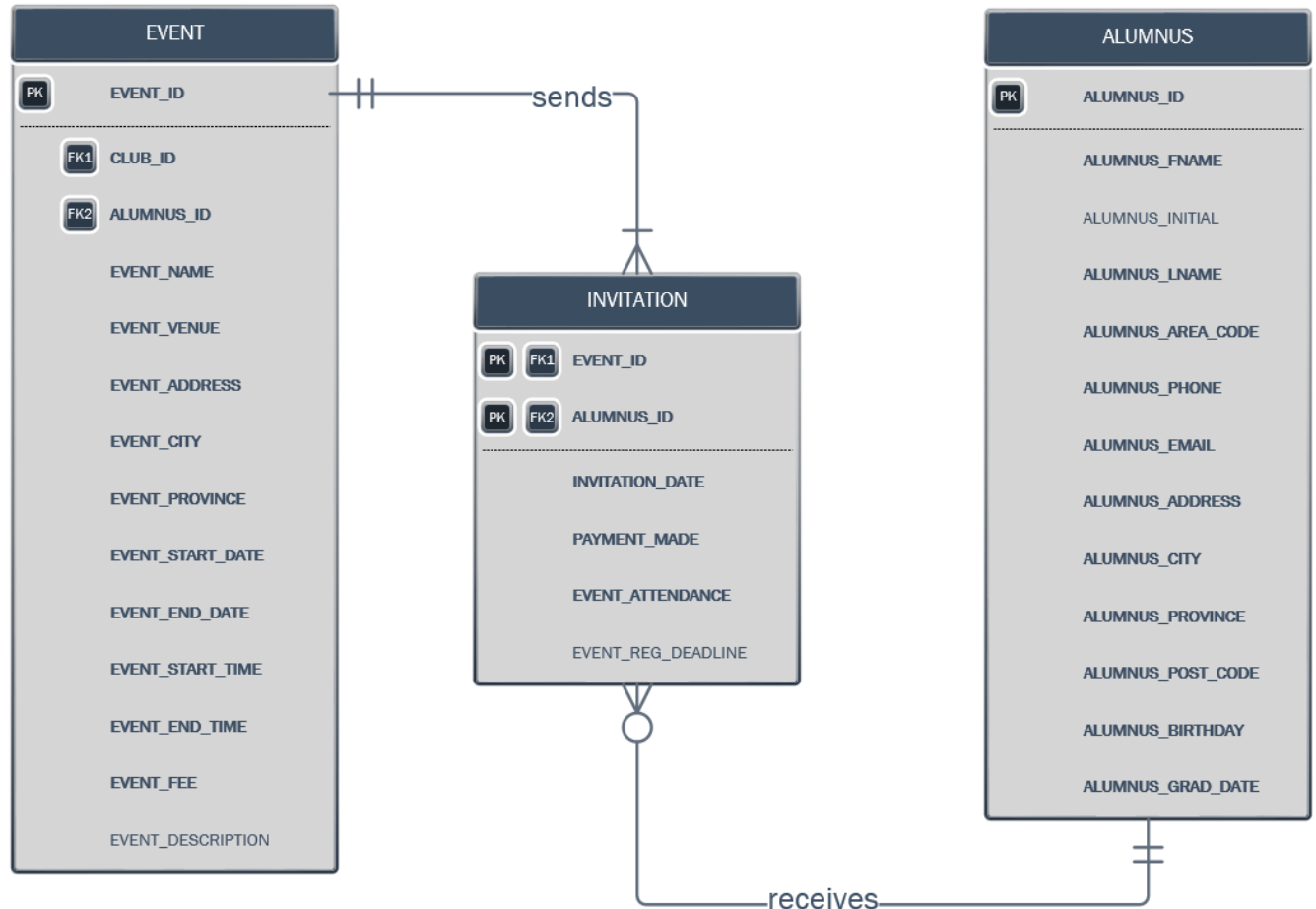
- A member may attend zero or more events.
- An event may be attended by one or more members.

### Initial ERD



## Extended ERD and Expanded Business Rules

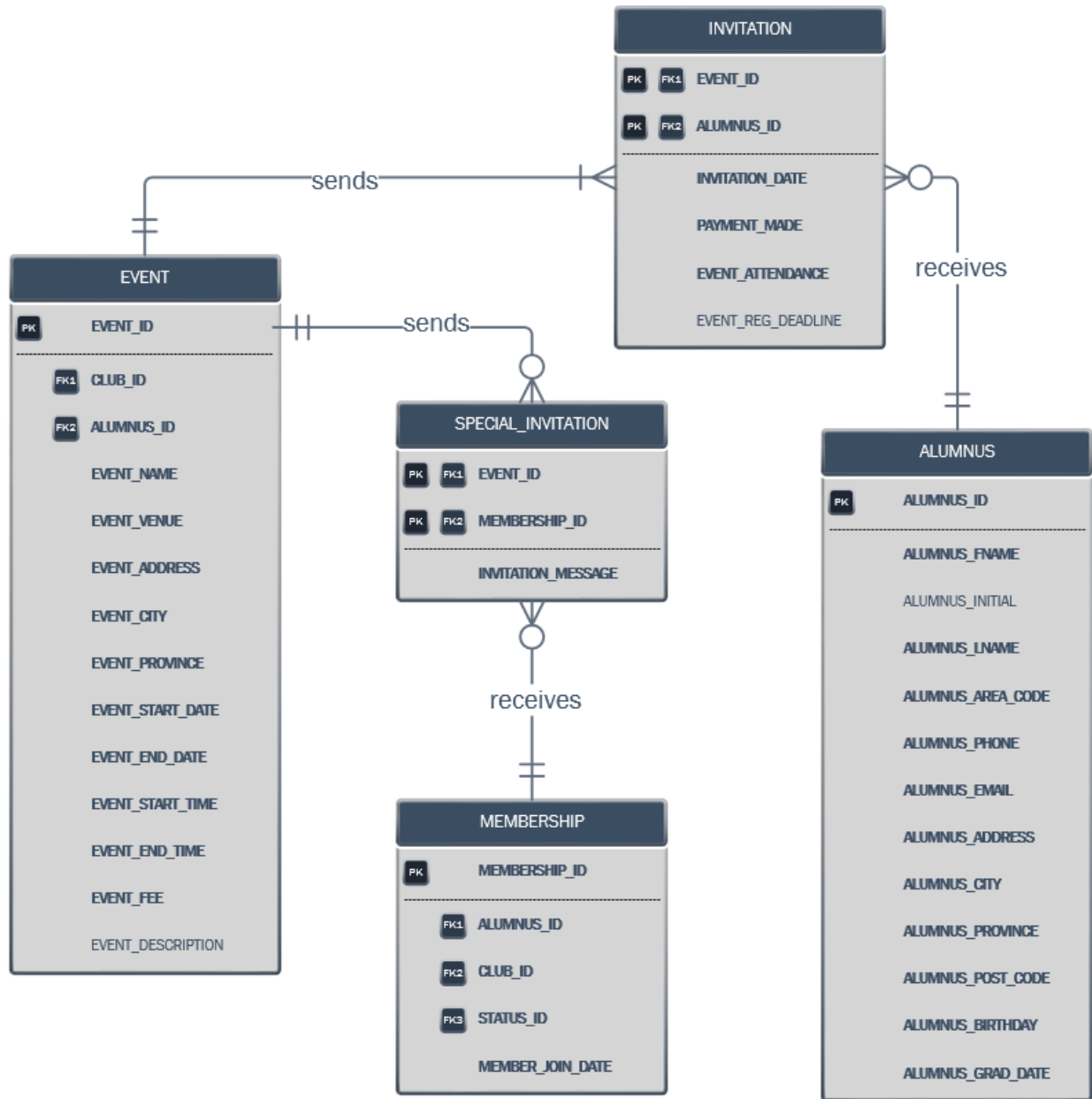
As there is another occurrence of a M:N relationship in this segment, a bridge entity must be introduced between the EVENT <-> ALUMNUS relationship. Below is the extended ERD and resulting expanded business rules for all relationships:



- A member may attend zero or more events.
- An event may be attended by one or more members.
- An event sends one or more invitations.
- An invitation is sent by one and only one event.
- An alumnus receives zero or more invitations.
- An invitation is received by only one alumnus.

## Final Extended ERD and Expanded Business Rules for Event Invitation/Registration Segment

The **SPECIAL\_INVITATION** entity is added in the extended ERD below for the purpose of identifying alumni with recently expired memberships to aid club directors in sending out special invitations. The business rules have also been expanded to govern these added relationships.



- A member may attend zero or more events.
- An event may be attended by one or more members.
- An event sends one or more invitations.
- An invitation is sent by one and only one event.
- An alumnus receives zero or more invitations.
- An invitation is received by only one alumnus.
- An event sends zero or more special invitations.
- A special invitation is sent by only one event.
- An alumnus with recently expired membership receives zero or more special invitations.
- A special invitation is received by only one alumnus with recently expired membership.

## Business Rules Not Reflected on ERD

- When an event is scheduled, all current members of the club(s) holding the event are sent one invitation via email.
- Only members receiving the invitation can register for the event.
  - The club director of a club holding an event may send a special invitation to people with a recently expired membership asking them to rejoin the club. Club joining fees apply.
- In order to complete the event registration, the event fee has to be paid.
- A member does not have to attend an event in which they are registered.

## Relational Schema

Please refer to page 7 for ALUMNUS and MEMBERSHIP, page 9 for EVENT.

INVITATION (EVENT\_ID, ALUMNUS\_ID, INVITATION\_DATE, PAYMENT\_MADE, EVENT\_ATTENDANCE)

SPECIAL\_INVITATION (EVENT\_ID, MEMBERSHIP\_ID, INVITATION\_MESSAGE)

## Attribute List

Please refer to page 7 for ALUMNUS, page 8 for MEMBERSHIP, and page 10 for EVENT.

INVITATION	
EVENT_ID	Primary Key and Foreign Key
ALUMNUS_ID	Primary Key and Foreign Key
INVITATION_DATE	Date the invitation is sent
PAYMENT_MADE	Whether the fee to the event had been made by the alumnus
EVENT_ATTENDANCE	Whether the alumnus attended the event
EVENT_REG_DEADLINE	Deadline to register/pay for the event

SPECIAL_INVITATION	
EVENT_ID	Primary Key and Foreign Key, to EVENT entity
MEMBERSHIP_ID	Primary Key and Foreign Key, to MEMBERSHIP entity

## Validation Process

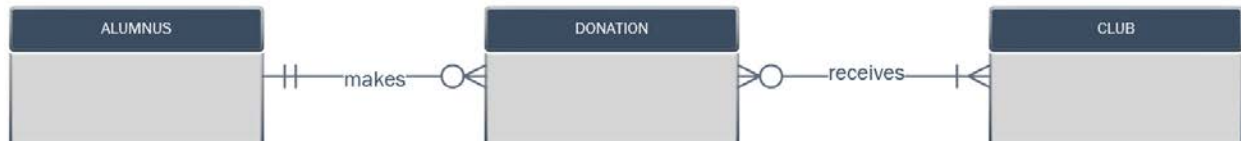
Invitations only goes out to people with at least one active membership of the club(s) hosting the event. Recipients of a special invitation must have a recently expired membership corresponding to a hosting club. Directors can only send special invitations to members with recently expired memberships of the club(s) they direct. The option to send a special invitation hinges upon an event being created, referencing a recently expired membership. MEMBER\_ID attribute in SPECIAL\_INVITATION entity will always be the latest membership of a specific club at the time of record creation.

## 1.4 Donation Segment

### Business Rules

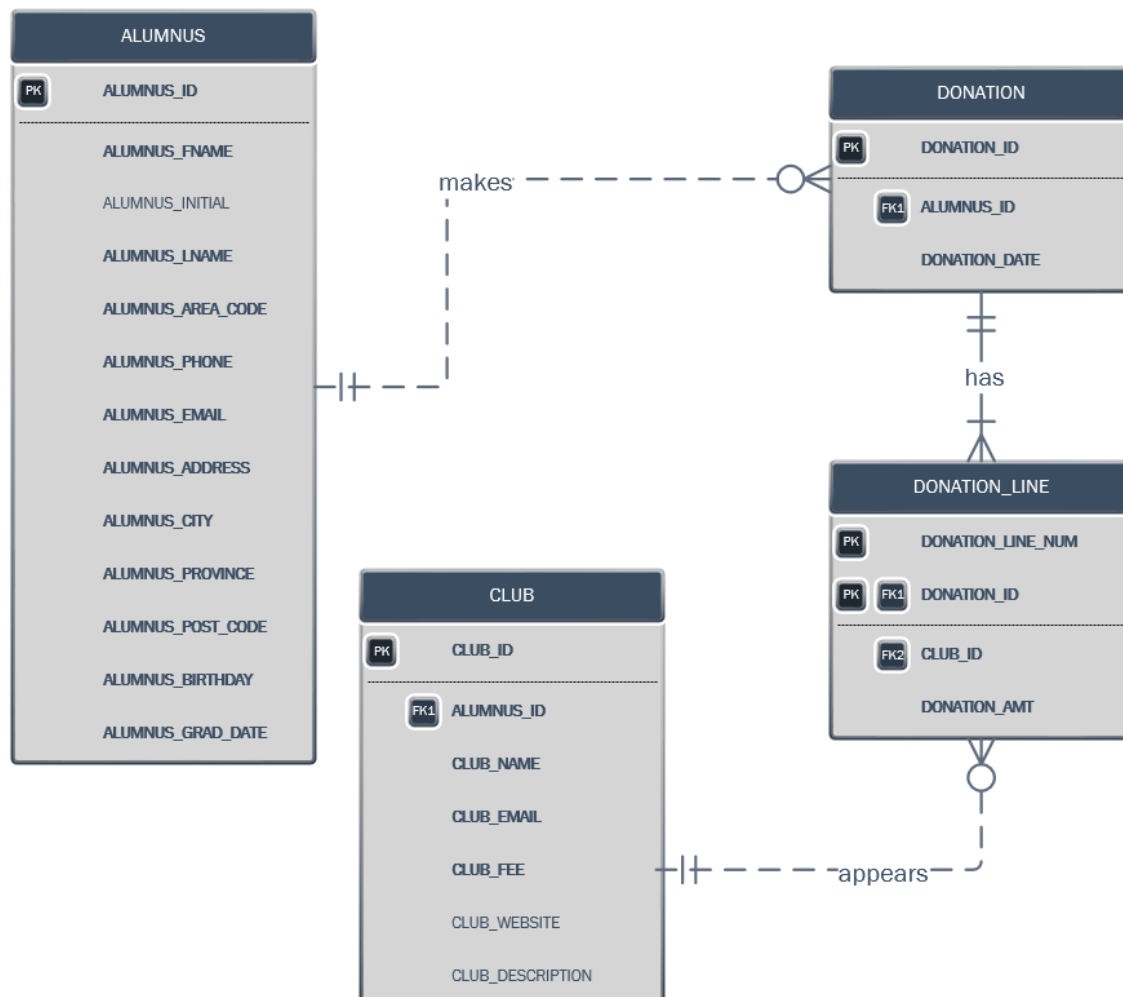
- A member may make zero or more donations.
- A donation comes from one and only one member.
- A donation can be allocated to one or more clubs.
- A club receives zero or more donations.

### Initial ERD



### Extended ERD and Expanded Business Rules

With another existence of a M:N relationship in this final segment, a bridge entity must be introduced between the DONATION ↔ CLUB relationship. Below is the extended ERD and resulting expanded business rules for all relationships:





- A member may make zero or more donations.
- A donation comes from one and only one member.
- A donation has one or more lines.
- A donation line belongs to one and only one donation.
- A donation line is associated with one and only one club.
- A club appears zero or more times in donation line.

## Relational Schema

Please refer to page 7 for ALUMNUS and CLUB.

DONATION (**DONATION\_ID**, ALUMNUS\_ID, DONATION\_DATE)

DONATION\_LINE (**DONATION\_LINE\_NUM**, **DONATION\_ID**, CLUB\_ID, DONATION\_AMT)

## Attribute List

Please refer to page 7 for ALUMNUS and page 8 for CLUB.

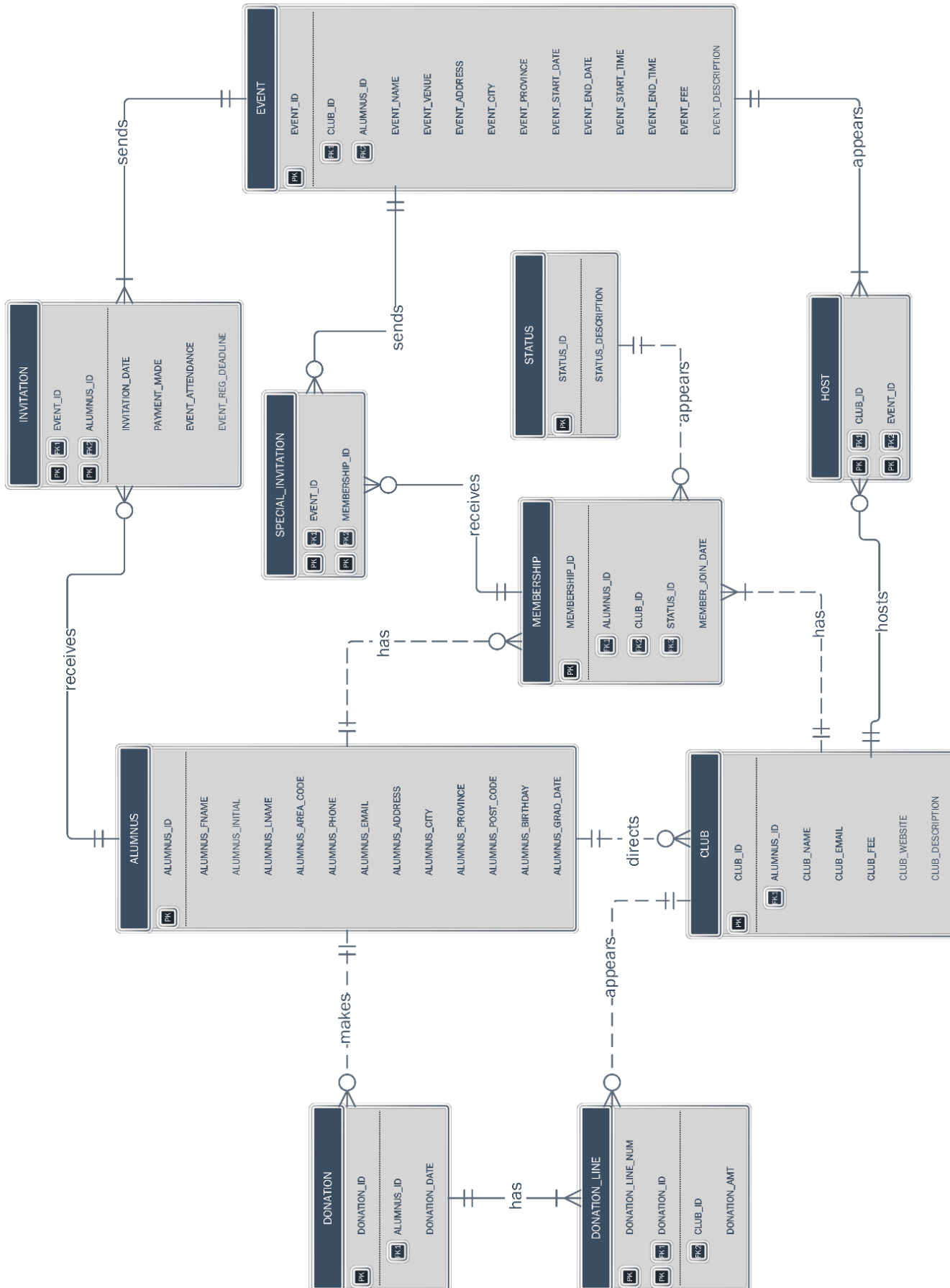
DONATION	
DONATION_ID	Primary Key
ALUMNUS_ID	Foreign Key, tracks which member made the donation
DONATION_DATE	Date of donation

DONATION_LINE	
DONATION_LINE_NUM	Primary Key, surrogate key that starts at 1 and gets incremented for each line of a specific donation
DONATION_ID	Primary Key and Foreign Key, tracks the specific donation
CLUB_ID	Foreign Key, tracks which club the donation is going to
DONATION_AMT	The amount being donated

## Validation Process

For the DONATION\_LINE entity, CLUB\_ID has to be unique per donation, such that the same club cannot have more than one donation line number for a specific DONATION\_ID.

## 2. Final ERD (Conceptual Model)



### 3. Components of ERM

ENTITY	RELATIONSHIP	CONNECTIVITY	ENTITY
ALUMNUS	has	1:M	MEMBERSHIP
CLUB	has	1:M	MEMBERSHIP
ALUMNUS	directs	1:M	CLUB
CLUB	hosts	1:M	HOST
EVENT	appears	1:M	HOST
EVENT	sends	1:M	INVITATION
ALUMNUS	receives	1:M	INVITATION
EVENT	sends	1:M	SPECIAL_INVITATION
MEMBERSHIP	receives	1:M	SPECIAL_INVITATION
STATUS	appears	1:M	MEMBERSHIP
ALUMNUS	makes	1:M	DONATION
DONATION	has	1:M	DONATION_LINE
CLUB	appears	1:M	DONATION_LINE

### 4. List of sample data

MEMBERSHIP - Bridge Entity

MEMBERSHIP_ID	ALUMNUS_ID	CLUB_ID	STATUS_ID	MEMBER_JOIN_DATE
1	2	1	C	4/10/2017
2	1	1	C	12/5/2016
3	4	2	R	1/23/2016
4	3	3	C	6/18/2016
5	6	4	F	9/2/2014
6	5	2	R	5/6/2016
7	8	8	C	3/31/2017
8	7	1	F	10/15/2015

STATUS

STATUS_ID	STATUS_DESCRIPTION
C	Current
R	Recently Expired
F	Former

## ALUMNUS

ALUMNUS_ID	ALUMNUS_FNAME	ALUMNUS_INITIAL	ALUMNUS_LNAME	ALUMNUS_AREA_CODE	ALUMNUS_PHONE	ALUMNUS_EMAIL	ALUMNUS_ADDRESS	ALUMNUS_CITY	ALUMNUS_PROVINCE	ALUMNUS_POST_CODE	ALUMNUS_BIRTHDAY	ALUMNUS_GRAD_DATE
1	John	F	Smith	778	5551234	jsmith@gmail.com	6991 Frederick Ave	Burnaby	BC	V2G6R2	3/31/1990	4/26/2010
2	Michael	R	Friday	250	5552234	mfriday@msn.com	110-2858 Acacia Dr	Victoria	BC	V6N1B5	2/16/1992	6/20/2013
3	Jesse		Billings	604	5553234	jbillings@gmail.com	3308 Ash St	Vancouver	BC	V9L6W2	9/31/1989	12/19/2011
4	Jennifer	L	Fleetwood	604	5554234	jfleetwood@hotmail.com	2485 Broadway	Vancouver	BC	V9B0A2	8/2/1984	4/28/2008
5	Emily	R	McArthur	778	5555234	emcarthur@gmail.com	4460 Garry St	Richmond	BC	V5A4R4	12/23/1988	12/20/2008
6	Danielle		Jones	604	5556234	djones@msn.ca	3374 Haida Dr	Victoria	BC	V4B9S3	6/10/1996	6/24/2016
7	James	N	Walker	250	5557234	jwalker@yahoo.com	102-5763 198 St	Langley	BC	V9B6N6	6/30/1995	7/1/2016
8	Kyle	H	Dickinson	604	5558234	kdickinson@gmail.com	2929 Barnet Hwy	Coquitlam	BC	V9C3Y9	10/11/1985	12/23/2006

## EVENT

EVENT_ID	CLUB_ID	ALUMNUS_ID	EVENT_NAME	EVENT_VENUE	EVENT_ADDRESS	EVENT_CITY	EVENT_PROVINCE	EVENT_START_DATE	EVENT_END_DATE	EVENT_START_TIME	EVENT_END_TIME	EVENT_FEE	EVENT_DESCRIPTION
1	10	10	Volunteer Thank You	Executive Hotel	4201 Lougheed Hwy	Burnaby	BC	3/22/2017	3/22/2017	18:00	22:00	100	
2	5	1	Community Fundraiser	Kits Community Centre	2690 Larch St	Vancouver	BC	2/3/2017	2/4/2017	8:00	1:00	25	Fundraiser event to help the less fortunate
3	6	13	Museum Visit	Surrey Museum	17710 56a Ave	Surrey	BC	4/12/2017	4/12/2017	12:00	18:00	200	Opportunity to visit a new local museum
4	8	22	Annual Dinner	The Keg	1499 Anderson St	Vancouver	BC	12/16/2016	12/16/2016	14:30	20:00	100	Annual dinner, formal dress code
5	2	3	Local Alumni Speakers	Radisson Hotel	8181 Cambie Rd	Richmond	BC	5/12/2017	5/12/2017	8:00	12:00	50	
6	3	14	Rookie Night	JOEY Burnaby	109 - 1899 Rosser Ave	Burnaby	BC	6/15/2016	6/15/2016	18:30	22:00	25	Welcome event for rookie members
7	11	8	Wine Tasting	Cactus Club Café	6070 200 St #101	Langley	BC	2/23/2017	2/23/2017	16:00	20:00	40	
8	3	14	Royal Regatta	Inlet Rowing Club	2715 Esplanade St	Coquitlam	BC	8/13/2016	8/13/2016	9:00	17:00	45	Annual regatta

## CLUB

CLUB_ID	ALUMNUS_ID	CLUB_NAME	CLUB_EMAIL	CLUB_FEE	CLUB_WEBSITE	CLUB_DESCRIPTION
1	2	General Alumni Club	gac@college.com	100	www.gac-college.com	General alumni club welcomes all former students
2	1	Chess Club	chessclub@college.com	25	www.chessclub-college.com	Chess club organized by alumni association
3	4	Rowing Club	rowingclub@college.com	200	www.rowingclub-college.com	Rowing club run all year that hosts many events
4	3	Programming Club	programmingclub@college.com	150	www.programmingclub-college.com	Coders unite, participate in many fun activities and challenges
5	6	Debate Club	debateclub@college.com	100	www.debateclub-college.com	Student-led debate club, new members always welcome
6	7	Writing Club	writingclub@college.com	50	www.writingclub-college.com	Workshops and exercises for writers of all skill levels
7	8	Auto Enthusiast Club	aec@college.com	200	www.aec-college.com	Activity club for alumni who enjoy all things automotive
8	5	Swimming Club	swimmingclub@college.com	150	www.swimmingclub-college.com	Formed by alumni, competes against other local clubs
9	10	Database Club	databaseclub@college.com	60	www.databaseclub-college.com	Database club organized by alumni working in the DB industry

## HOST - Bridget Entity

CLUB_ID	EVENT_ID
1	2
2	2
3	4
4	11
5	6
6	12
7	8
8	1

### INVITATION - Bridge Entity

EVENT_I	ALUMNUS_I	INVITATION_DA	PAYMENT_MA	EVENT_ATTENDAN	EVENT_REG_DEADLI
1	7	6/8/2016	Y	Y	6/18/2016
2	8	9/25/2016	Y	N	10/5/2016
3	5	4/20/2016	N	N	5/3/2016
4	6	6/8/2016	Y	Y	7/8/2016
5	3	8/10/2014	N	N	8/20/2014
6	4	5/7/2015	Y	Y	5/14/2015
7	1	4/2/2017	Y	Y	4/12/2017
8	2	12/1/2016	N	N	12/15/2016

### SPECIAL\_INVITATION - Bridge Entity

EVENT_ID	MEMBERSHIP_ID
1	3
2	9
3	11
4	15
5	6
6	25
7	10
8	5

### DONATION

DONATION_ID	ALUMNUS_ID	DONATION_DATE
1	2	1/29/2017
2	1	2/4/2017
3	4	2/13/2017
4	3	2/13/2017
5	6	2/16/2017
6	5	2/20/2017
7	8	2/21/2017
8	7	2/24/2017

### DONATION\_LINE - Bridge Entity

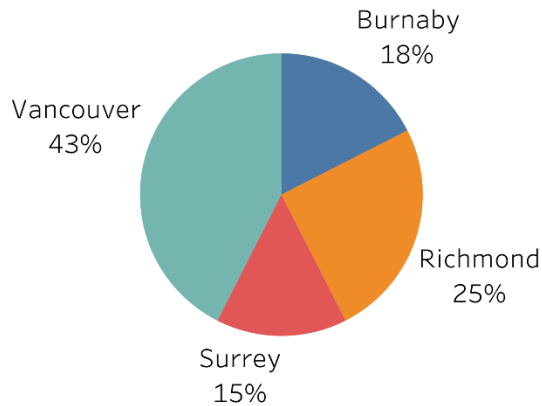
DONATION_LINE_NUM	DONATION_ID	CLUB_ID	DONATION_AMT
1	1	2	110
2	1	5	100
3	2	1	210
4	3	8	110
5	4	1	150
6	4	7	220
7	5	9	310
8	6	3	290

## 5. Sample Reports

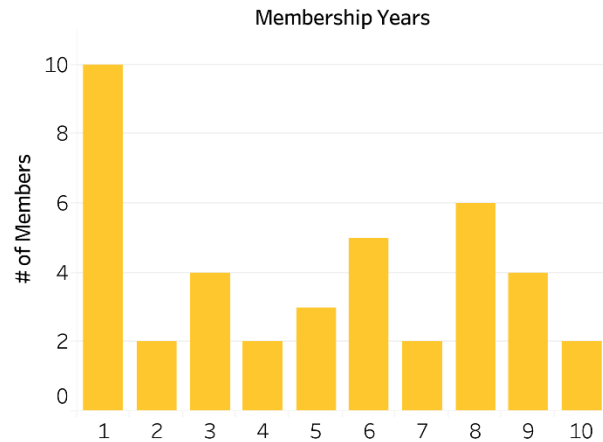
### Database Club Members Info

For Period May 2017  
Generated on May 20, 2017

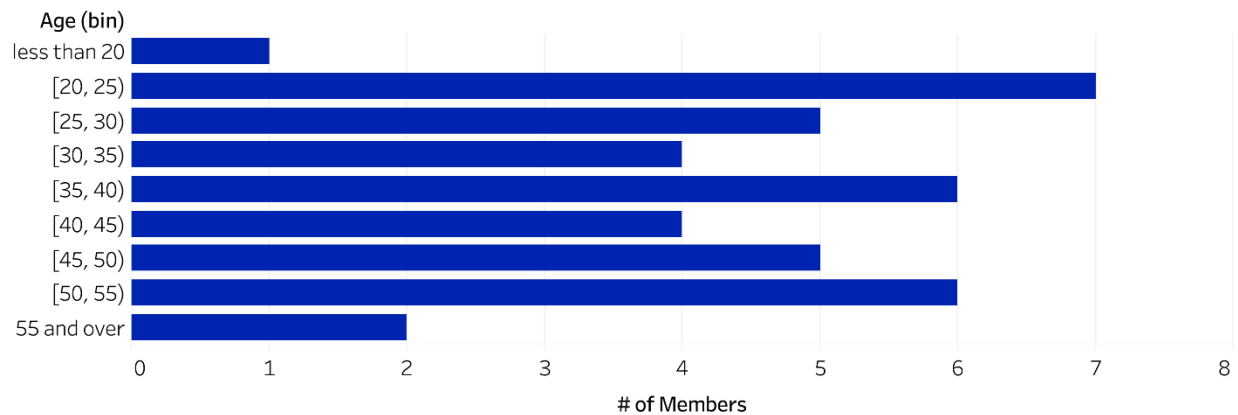
Location Breakdown



Membership Years Breakdown



Member Age Breakdown



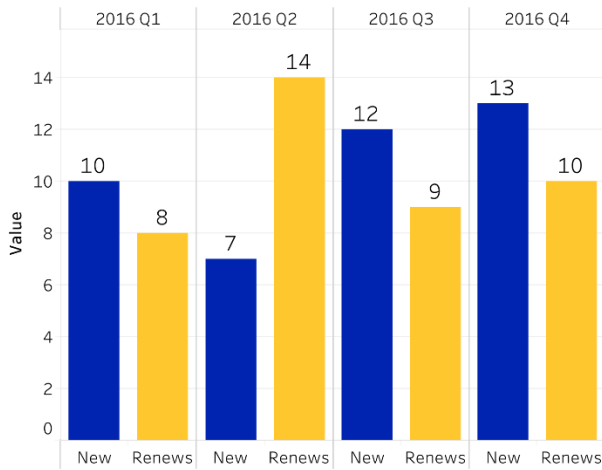
Detailed Breakdown

Row ID	Location	Age	Membership Years
1	Burnaby	23	1
2	Vancouver	29	7
3	Vancouver	21	3
4	Burnaby	32	4
5	Vancouver	51	1
6	Richmond	51	3
7	Surrey	40	1
8	Surrey	25	2
9	Richmond	28	6
10	Richmond	24	6

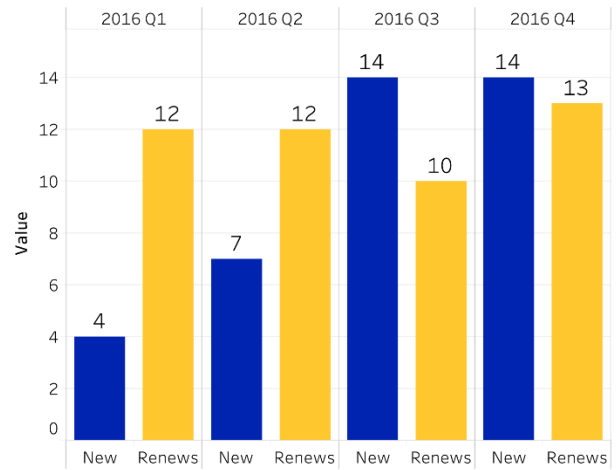
## New Memberships and Renewals (Chess Club vs. Programming Club)

For Period Jan - Dec 2016  
Generated on May 20, 2017

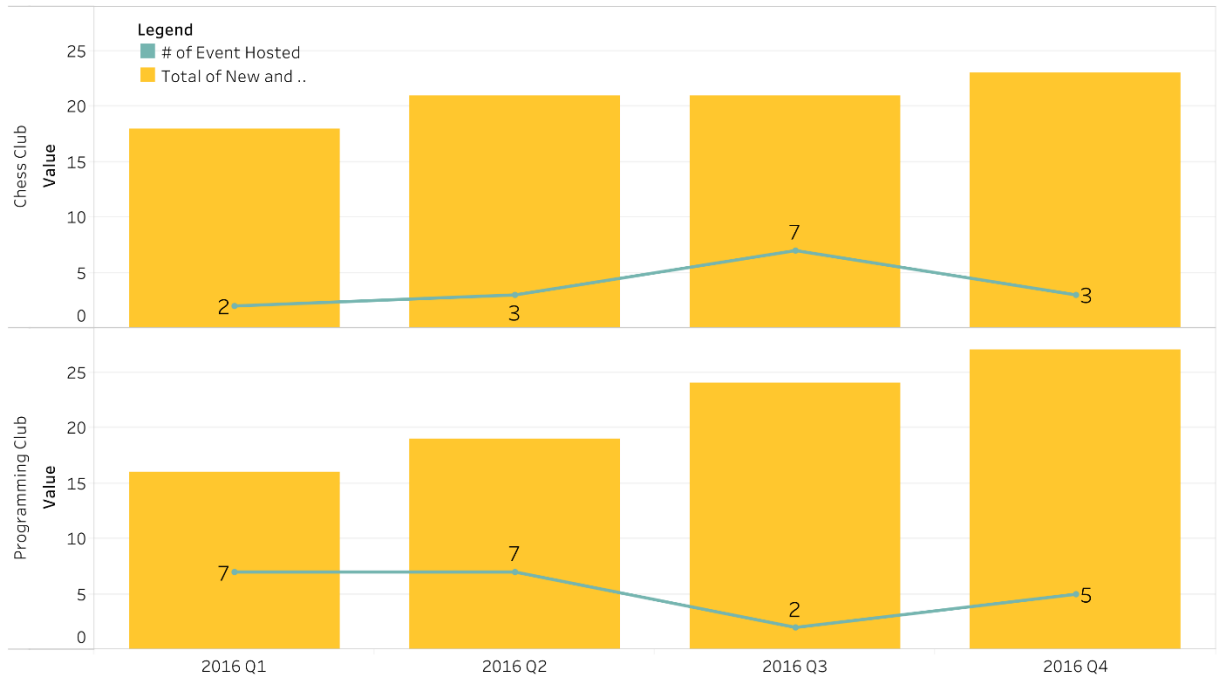
Chess Club



Programming Club



Events vs Total New and Renewals



Detailed Breakdown

		New	Renews	# of Event Hosted
Chess Club	January 2016	2	0	2
	February 2016	1	1	0
	March 2016	7	7	0
	April 2016	4	3	0
	May 2016	3	5	3
	June 2016	0	6	0
	July 2016	7	1	2
	August 2016	0	6	2
	September 2016	5	2	3
	October 2016	6	2	1
	November 2016	2	2	1
	December 2016	5	6	1

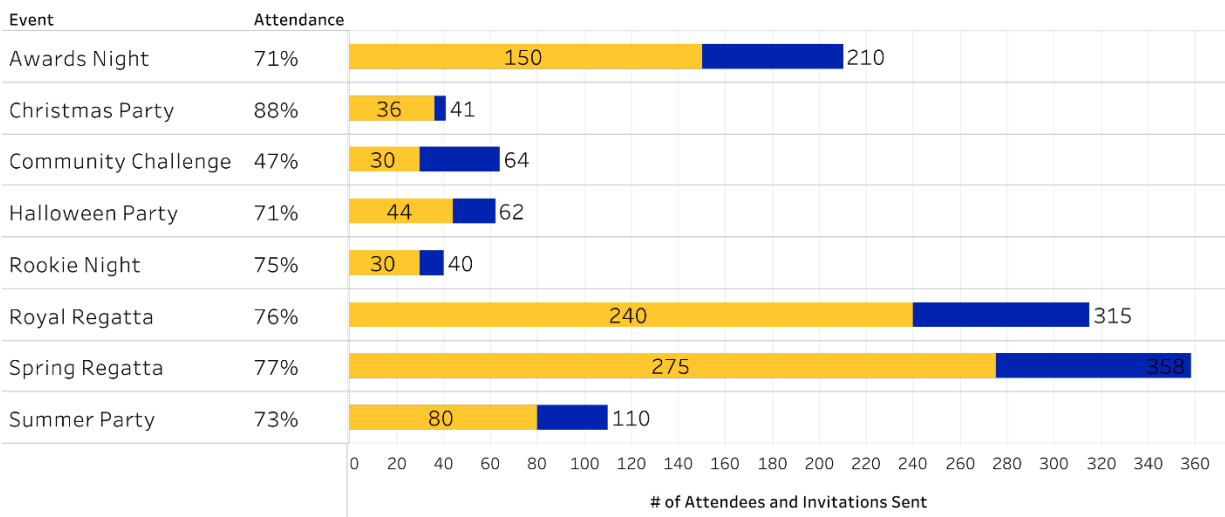


## Rowing Club Events Summary

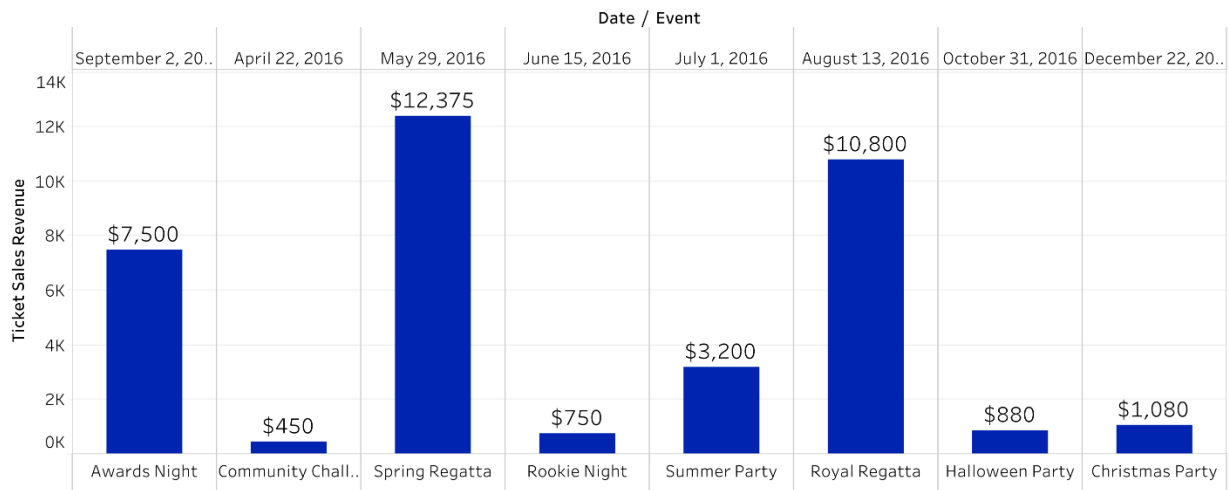
For Period Sep 2015 - Dec 2016

Generated on May 20, 2017

# of Attendees and Total Invitations Sent Per Event



Ticket Sales Revenue Per Event



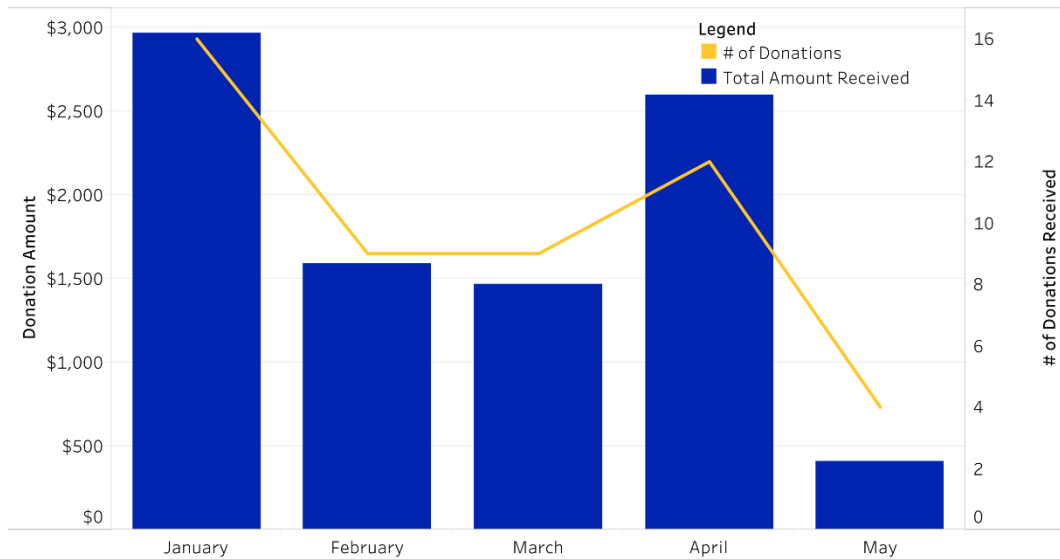
### Detailed Summary

Date	Event	Inv Sent	Special Inv Sent	# of Attendees	Event Fee	Revenue
9/2/2015	Awards Night	200	10	150	\$50	\$7,500
4/22/2016	Community Challenge	60	4	30	\$15	\$450
5/29/2016	Spring Regatta	350	8	275	\$45	\$12,375
6/15/2016	Rookie Night	40	0	30	\$25	\$750
7/1/2016	Summer Party	100	10	80	\$40	\$3,200
8/13/2016	Royal Regatta	300	15	240	\$45	\$10,800
10/31/2016	Halloween Party	60	2	44	\$20	\$880
12/22/2016	Christmas Party	40	1	36	\$30	\$1,080
Grand Total		1,150	50	885		\$37,035

## Donations Summary

For Period Jan - May 2017

Generated on May 20, 2017



Club	January	February	Date March	April	May
Auto Enthusiast Club	\$500	\$110	\$280	\$400	
Chess Club	\$540	\$710	\$140	\$1,240	\$200
Database Club	\$470		\$80	\$430	
Debate Club	\$370		\$510		\$70
General Alumni Club	\$500	\$250		\$80	\$50
Programming Club		\$430	\$110		
Rowing Club	\$480		\$140	\$360	\$90
Swimming Club	\$110		\$210		
Writing Club		\$90		\$90	

### Detailed Summary

Club	# of Donations	Total Amount Received	% of All Donations
Auto Enthusiast Club	8	\$1,290	14.27%
Chess Club	12	\$2,830	31.31%
Database Club	5	\$980	10.84%
Debate Club	5	\$950	10.51%
General Alumni Club	6	\$880	9.73%
Programming Club	4	\$540	5.97%
Rowing Club	6	\$1,070	11.84%
Swimming Club	2	\$320	3.54%
Writing Club	2	\$180	1.99%
<b>Grand Total</b>	<b>50</b>	<b>\$9,040</b>	<b>100.00%</b>

## Conclusions/Summary

In conclusion, the database system designed in this report will serve as an effective and efficient way of managing data for a university alumni association. As all entities have gone through the process of normalization, the possibility of data redundancies has been greatly minimized. This will ensure the existence of no data inconsistencies and anomalies.

Limitations of the current model have been identified as possible areas for future implemented features if the user so chooses.