CPSC 304 Project Cover Page

Milestone #: ___2____

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Group Number: ____18____

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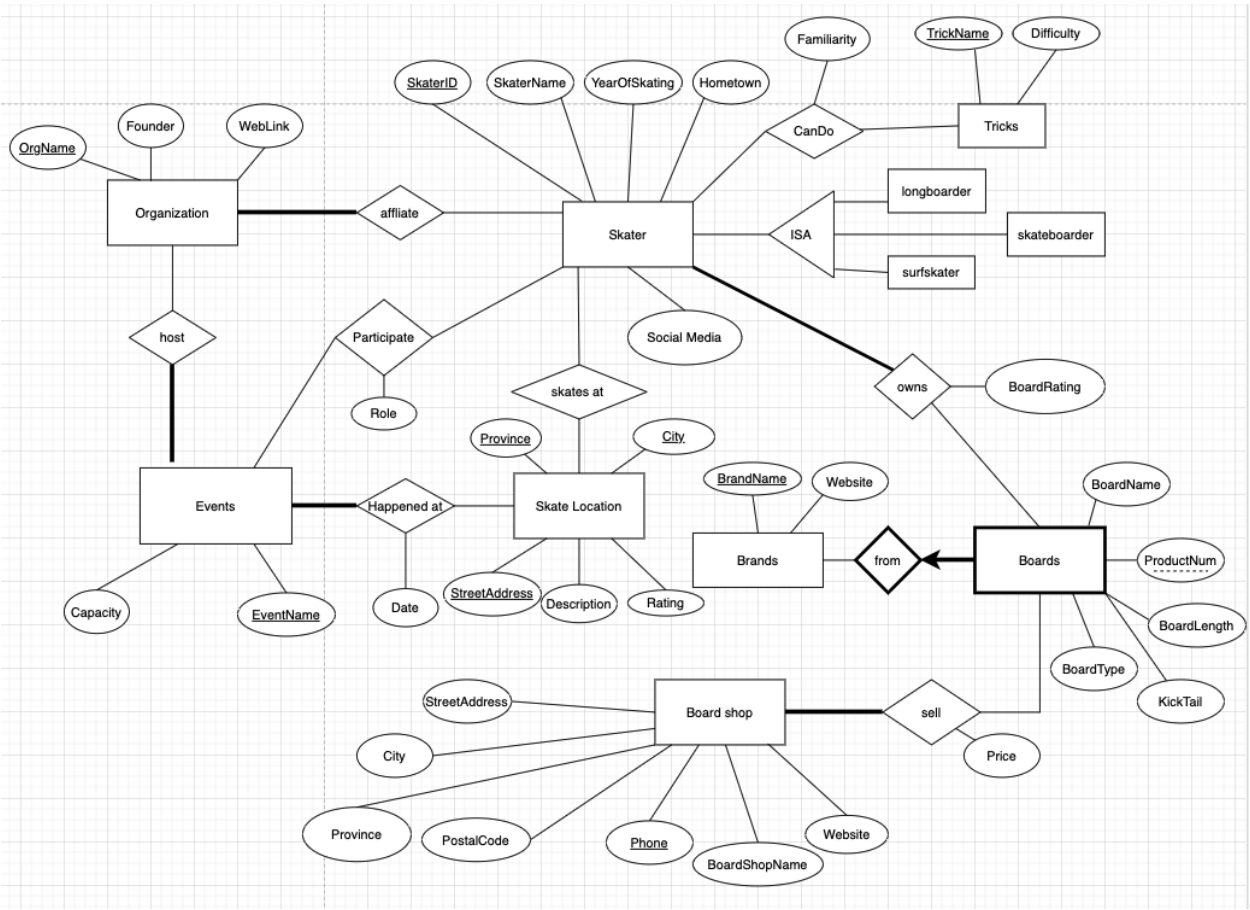
By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

ER diagram:

Link to file for a more clear picture:
https://drive.google.com/file/d/15xTMe55y_z03xMYPiTczrj71-JMB30HJ/view?usp=sharing



Changes from proposal:

Change	Details	Reason
Name changes	Event/Competition → Events SID → SkaterID Name → EventName/BoardShopName/ OrgName/SkaterName/BrandName/BoardName (in their corresponding tables) Product # → ProductNum Address → StreetAddress	Adopted a more descriptive naming strategy to avoid confusion and avoid keywords conflict in SQL.
Added BoardRating	BoardRating: integer attribute added to owns relationship	An additional attribute for a potential query we can ask regarding how

		skaters feel about each board they own.
Changed the arrow between board and owns	Changed to line instead of the arrow	The cardinality of the Owns relationship between skater and board is many-to-many, because a skater can own multiple boards and multiple skaters can own the same board. We define board entry as a specific line of board under a brand, not the exact one board that the skater owns.
Changed address attribute to (Address, City and Province)	Province and City are added as attributes for SkateLocation and BoardShop. The set of attributes (StreetAddress, city, province) is also the primary key for SkateLocation.	Separating province and city out from the address attribute can enable us to do queries such as comparing skaters between different cities and provinces.
Added Postal Code	Postal Code is added as an additional attribute for BoardShop	Postal code is added to make the BoardShop table satisfy the requirement that at least 2 relations are NOT higher than 2NF on the rubric. Also, the users might want to query the postal code of the board shop for usages like mailing.
Replaced Specification in Boards with new attributes	Spec is replaced by BoardType, KickTail and BoardLength as additional attribute for Boards	We feel that additional separation of details regarding length and the number of kicktails will be more descriptive and easier for making queries later on than just a single attribute of spec description. We can also determine the BoardType with the KickTail and BoardLength information. Also, this makes our DB satisfy the requirement that at least 2 relations are NOT higher than 2NF on the rubric.

Schema:

Table Name	Table Definition
Skater	Skater(SkaterID: char(8), SkaterName: char(50), YearOfSkating: integer, Hometown: char(50), SocialMedia: varchar(500))
Organization	Organization(OrgName: char(50), Founder: char(50), WebLink: varchar(500))
Affiliate	Affiliate(**OrgName**: char(50), **SkaterID**: char(8))
Events	Events(EventName: char(50), Capacity: integer)
Host	Host(**OrgName**: char(50), **EventName**: char(50))
Participate	Participate(**EventName**: char(50), **SkaterID**: char(8), ParticipantRole: string)
SkateLocation	SkateLocation(StreetAddress: varchar(100), City: char(50), Province: char(50), LocationDescription: text, Rating: integer)
HappenedAt	HappenedAt(**EventName**: char(50), **StreetAddress**: varchar(100), EventDate: date, **Province**: char(30), **City**: char(50))
Brands	Brands(BrandName: char(50), Website: varchar(500))
Boards	Boards(**BrandName:** char(40), ProductNum: char(20), BoardName: char(40), BoardLength: double(200, 2), BoardType: string, KickTail: integer)
Owns	Owns(**BrandName:** char(40), **ProductNum**: char(20), **SkaterID**: char(8), BoardRating: integer)
Sell	Sell(**BrandName:** char(40), **ProductNum**: char(20), **Phone**: char(12), Price: integer)
BoardShop	BoardShop(Phone: char(12), BoardShopName: char(100), StreetAddress: varchar(100), Website: varchar(500), City: char(50), PostalCode: char(10), Province: char(30))
Tricks	Tricks(TrickName: char(100), Difficulty: integer)
CanDo	CanDo(**TrickName**: char(100), **SkaterID**: char(8), Familiarity: integer)
SkateAt	SkateAt(**Province**: char(30), **City**: char(50), **StreetAddress**: char(100), **SkaterID**: char(8))
Longboarder	Longboarder(**SkaterID**: char(8))

Skateboarder	Skateboarder(**SkaterID**: char(8))
Surfskater	Surfskater(**SkaterID**: char(8))

Key and Constraints

Table Name	Primary key	Candidate key	Foreign Keys	Additional Constraints (not null)
Skater	SkaterID	SkaterID, Social Media		
Organization	OrgName	OrgName, WebLink		
Affiliate	OrgName, SkaterID	OrgName, SkaterID	Organization(OrgName), Skater(SkaterID)	SkaterID not null
Events	EventName	EventName		
Host	OrgName, EventName	OrgName, EventName	Organization(OrgName),Events(EventName)	OrgName not null
Participate	EventName, SkaterID	EventName, SkaterID	Events(EventName), Skater(SkaterID)	
SkateLocation	(StreetAddress, City, Province)	(StreetAddress, City, Province)		
HappenedAt	Name, (StreetAddress,City, Province)	Name, (StreetAddress,City, Province)	Event(Name), SkateLocation(StreetAddress, City, Province)	SkateLocation (StreetAddress, City, Province) not null
Brands	Name	Name, Website		
Boards	BrandName, ProductNum	BrandName, ProductNum	Brands(BrandName)	BrandName not null
Owns	BrandName, ProductNum, SkaterID	BrandName, ProductNum, SkaterID	Brands(BrandName), Boards(ProductNu	BrandName and ProductNum

			m), Skater(SkaterID)	not null
Sell	BrandName, ProductNum, Phone	BrandName, ProductNum, Phone	Brands(BrandName), Boards(ProductNum), BoardShop(Phone)	BrandName and ProductNum not null
BoardShop	Phone	Phone, (StreetAddress, City, Province), (Street Address, PostalCode), Website		
Tricks	TrickName	TrickName		
CanDo	TrickName, SkaterID	TrickName, SkaterID	Tricks(TrickName), Skater(SkaterID)	
SkateAt	(StreetAddress, Province, City), SkaterID	(StreetAddress, Province, City), SkaterID	Skate Location(StreetAddress, Province, City), Skater(SkaterID)	
Longboarder	SkaterID	SkaterID	SkaterID	
Skateboarder	SkaterID	SkaterID	SkaterID	
Surfskater	SkaterID	SkaterID	SkaterID	

Functional Dependencies (FDs):

Table	Functional Dependencies
Skater	SkaterID → SkaterName, SkaterID → YearOfSkating, SkaterID → Hometown, SkaterID → SocialMedia SocialMedia → SkaterName, SocialMedia → YearOfSkating, SocialMedia → Hometown, SocialMedia → SkaterID
Organization	OrgName → Founder

	OrgName → WebLink WebLink → Founder WebLink → OrgName
Event/Competition	EventName→ Capacity
SkateLocation	(StreetAddress, City, Province) → LocationDescription (StreetAddress, City, Province) → Rating
Brands	BrandName→ Website Website→BrandName
Boards	ProductNum, BrandName → BoardName ProductNum, BrandName → BoardType ProductNum, BrandName → BoardLength ProductNum, BrandName → Kicktail BoardLength, Kicktail → BoardType
BoardShop	Phone → BoardShopName Phone → Website Phone → Address Phone → City Phone → Province Phone → PostalCode Website → BoardShopName Website → Phone Website → Address Website → PostalCode Website → City Website → Province StreetAddress, PostalCode → BoardShopName StreetAddress, PostalCode → Phone StreetAddress, PostalCode → Website PostalCode → City PostalCode → Province StreetAddress, City, Province → PostalCode StreetAddress, City, Province → BoardShopName StreetAddress, City, Province → Phone StreetAddress, City, Province → Website
Tricks	TrickName → Difficulty
Longboarder	
Skateboarder	
Surfskater	
Affiliate	
Host	

Participate	EventName, SkaterID → Role
HappenedAt	EventName, StreetAddress, City, Province → Date
Owns	
Sell	BrandName, Phone, ProductID → Price
CanDo	SkaterID, TrickName → Familiarity
SkateAt	

Normalization:

1. Boards(**BrandName**, Product ID, Name, BoardLength, BoardType, KickTail)

FD:
ProductNum, BrandName → BoardName
ProductNum, BrandName →BoardType
ProductNum, BrandName → BoardLength
ProductNum, BrandName → Kicktail
BoardLength, Kicktail → BoardType

Closure:
(ProductNum, BrandName)+ = {BoardName, ProductNum, BrandName, BoardType, Kicktail, BoardLength}, → superkey

(BoardLength, Kicktail)+ = {BoardType, BoardLength, Kicktail} → not a superKey

Because (BoardLength, Kicktail) is not a superKey, this relation is not in BCNF.

Decomposition:
R1 (BoardLength, Kicktail, BoardType)
R2 (BoardName, ProductNum, BrandName, Kicktail, BoardLength)

Both relationships are now in BCNF

Tables	Primary key	Candidate key	Foreign Keys
R1 - BoardType(BoardLength: double, Kicktail: integer, BoardType: varchar(20))	(BoardLength, Kicktail)	(BoardLength, Kicktail)	
R2 - Boards(ProductNum:	(ProductNum	(ProductNum,	Brands(BrandNa

integer, **<u>BrandName</u>**: string, BoardName: varchar(40), Kicktail: varchar(40), BoardLength: double)	, BrandName)	BrandName)	me)

2. BoardShop(<u>Phone</u>, Name, StreetAddress, Website, City, PostalCode, Province)

FD:
Phone → BoardShopName
Phone → Website
Phone → StreetAddress
Phone → City
Phone → Province
Phone → PostalCode
Website → BoardShopName
Website → Phone
Website → StreetAddress
Website → PostalCode
Website → City
Website → Province
StreetAddress, PostalCode → BoardShopName
StreetAddress, PostalCode → Phone
StreetAddress, PostalCode → Website
PostalCode → City
PostalCode → Province
StreetAddress, City, Province → PostalCode
StreetAddress, City, Province → BoardShopName
StreetAddress, City, Province → Phone
StreetAddress, City, Province → Website

Closure:
Phone+ = {Phone, BoardShopName, Website, StreetAddress, City, Province, PostalCode} → superkey

Website + = {Website, BoardShopName, Phone, StreetAddress, PostalCode, City, Province} → superkey

StreetAddress, PostalCode+ = {StreetAddress, PostalCode, BoardShopName, Phone, Website, City, Province} → superkey

StreetAddress, City, Province+ = {StreetAddress, City, Province, PostalCode, BoardShopName, Phone, Website} → superkey

PostalCode+ = {City, Province, PostalCode} → not a superkey

Because PostalCode is not a superkey, this relation is not in BCNF.

Decomposition:
R1(City, Province, PostalCode)
R2(PostalCode, Phone, BoardShopName, Website, StreetAddress)

Both relationships are now in BCNF

Tables	Primary key	Candidate key	Foreign Keys
R1 - BoardShopAddress(City: string, Province: string, PostalCode: string)	PostalCode	PostalCode	
R2 - BoardShop(**PostalCode**: string, Phone: integer, BoardShopName: string, Website: string, StreetAddress: string)	Phone	Phone, Website, (StreetAddress, PostalCode)	BoardShopAddress(PostalCode)

SQL DDL:

```
CREATE TABLE Skater (
   SkaterID CHAR(8) PRIMARY KEY,
```

```
   SkaterName CHAR(50),
   YearOfSkating INTEGER,
   Hometown CHAR(50),
   SocialMedia VARCHAR(500) UNIQUE
);

CREATE TABLE Organization (
   OrgName CHAR(50) PRIMARY KEY,
   Founder CHAR(50),
   WebLink VARCHAR(500) UNIQUE
);

CREATE TABLE Affiliate {
   OrgName CHAR(50),
   SkaterID CHAR(8),
   PRIMARY KEY (OrgName, SkaterID),
   FOREIGN KEY (OrgName)
       REFERENCES Organization
       ON DELETE CASCADE
       ON UPDATE CASCADE,
   FOREIGN KEY (SkaterID)
       REFERENCES Skater
       ON DELETE CASCADE
       ON UPDATE CASCADE
};

CREATE TABLE Events{
   EventName CHAR(50) PRIMARY KEY,
   Capacity INTEGER
};

CREATE TABLE Host {
   OrgName CHAR(50),
   EventName CHAR(50),
   PRIMARY KEY (OrgName, EventName),
   FOREIGN KEY (OrgName)
       REFERENCES Organization
       ON DELETE CASCADE
       ON UPDATE CASCADE,
   FOREIGN KEY (EventName)
       REFERENCES Events
       ON DELETE CASCADE
       ON UPDATE CASCADE
};

CREATE TABLE Participate {
   EventName CHAR(50),
   SkaterID CHAR(8),
   ParticipantRole CHAR(50),
   PRIMARY KEY (EventName, SkaterID),
   FOREIGN KEY (EventName)
       REFERENCES Events
       ON DELETE CASCADE
       ON UPDATE CASCADE,
```

```
   FOREIGN KEY (SkaterID)
       REFERENCES Skater
       ON DELETE CASCADE
       ON UPDATE CASCADE
};

CREATE TABLE SkateLocation{
   StreetAddress VARCHAR(100),
   City CHAR(50),
   Province CHAR(50),
   LocationDescription TEXT,
   Rating INTEGER,
   PRIMARY KEY (StreetAddress, City, Province)
};

CREATE TABLE  HappenedAt (
   EventName CHAR(50),
   StreetAddress VARCHAR(100),
   EventDate DATE,
   PRIMARY KEY(EventName, StreetAddress),
   FOREIGN KEY(EventName)
       REFERENCES Events
       ON DELETE CASCADE
       ON UPDATE CASCADE,
   FOREIGN KEY(StreetAddress)
       REFERENCES SkateLocation
       ON DELETE CASCADE
       ON UPDATE CASCADE
);

CREATE TABLE  Brands (
   BrandName CHAR(40) PRIMARY KEY,
   Website VARCHAR(500) UNIQUE
);

CREATE TABLE  BoardType (
   BoardLength DOUBLE(200, 2),
   Kicktail INTEGER,
   BoardType CHAR(40),
   PRIMARY KEY(BoardLength, Kicktail)
);

CREATE TABLE  Boards (
   ProductNum CHAR(20),
   BrandName CHAR(40),
   BoardName CHAR(40),
   Kicktail CHAR(40),
   BoardLength DOUBLE(200, 2),
   PRIMARY KEY(ProductNum, BrandName),
   FOREIGN KEY(BrandName)
       REFERENCES Brands
       ON DELETE CASCADE
       ON UPDATE CASCADE
);
```

```
CREATE TABLE  Owns (
   BrandName CHAR(40),
   ProductNum  CHAR(20),
   SkaterID CHAR(8),
   BoardRating INTEGER,
   PRIMARY KEY(BrandName, ProductNum, SkaterID),
   FOREIGN KEY(BrandName, ProductNum)
       REFERENCES Boards(BrandName, ProductNum)
       ON UPDATE CASCADE,
   FOREIGN KEY (SkaterID)
       REFERENCES Skater
       ON DELETE CASCADE,
       ON UPDATE CASCADE

);

CREATE TABLE  Sell (
   BrandName CHAR(40),
   ProductNum  CHAR(20),
   Phone CHAR(12),
   Price INTEGER,
   PRIMARY KEY(BrandName, ProductNum, Phone),
   FOREIGN KEY(BrandName, ProductNum)
       REFERENCES Boards(BrandName, ProductNum)
       ON UPDATE CASCADE,
   FOREIGN KEY(Phone)
       REFERENCES BoardShop,
       ON DELETE CASCADE
       ON UPDATE CASCADE
);

CREATE TABLE BoardShopAddress(
   PostalCode CHAR(10) PRIMARY KEY,
   City CHAR(50),
   Province CHAR(30)
);

CREATE TABLE BoardShop(
   PostalCode CHAR(10),
   Phone CHAR(12) PRIMARY KEY,
   BoardShopName CHAR(100),
   Website VARCHAR(500) UNIQUE,
   StreetAddress VARCHAR(100),
   FOREIGN KEY (PostalCode)
       REFERENCES BoardShopAddress(PostalCode)
       ON DELETE CASCADE
       ON UPDATE CASCADE
);

CREATE TABLE Tricks(
   TrickName CHAR(100) PRIMARY KEY,
   Difficulty INTEGER
);
```

```
CREATE TABLE CanDo(
   TrickName CHAR(100),
   SkaterID CHAR(8),
   Familiarity INTEGER,

   PRIMARY KEY (TrickName, SkaterID),
   FOREIGN KEY (SkaterID)
       REFERENCES Skater(SkaterID)
       ON DELETE CASCADE
       ON UPDATE CASCADE,
   FOREIGN KEY (TrickName)
       REFERENCES Tricks(TrickName)
       ON DELETE CASCADE
       ON UPDATE CASCADE
);

CREATE TABLE SkateAt(
   Province CHAR(30),
   City CHAR(50),
   StreetAddress CHAR(100),
   SkaterID CHAR(8),
   PRIMARY KEY (Province, City, StreetAddress, SkaterID)
       REFERENCES Skater
       ON DELETE CASCADE,
       ON UPDATE CASCADE,
   FOREIGN KEY (Province, City, StreetAddress)
       REFERENCES BoardShopAddress(Province, City, StreetAddress)
       ON UPDATE CASCADE,
   FOREIGN KEY (SkaterID)
       REFERENCES Skater(SkaterID)
       ON DELETE CASCADE
       ON UPDATE CASCADE
);

CREATE TABLE Longboarder (
   SkaterID CHAR(8) PRIMARY KEY,
   FOREIGN KEY (SkaterID)
       REFERENCES Skater(SkaterID)
       ON DELETE CASCADE
       ON UPDATE CASCADE
);

CREATE TABLE Skateboarder (
   SkaterID CHAR(8) PRIMARY KEY,
   FOREIGN KEY (SkaterID)
       REFERENCES Skater(SkaterID)
       ON DELETE CASCADE
       ON UPDATE CASCADE
);

CREATE TABLE Surfskater (
   SkaterID CHAR(8) PRIMARY KEY,
   FOREIGN KEY (SkaterID)
```

```
        REFERENCES Skater(SkaterID)
        ON DELETE CASCADE
        ON UPDATE CASCADE
);
```

Data populate

The data tuples are populated using excel. The table names are below the corresponding screenshots.

	A	B	C	D	E
1	SkaterID	SkaterName	YearOfSkating	Hometown	SocialMedia
2	1	Duffy	10	Toronto	www.google.com
3	2	May	1	New Zealand	www.ubc.com
4	3	Jonathan	1	Hong Kong	www.J0nathan.com
5	4	Yifan	15	Australia	www.redditYifan.com
6	5	Mary	9	Jamica	www.jam.com

Skater

	A	B	C
1	PostalCode	City	Province
2	111111	Vancouver	British Columbia
3	222222	Montreal	Quebec
4	333333	Burnaby	British Columbia
5	444444	Richmond	British Columbia
6	555555	Surrey	British Columbia

BoradShopAddress

	A	B	C	D	E
1	PostcalCode	Phone	BoardShopName	Website	StreetAddress
2	111111	110	UBC Boards	www.boards.com	1117 University Road
3	222222	911	Montreal Boards	www.monboards.com	3823 Lucy Road
4	333333	1000000	Burnaby Boards	www.burnboards.com	2222 Burnaby Road
5	444444	1234567890	Richmond Boards	www.richboards.com	1213 Rich Road
6	555555	9876543210	Surrey Boards	www.uni.com	9872 Surrey Road

BoardShop

	A	B
1	TrickName	Difficulty
2	Pivot180	4
3	Kickflip	8
4	Shovit	5
5	Ghost Kick	4
6	No-Comply	5

Tricks

	A	B	C
1	TrickName	SkaterID	Familiarity
2	Pivot180	1	8
3	Kickflip	1	7
4	Shovit	1	6
5	Ghost Kick	1	5
6	No-Comply	1	10
7	Pivot180	2	10
8	Kickflip	2	10
9	Pivot180	3	1
10	Pivot180	4	10
11	Kickflip	4	10
12	Shovit	4	10
13	Ghost Kick	4	10
14	No-Comply	4	10
15	Shovit	5	7

CanDo

	A
1	SkaterID
2	1
3	4
4	2
5	3
6	5

Longboarder

	A
1	SkaterID
2	1
3	2
4	3
5	4
6	5

Skateboarder

	A
1	SkaterID
2	1
3	2
4	3
5	4
6	5

Surfskater

	A	B	C
1	OrgName	Founder	WebLink
2	SkateOrDie	Duffy	www.duffySk8er.com
3	UBC Skate	Yifan	www.ubcskate8.com
4	SkateBurnab	Girish	www.burnabyskate.com
5	SkaterVan	Lucy	www.vanskate.com
6	SkaterinCad	Mary	www.maryinskate.com

Organization

	A	B
1	OrgName	SkaterID
2	SkateOrDie	1
3	UBC Skate	4
4	SkateBurnab	3
5	SkaterVan	3
6	SkaterinCad	4

Affiliate

	A	B
1	EventName	Capacity
2	Skate to Toronto	999
3	Skate to Stanley park	100
4	Vancouver International Skate Competition	9999
5	Toronto International Skate Competition	8888
6	Montreal International Skate Competition	7777

Events

	A	B
1	OrgName	EventName
2	SkateOrDie	Skate to Toronto
3	UBC Skate	Skate to Stanley park
4	SkateBurnab	Vancouver International Skate Competition
5	SkaterVan	Toronto International Skate Competition
6	SkaterVan	Montreal International Skate Competition

Host

	A	B	C
1	EventName	SkaterID	ParticipantRole
2	Skate to Toronto	1	DJ
3	Skate to Stanley park	2	DJ
4	Vancouver International Skate Competition	3	DJ
5	Toronto International Skate Competition	4	DJ
6	Montreal International Skate Competition	5	DJ

Participate

	A	B	C	D	E
1	StreetAddress	City	Province	LocationDescription	Rating
2	1288 West Georgia	Calgary	Alberta	Very good place to skate, lots of skaters	8
3	1111 Christina Road	Richmond	British Columbia	Bowl for surfskater	7
4	2133 University Road	Vancouver	British Columbia	Parking lot at UBC, be careful of security guards	8
5	1323 Univeirsity Road	Vancouver	British Columbia	Nice skate park	7
6	3221 East Vancouver Road	Montreal	Quebec	Skate park for longboard, very original	9

SkateLocation

	A	B	C	D	E
1	EventName	City	Province	StreetAddress	EventDate
2	Skate to Toronto	Calgary	Alberta	1288 West Georgia	2022-01-13
3	Skate to Stanley park	Richmond	British Columbia	1111 Christina Road	2021-09-28
4	Vancouver International Skate Competition	Vancouver	British Columbia	2133 University Road	2021-12-21
5	Toronto International Skate Competition	Vancouver	British Columbia	1323 Univeirsity Road	2022-07-07
6	Montreal International Skate Competition	Montreal	Quebec	3221 East Vancouver Road	2022-06-27

HappenedAt

	A	B
1	BrandName	Website
2	Landyatchz	https://landyachtz.ca/
3	Loaded	https://loadedboards.com/
4	Zenit	https://zenitboards.com/
5	Arbor	https://www.arborcollective.com/
6	Moonshine	https://www.moonshinemfg.com/
7	Santa Cruz	https://santacruzskateboards.com/

Brands

	A	B	C	D
1	SID	BoardRating	BrandName	ProductNum
2	1	3	Landyatchz	100
3	2	6	Loaded	200
4	3	7	Zenit	300
5	4	1	Arbor	400
6	5	9	Moonshine	500

Owns

	A	B	C	D
1	BrandName	ProductNum	Phone	Price
2	Landyatchz	123	110	287
3	Landyatchz	222	911	300
4	Landyatchz	900	1000000	258
5	Loaded	100	1234567890	372
6	Moonshine	200	9876543210	200

Sells