

**University of British Columbia, Vancouver**  
Department of Computer Science

**CPSC 304 Project Cover Page**

Milestone #: 4

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Group Number: 35

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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

## Project Description

The crime-case database allows users to find information of specific cases. Users are allowed to create new cases, update and delete current cases. They can also search for specific cases by Case Number, and find information of the police force by their badge number. In addition, Users can find criminals involved in a specified amount of cases.

Users can see current hotspots for crime.

Users can see which people of interest are involved in all cases.

Users can see the amount of open and closed cases.

## Changes

We got rid of the CaseStatus relation because it was unnecessary and we could have it as an attribute to Case.

We made a few more insert statements to show the tables in some of the queries.

We changed IncidentTime(time) to Reason(string) in First Incident Report to make PHP implementation easier.

We removed the Has\_Evidence table as it was unnecessary.

We renamed some attributes.

## Final Schema and Screenshots of Data

Legend

Primary key

**Foreign key**

*Candidate key*

### Entities

Detective(D-BadgeNumber: integer, **PC-BadgeNumber**: integer, **PrecinctNumber**: integer, Name: string, Rank: string, *PhoneNumber*: string)

D-BadgeNumber	PC-BadgeNumber	PrecinctNumber	Name	Rank	PhoneNumber
1	100	95	Batman	Vigilante	888-888-8888
2	100	95	Jim Gordon	Lieutenant	487-581-2945
3	200	96	Sherlock Holmes	Chief	555-555-5555
4	300	97	Inspector Gadget	Inspector	234-432-1234
5	300	97	Curious George	Inspector	180-222-3343

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Police Chief(PC-BadgeNumber: integer, Name: string, *PhoneNumber*: string)

BadgeNumber	Name	PhoneNumber
1	Tyler1	604-234-4355
100	Tyreke Beasley	604-888-8888
200	Tyrone Moose	604-456-4566
300	Tyler the Creator	604-101-1010
400	Tyra Banks	604-289-9820
500	Tyler Relyt	604-604-6040

Precinct(PrecinctNumber: integer, *Address*: string)

PrecinctNumber	Address
99	1000 Jake St
97	5555 West Mall St
95	5603 Charming Ave
96	8888 University Blvd
98	9023 Pender St

Cases(CAID: integer, DateLogged: date, Result: string, CaseStatus: string)

CAID	DateLogged	Result	CaseStatus
1800001	2022-06-06	N/A	Active
1800002	2022-11-10	N/A	Active
1800003	2022-05-18	N/A	Active
1800004	2022-07-11	Guilty	Inactive
1800005	2022-01-05	Dead	Inactive
1800006	2022-11-22	Dead	Inactive

CriminalRiskLevel(TimesArrested: integer, RiskLevel: string)

TimesArrested	RiskLevel
0	Low
1	Low
54	Mid
70	High
9999	EXTREME

Criminal(CID: integer, Name: string, **TimesArrested**: integer)

CID	Name	TimesArrested
1	Jawa	9999
2	Walter White	1
3	Riddler	54
4	Jack the Ripper	0
5	Chuck E. Cheese	70

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Forensic Lab(FID: integer, OfficeName: string, OfficeAddress: string)

FID	OfficeName	OfficeAddress
15	Flesh Sweeper	555 Death St
16	We Love Evidence!	723 Yummy Dr
17	4ensics 4lyfe	809 Patrice St
18	Peter	111 Peter St
19	Lois	222 Lois Rd

People of Interest(ID: integer, Name: string, Address: string, Contact: string)

ID	Name	Address	Contact
1	Peter Griffin	31 Spooner St	petergriffinfunny@yahoo.com
2	Eric Cartman	1542 Colorado Spring Rd	respectmahauthoritah@southpark.com
3	Tyler Blevins	9400 San Francisco St	ninja@twitch.tv
4	John Cena	5545 BlingQilin Ave	cantseeme@wwe.com
5	Pooh Shiesty	420 Drill Rd	reallyshiesty@rapper.com
6	Lebron James	0623 Goat Dr	goat@nba.com
7	Odell Beckham Jr.	1313 One Hand St	obj@nfl.com
8	Dave Chappelle	2134 Comedy St	davechappelle@comedy.com
9	Will Smith	2451 Bel Air Dr	wildwest@acting.com
10	Chris Rock	4444 Oscar St	slapped@acting.com
11	Mr. Bean	0592 Great St	mrbean@acting.com
12	Undertaker	100-5055 Forsyth Commerce Rd	undertaker@wwe.com
13	Patrick Star	2 Rock St	starpatrick@bbmail.com
14	Homer Simpson	742 Evergreen Terrace	homesimp@smail.com
15	Bender Rodriguez	#1 Apt The Future	bitemyshinymetal@ssfuture.com

Suspect(ID: integer, Reason: string)

ID	Reason
1	Too Funny!
4	Can't see this man
5	Acting suspicious
9	Slapped Chris Rock
13	Under his rock all the time

Witness(ID: integer, Protected: char)

ID	Protected
2	Y
7	Y
8	Y
11	N
15	N

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Victim(**ID**: integer, CurrCondition: string)

ID	CurrCondition
3	Losing popularity
6	Sprained ankle
10	Bruise on cheek
12	Dead
14	Two brain cells

Physical Evidence(**CAID**: integer, **EID**: integer, **FID**: integer, DateCollected: date, EvdSource: string, Type: string)

CAID	EID	FID	DateCollected	EvdSource	Type
1800001	511	15	2022-06-06	Crime Scene	Weapon
1800002	512	16	1985-03-28	Crime Scene	Finger Prints
1800003	513	17	2000-12-25	WWE Cage	Foldable Chair
1800004	514	18	2008-05-30	Crime Scene	Drug
1800005	515	19	2021-10-10	National TV	Chris Rock's hand

Statements(**CAID**: integer, **EID**: integer, **FID**: integer, DateCollected: date, EvdSource: string)

CAID	EID	FID	DateCollected	EvdSource
1800001	516	(null)	2022-06-06	Victim
1800002	512	(null)	1985-03-28	Witness
1800003	513	(null)	2000-12-25	Suspect A
1800004	514	(null)	2008-05-30	Victim's Friend
1800005	515	(null)	2021-10-10	Witness

Follow-Up Reports(**CAID**: integer, **EID**: integer, **FID**: integer, DateCollected: date, EvdSource: string, Reason: string, **FURID**: integer)

CAID	EID	FID	DateCollected	EvdSource	Reason	FURID
1800001	516	15	2022-06-16	(null)	Reinterrogate	606
1800002	512	16	1985-04-10	(null)	New POI found	607
1800003	513	17	2000-12-31	(null)	New POI found	608
1800004	514	18	2008-06-25	(null)	New information found	609
1800005	515	19	2021-11-10	(null)	Reinterrogate	610

First-Incident Report(**CAID**: integer, **EID**: integer, **FID**: integer, Date: date, EvdSource: string, Reason: string, **FIRID**: integer)

CAID	EID	FID	DateCollected	EvdSource	Reason	FIRID
1800001	516	15	2022-06-06	(null)	Reinterrogate	606
1800002	512	16	1985-03-28	(null)	New POI found	607
1800003	513	17	2000-12-25	(null)	New POI found	608
1800004	514	18	2008-05-30	(null)	New information found	609
1800005	515	19	2021-10-10	(null)	Reinterrogate	610

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### Relations

DetectiveCaseManagement(BadgeNumber: integer, CAID: integer)

BADGENUMBER	CAID
1	1800001
2	1800002
3	1800003
4	1800004
4	1800006
5	1800005
5	1800006

CrimeInCase(CAID: integer, CRID: integer, Location: string, CrimeType: string)

CAID	CRID	LOCATION	CRIMETYPE
1800001	1010	Downtown	Murder
1800002	1015	Mount Pleasant	BE
1800002	1010	Mount Pleasant	Murder
1800003	1010	Yaletown	Murder
1800004	1016	Waterfront	Drug Dealing
1800005	1012	Downtown	Assault

WorkWithPOI(BadgeNumber: integer, ID: integer)

BADGENUMBER	ID
1	1
3	9
3	10
4	14
5	6

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CaseInvolvesPOI(CAID: integer, ID: integer)

CAID	ID
1800001	5
1800002	5
1800002	7
1800003	5
1800003	6
1800004	5
1800005	5
1800005	9
1800005	10
1800006	5

CommitCrime(CRID: integer, CID: integer, CAID: integer)

CRID	CID	CAID
1010	1	1800001
1010	1	1800002
1010	4	1800003
1012	5	1800005
1015	3	1800002
1016	2	1800004

## All SQL Queries

### INSERT

```
INSERT INTO Cases VALUES ($caid, DATE '$date', 'N/A', 'Active');
INSERT INTO DetectiveCaseManagement VALUES ($dbnum, $caid);
INSERT INTO CrimeInCase VALUES ($caid, $crimeid, '$crimeloc', '$crimetype');
```

### UPDATE

```
UPDATE Cases SET Cases.CaseStatus='$status', Cases.Result='$result' WHERE Cases.CAID = $caseid;
```

### DELETE

```
DELETE FROM Cases WHERE Cases.CAID=$caseid;
```

### Selection

```
SELECT * FROM $selection WHERE DBadgeNumber = $badgeNo;
SELECT * FROM $selection WHERE BadgeNumber = $badgeNo;
SELECT * FROM DetectiveCaseManagement WHERE BadgeNumber = $badgeNo;
```

### Projection

```
SELECT $cols FROM Cases;
```

### Join

```
SELECT Cases.CAID, Cases.DateLogged, Detective.Name, CrimeInCase.CrimeType,
CrimeInCase.Location FROM Cases
    FULL OUTER JOIN DetectiveCaseManagement ON
        DetectiveCaseManagement.CAID = Cases.CAID
    FULL OUTER JOIN Detective ON
        DetectiveCaseManagement.BadgeNumber =
Detective.DBadgeNumber
    FULL OUTER JOIN CrimeInCase ON
        Cases.CAID = CrimeInCase.CAID
WHERE Cases.CAID = $caseNo;
```



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### Aggregation with GROUP BY

```
SELECT Count(CAID) FROM Cases WHERE CaseStatus = 'Active' GROUP BY CaseStatus;  
SELECT Count(CAID) FROM Cases WHERE CaseStatus = 'Inactive' GROUP BY CaseStatus;
```

### Aggregation with HAVING

```
SELECT Criminal.CID, Criminal.Name  
      FROM Cases  
      JOIN CommitCrime ON Cases.CAID == CommitCrime.CAID  
      JOIN Criminal ON CommitCrime.CID == Criminal.CID  
      GROUP BY Criminal.CID, Criminal.Name, Criminal.TimesArrested  
      HAVING COUNT(Cases.CAID) >= $mostWanted;
```

### Nested Aggregation with GROUP BY

```
SELECT c1.Location, COUNT(c1.location) as lcount  
      FROM CrimeInCase c1  
      GROUP BY c1.Location  
      HAVING COUNT(c1.location) >= ALL(SELECT COUNT(c2.Location)  
                                       FROM CrimeInCase c2  
                                       GROUP BY c2.Location);
```

### Division

```
SELECT poi.ID as ID, poi.Name as name  
      FROM PeopleOfInterest poi  
      WHERE NOT EXISTS  
            ((SELECT Cases.CAID  
              FROM Cases)  
             MINUS  
             (SELECT CaseInvolvesPOI.CAID  
              FROM CaseInvolvesPOI  
              WHERE CaseInvolvesPOI.ID = poi.ID));
```

## Screenshots of Query Results

(For some of the screenshots, we don't have a "before" output built into GUI)

### INSERT

CAID	DateLogged	Result	CaseStatus
1800001	06-JUN-22	N/A	Active
1800002	10-NOV-22	N/A	Active
1800003	18-MAY-22	N/A	Active
1800004	11-JUL-22	Guilty	Inactive
1800005	05-JAN-22	Dead	Inactive
1800006	22-NOV-22	Dead	Inactive

CAID	DateLogged	Result	CaseStatus
1800001	06-JUN-22	N/A	Active
1800002	10-NOV-22	N/A	Active
1800003	18-MAY-22	N/A	Active
1800004	11-JUL-22	Guilty	Inactive
1800005	05-JAN-22	Dead	Inactive
1800006	22-NOV-22	Dead	Inactive
1800007	24-NOV-22	N/A	Active

### UPDATE

CAID	DateLogged	Result	CaseStatus
1800001	06-JUN-22	N/A	Active
1800002	10-NOV-22	N/A	Active
1800003	18-MAY-22	N/A	Active
1800004	11-JUL-22	Guilty	Inactive
1800005	05-JAN-22	Dead	Inactive
1800006	22-NOV-22	Dead	Inactive
1800007	24-NOV-22	N/A	Active

CAID	DateLogged	Result	CaseStatus
1800001	06-JUN-22	N/A	Active
1800002	10-NOV-22	N/A	Active
1800003	18-MAY-22	N/A	Active
1800004	11-JUL-22	Guilty	Inactive
1800005	05-JAN-22	Dead	Inactive
1800006	22-NOV-22	Dead	Inactive
1800007	24-NOV-22	False Alarm	Inactive

### DELETE

CAID	DateLogged	Result	CaseStatus
1800001	06-JUN-22	N/A	Active
1800002	10-NOV-22	N/A	Active
1800003	18-MAY-22	N/A	Active
1800004	11-JUL-22	Guilty	Inactive
1800005	05-JAN-22	Dead	Inactive
1800006	22-NOV-22	Dead	Inactive
1800007	24-NOV-22	N/A	Active

CAID	DateLogged	Result	CaseStatus
1800001	06-JUN-22	N/A	Active
1800002	10-NOV-22	N/A	Active
1800003	18-MAY-22	N/A	Active
1800004	11-JUL-22	Guilty	Inactive
1800005	05-JAN-22	Dead	Inactive
1800006	22-NOV-22	Dead	Inactive

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### Selection

DBadgeNumber	PCBadgeNumber	PrecinctNumber	Name	Rank	PhoneNumber
1	100	95	Batman	Vigilante	888-888-8888
2	100	95	Jim Gordon	Lieutenant	487-581-2945
3	200	96	Sherlock Holmes	Chief	555-555-5555
4	300	97	Inspector Gadget	Inspector	234-432-1234
5	300	97	Curious George	Inspector	180-222-3343

Badge	PoliceChiefBadge	Precinct#	Name	Rank	Phone#
1	100	95	Batman	Vigilante	888-888-8888

### Projection

CAID	DateLogged	Result	CaseStatus
1800001	06-JUN-22	N/A	Active
1800002	10-NOV-22	N/A	Active
1800003	18-MAY-22	N/A	Active
1800004	11-JUL-22	Guilty	Inactive
1800005	05-JAN-22	Dead	Inactive
1800006	22-NOV-22	Dead	Inactive

CAID	CaseStatus
1800001	Active
1800002	Active
1800003	Active
1800004	Inactive
1800005	Inactive
1800006	Inactive

### Join

CAID	DateLogged	Result	CaseStatus
1800001	06-JUN-22	N/A	Active
1800002	10-NOV-22	N/A	Active
1800003	18-MAY-22	N/A	Active
1800004	11-JUL-22	Guilty	Inactive
1800005	05-JAN-22	Dead	Inactive
1800006	22-NOV-22	Dead	Inactive

CAID	DateLogged	Detective	CrimeType	CrimeLocation
1800001	06-JUN-22	Batman	Murder	Downtown

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## Aggregation with GROUP BY

CAID	DateLogged	Result	CaseStatus
1800001	06-JUN-22	N/A	Active
1800002	10-NOV-22	N/A	Active
1800003	18-MAY-22	N/A	Active
1800004	11-JUL-22	Guilty	Inactive
1800005	05-JAN-22	Dead	Inactive
1800006	22-NOV-22	Dead	Inactive

**Total Open Cases:**

3

**Total Closed Cases:**

3

## Aggregation with HAVING

CAID	DateLogged	Result	CaseStatus
1800001	06-JUN-22	N/A	Active
1800002	10-NOV-22	N/A	Active
1800003	18-MAY-22	N/A	Active
1800004	11-JUL-22	Guilty	Inactive
1800005	05-JAN-22	Dead	Inactive
1800006	22-NOV-22	Dead	Inactive

**Criminal(s) involved in >= 2 cases:**

Criminal ID	Name
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1	Jawa
---	------

## Nested Aggregation with GROUP BY

CAID	CRID	LOCATION	CRIMETYPE
1800001	1010	Downtown	Murder
1800002	1015	Mount Pleasant	BE
1800002	1010	Mount Pleasant	Murder
1800003	1010	Yaletown	Murder
1800004	1016	Waterfront	Drug Dealing
1800005	1012	Downtown	Assault

Location	Number of Crimes
Mount Pleasant	2
Downtown	2

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### Division

ID	Name	Address	Contact
1	Peter Griffin	31 Spooner St	petergriffinfunny@yahoo.com
2	Eric Cartman	1542 Colorado Spring Rd	respectmahauthoritah@southpark.com
3	Tyler Blevins	9400 San Francisco St	ninja@twitch.tv
4	John Cena	5545 BingQilin Ave	cantseeme@wwe.com
5	Pooh Shiesty	420 Drill Rd	reallyshiesty@rapper.com
6	Lebron James	0623 Goat Dr	goat@nba.com
7	Odell Beckham Jr.	1313 One Hand St	obj@nfl.com
8	Dave Chappelle	2134 Comedy St	davechappelle@comedy.com
9	Will Smith	2451 Bel Air Dr	wildwest@acting.com
10	Chris Rock	4444 Oscar St	slapped@acting.com
11	Mr. Bean	0592 Great St	mrbean@acting.com
12	Undertaker	100-5055 Forsyth Commerce Rd	undertaker@wwe.com
13	Patrick Star	2 Rock St	starpatrick@bbmail.com
14	Homer Simpson	742 Evergreen Terrace	homesimp@small.com
15	Bender Rodríguez	#1 Apt The Future	bitemyshinymetal@ssfuture.com

ID      Name  
5   Pooh Shiesty