

# Set Operations: Solutions

## Schema

Student( <u>sID</u> , surName, firstName, campus, email, cgpa)	Offering[dept, cNum] $\subseteq$ Course[dept, cNum]
Course( <u>dept</u> , <u>cNum</u> , name, breadth)	Took[sID] $\subseteq$ Student[sID]
Offering( <u>oID</u> , dept, cNum, term, instructor)	Took[oID] $\subseteq$ Offering[oID]
Took( <u>sID</u> , <u>oID</u> , grade)	

## Questions

1. Assuming bag semantics, compute the following:

(a)  $\{1, 1, 1, 3, 7, 7, 8\} \cup \{1, 5, 7, 7, 8, 8\}$

(b)  $\{1, 1, 1, 3, 7, 7, 8\} \cap \{1, 5, 7, 7, 8, 8\}$

(c)  $\{1, 1, 1, 3, 7, 7, 8\} - \{1, 5, 7, 7, 8, 8\}$

### Solution:

Remember that these are sets, and so order doesn't matter. The questions were presented in order to make it easier on your eyeballs.

(a)  $\{1, 1, 1, 3, 7, 7, 8\} \cup \{1, 5, 7, 7, 8, 8\} = \{1, 1, 1, 3, 7, 7, 8, 1, 5, 7, 7, 8, 8\} = \{1, 1, 1, 1, 3, 5, 7, 7, 7, 7, 8, 8, 8\}$

(b)  $\{1, 1, 1, 3, 7, 7, 8\} \cap \{1, 5, 7, 7, 8, 8\} = \{1, 7, 7, 8\}$

(c)  $\{1, 1, 1, 3, 7, 7, 8\} - \{1, 5, 7, 7, 8, 8\} = \{1, 1, 3\}$

2. Write a query to find all terms when Jepson and Suzuki were both teaching. Include duplicates of the same term.

### Solution:

```
(select Term from Offering where instructor = 'Suzuki')
intersect all
(select Term from Offering where instructor = 'Jepson');
```

### Output:

```

term
-----
20089
20081
20081
(3 rows)

```

3. Find the sID of students who have earned a grade of 85 or more in some course, or who have passed a course taught by Atwood. Use views for the intermediate steps. Do not include duplicates in the result.

**Solution:**

```

create view High as
(select sid from took where grade >= 85);

create view HighAtwood as
(select sid
from Took, Offering
where Took.oid = Offering.oid and instructor = 'Atwood' and grade >= 50);

(select * from high)
union
(select * from highAtwood);

```

**Output:**

```

sid
-----
98000
99132
99999
157
(4 rows)

```

4. Find all terms when csc369 was not offered.

**Solution:**

```

(select term
from Offering)
except
(select term
from Offering
where dept = 'csc' and cNum = 369);

```

**Output:**

```

term
-----
20081
20089

```