

Ben and Jerry's sample query solutions

1. What are the names of all our base flavors?

```
select name from flavor;
```

2. What are all the base flavors that cost more than 20¢ per gallon?

```
select name from flavor where costpercarton > .2;
```

3. Which recipe is currently running on assembly line #3?

```
select recipe from assemblyLine where id=3;
```

4. How many freezers do we have? And how many different models of freezer (*i.e.*, how many different-sized freezers) do we have?

```
select count() from freezer;  
  
select count(distinct capacity) from freezer;
```

5. What flavor is currently being stored in freezer ID #5, and what percent full is that freezer?

```
select flavor.name, 100.0*load/capacity as howfull from freezer, flavor  
where freezer.id=5 and freezerid=5;
```

6. Cow illness has left our region with a shortage of vanilla and banana ice cream. We need to get our head around the problem. How many cartons have been ordered of flavors that use one of those base flavors?

```
select sum(cartonsOrdered) from recipe where flavorname in ('vanilla','banana');
```

7. On average, how full are our freezers?

- (a) Kinda two different ways to answer this. Way one is to consider each freezer individually, compute its “fullness,” then average the “fullnesses.”

```
select avg(100.0*load/capacity) as avg_fullness from freezer;
```

- (b) Way two is to look at the fullness of the factory as a whole: considering all our available capacity, including all freezers, what percentage of it is being currently used?

```
select 100.0 * sum(load)/sum(capacity) as factory_fullness from freezer;
```

8. How many cartons per minute of New York Super Fudge Chunk ice cream is our factory currently assembling?

```
select sum(capacity) from assemblyLine where recipe='NYSFC';
```

9. Which flavors of ice cream are currently running on assembly lines #2 and #3?

```
select flavorname from recipe join assemblyLine on recipe.name = assemblyLine.recipe
where assemblyLine.id in (2,3);
```

10. How many ounces of brownies do we currently have in containers?

```
select sum(load) from container where mixin_name='brownies';
```

11. Which containers have more than 20 oz. of graham cracker crumbs?

```
select container_id from container where load>20 and mixin_name='graham crackers';
```

12. Which recipes use at least one expensive mixin? (ie., those over \$.12/oz)

```
select distinct recipe_name from ingredients join mixin on mixin_name=name
where costperoz>0.12;
```

13. Which assembly lines are currently using chocolate or vanilla, and what are their capacities?

```
select id, capacity
from assemblyLine join recipe on assemblyLine.recipe=recipe.name
where flavorname in ('chocolate','vanilla');
```

14. Which refrigerated mixins are currently being added to assembly line #3?

```
select mixin_name from ingredients, assemblyLine, mixin
where ingredients.recipe_name = assemblyLine.recipe
and ingredients.mixin_name = mixin.name
and assemblyLine.id=3 and needsRef='yes';
```

15. Yikes we've just learned that some of our containers were made out of a defective plastic which, in even trace amounts, reacts explosively to contact with chocolate ice cream. Quick: which of our containers are holding contents that could possibly be used in a chocolate-ice-cream-based recipe?

```
select distinct container_id from container, ingredients, recipe
where container.mixin_name=ingredients.mixin_name and
recipe.name=ingredients.recipe_name and
recipe.flavorName = 'chocolate';
```

16. In light of the previous health emergency, which are our known “safe” containers; *i.e.*, the ones containing only mixins that are never used in chocolate ice cream?

```
with choc_containers as
  (select distinct container_id from container, ingredients, recipe
   where container.mixin_name=ingredients.mixin_name and
   recipe.name=ingredients.recipe_name and
   recipe.flavorName = 'chocolate')
select container_id from container where container_id not in choc_containers;
```

(Note that this does *not* work:

```
select distinct container_id from container, ingredients, recipe
  where container.mixin_name=ingredients.mixin_name and
  recipe.name=ingredients.recipe_name and
  recipe.flavorName <> 'chocolate';
```

since this will match mixins that are used in any non-chocolate-based recipe, regardless of whether they are also used in some chocolate-based recipe. It would mistakenly say “container #17 is safe, since it contains walnuts which are used in Maple Walnut Crunch, a recipe based on maple ice cream,” whereas little does it realize that walnuts are *also* used in New York Super Fudge Chunk, a chocolate-based recipe.)